Civil Aviation Authority

CAR OPS-3
Civil Aviation Regulation
Commercial Air Transport Operations (Helicopter)

Effective: 23rd October 2025

Approved by: H.E. Eng. Naif Ali Hamed Al Abri

(President of Civil Aviation Authority)

CORRIGENDUM OF AMENDMENTS

No.	Rev.	Year	Description
01	00	1999	Original Issue
02	01	2010	Amendment to Original Issue
03	02	2011	Amendment to Rev.1
04	03	2023	Amendment to Rev.2 The regulation has been comprehensively amended/ updated to include: Latest information from relevant ICAO Annexes 2, 3, 6, 8, 14, 16 and 18, Docs and State Letters in accordance with the State's EFOD; Based on amendments to Annex 06 Part III Ed 11 the following changes are made to:- • CAR OPS 3.003 Terminology • CAR OPS-3.170 Aircraft Operated under an Article 83 *bis* Agreement • CAR OPS 3.230 Departure and Approach Procedures (obstacle clearance criteria) • AMC OPS 3.295 (C) (i) Selection of Heliports with respect to final fuel reserve • CAR OPS 3.430 Heliport Operating Minima with use of HUD Appx 1 to Ops 3.450 on LVO using Hybrid Systems • CAR OPS 3.470 Performance • CAR OPS 3.725 Air Borne Image Recorders (AIRS) CAR OPS 3.795 Built in Lavatory Fire Extinguisher • CAR OPS 3.1140 Fatigue Risk Management System (FRMS) • Editing/ formatting changes
05	04	2024	The regulation has been amended to include Adoption of Amendment 25 to ICAO Annex 6, Part III and other necessary amendments and formatting: • CAR OPS-3.002 Transition Period; • CAR OPS-3.003 Terminology; • CAR OPS-3.005 General • CAR OPS-3.040 Additional crew members • CAR OPS-3.080 Duties of flight operations officer/flight dispatcher • CAR OPS-3.160 Preservation, production and use of flight recorder recordings • Appendix 1 to CAR OPS-3.005 Operator Requirements for Operations • Appendix 2 to CAR OPS 3.005 Commercial Air Transport. General Requirements • Appendix 1 to CAR OPS-3.005(d) Helicopter Emergency Medical Service • Appendix 1 to OPS CAR-3.005(e) Helicopter Operations over a Hostile Environment Located Outside a Congested Area • Appendix 1 to CAR OPS-3.005(f) Operations for Small Helicopters (VFR Day Only) • Appendix 1 to CAR OPS-3.005(g) Helicopter Hoist Operations (HHO) • Appendix 1 to CAR OPS-3.005(h) Helicopter Operations at a Public Interest Site • Appendix 1 to CAR OPS-3.005(i) Helicopter Operations with Night Vision Imaging Systems • Appendix 1 to CAR OPS-3.005(j) Helicopter Offshore Operations • Appendix 1 to CAR OPS-3.005(k) Helicopter External Slung Load Operations • AC to Appendix 1 to CAR OPS-3.005(i) Helicopter Operations with Night Vision Imaging Systems • AC to Appendix 1 to CAR OPS-3.005(k) Helicopter External Slung Load Operations • CAR OPS-3.710 Flight Data Recorders – Helicopters of between 2,250 kg and 3,175 kg • CAR OPS-3.740 Placards • CAR OPS-3.943 Initial Operator's Crew Resource Management (CRM) training • Appendix 1 to CAR OPS-3.1045 Operations Manual Contents • CAR OPS-3.1103 Standard provisions applicable to a scheme • CAR OPS-3.1105 Maximum Daily Flight Duty Period (FDP) • CAR OPS-3.1115 Fatigue risk management system (FRMS) • CAR OPS-3.1165 Flight Time Limitations (FTL) and Flight Duty Period (FDP) – All Operations
06	05	2025	The regulation has been amended to include Approval of Amendment 26 to ICAO Annex 6, Part III and other necessary amendments and formatting: • CAR OPS-3.445 Low visibility operations – Heliport considerations • AMC OPS 3.295 (e)(5) In-flight procedures: Meteorological Observations

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GLOSSARY OF TERMS AND ABBREVIATIONS

The following terms or acronyms may be used in any manual or document published by CAA. Reproduction in part or whole is allowed without prior approval. The Document Control Office reserves the rights to include such a listing in any CAA manual or document prior to publishing.

ACAS II	Airborne Collision Avoidance System
AC	Advisory Circular
ACC	Area Control Centre
ACCID	Accident
ADREP	Accident/Incident Reporting System
ADRS	Aircraft data recording system
ADS-C	Automatic dependent surveillance - contract
AFIS	Heliport Flight Information Service
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIR	Airborne image recorder
AIRS	Airborne image recording system
AIS	Aeronautical Information Service
A/C	Aircraft
AMC	Acceptable Means of Compliance
AMSL	Above Mean Sea Level
AOC	Air Operator Certificate
APCH	Approach
APP	Approach Control Office
ARO	Air Traffic Services Reporting Office
ATC	Air Traffic Control
ATS	Air Traffic Service
CAA	Civil Aviation Authority
CAR	Civil Aviation Regulation
CFMU	Central Flow Management Unit
CFIT	Controlled flight into terrain
COM	Communications/Equipment
DA	Decision Altitude
DA/H	Decision Altitude/ Height
DH	Decision Height
ELT	Emergency Locator transmitter
FATO	Final approach and take-off area
FDR	Flight Data Recorder
FIC	Flight Information Centre
FIS	Flight Information Service
GM	Guidance Material
HUD	Head-up display
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation

IEM	Interpretative Explanatory Material
IFR	Instrument flight rules
IIC	Investigator in Charge
ILS	Instrument landing system
INCID	Serious Incident
ISA	International standard atmosphere
MDA	Minimum descent altitude
Minister	Minister of Transport, Communication and IT
MMEL	Master minimum equipment list
NOTAM	Notice to Airmen
NPA	Notice of Proposed Amendment
NVA	Night vision imaging altitude
OCA	Obstacle clearance altitude
OTSB	Oman Transport Safety Bureau
PANS	Procedure for Air Navigation Services
PBN	Performance based navigation
PL	Policy Lead
RCC	Rescue Co-ordination Centre of the Sultanate
RNAV	Area Navigation
RPN	Required navigation performance
RVR	Runway visual range
SAR	Search and Rescue
SIGMET	Significant Meteorological Report
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
TCAS	Traffic Alert and Collision Avoidance System (TCAS II or TCAS X)
TDP	Take-off decision point
VFR	Visual flight rules
VNAV	Vertical navigation
TL	Technical Lead
UTC	Universal Time Coordinated
VHF	Very High Frequency
WX	Weather

FOREWORD

(a) Enforcement Procedures ensuring compliance against Civil Aviation Regulations (CAR-12) which has been issued by the Civil Aviation Authority of Oman (hereinafter referred as CAA or "the Authority") under the provisions of the Civil Aviation Law of the Sultanate of Oman.

(b) This CAR has been modelled upon similar regulations implemented by other member states and includes the subject matter endorsed within ICAO Annexes [Annexes 2, 3, 6, 8, 14, 16 and 18 and the relevant ICAO Documents]

(c) CAR OPS-3 prescribes the requirements for:

  (1) The establishing, implementation, and the maintaining of compliance requirements for Commercial Air Transport Operators (Helicopters).

  (2) The applicable punitive actions that can and will be enforced by the Authority against recognised actions of non-compliance.

(d) Amendments to the text in CAR OPS-3 in revised editions are issued as a complete amendment of pages contained within.

(e) The editing practices used in this document are as follows:

  (1) 'Shall' is used to indicate a mandatory requirement and may appear in CARs.

  (2) 'Should' is used to indicate a recommendation

  (3) 'May' is used to indicate discretion by the Authority, or the industry as appropriate.

  (4) 'Will' indicates a mandatory requirement and is used to advise of action incumbent on the Authority.

Note: The use of the male gender implies the female gender and vice versa.

SECTION 1 - SUBPART A – APPLICABILITY

CAR OPS-3.001 Applicability

(a) CAR OPS-3 prescribes requirements applicable to the operation of any civil Helicopter for the purpose of commercial air transportation by any operator whose principal place of business is in the Sultanate of Oman and the operator has been issued an Aircraft Operating Certificate, as the economic authority.

(b) CAR OPS-3 does not apply to Helicopters when used in military, customs and police services; nor:

 (1) to parachute dropping and firefighting flights, and to associated positioning and return flights in which the persons carried are those who would normally be carried on parachute dropping or firefighting; nor

 (2) to flights immediately before, during, or immediately after an aerial work activity provided these flights are connected with that aerial work activity and in which, excluding crew members, no more than six (6) person's, indispensable to the aerial work activity are carried.

CAR OPS-3.002 Transition Period

(a) All new applications by operators shall be in full compliance with this revision of CAR OPS-3.

(b) All operators are required to be compliant with this regulation by the 26th November 2025, unless approval has been granted by the Authority upon application.

CAR OPS-3.003 Terminology

Terms used in CAR OPS-3 have the following meaning:

***Advanced aircraft**. An aircraft with equipment in addition to that required for a basic aircraft for a given take-off, approach or landing operation.*

***Aerial work**. An aircraft operation in which an aircraft is used for specialized services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement, etc.*

***Aerodrome**. A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.*

***Agreement summary**. When an aircraft is operating under an Article 83 bis agreement between the State of Registry and another State, the agreement summary is a document transmitted with the Article 83 bis Agreement registered with the ICAO Council that identifies succinctly and clearly which functions and duties are transferred by the State of Registry to that other State.*

Note: The other State in the above definition refers to either the State of the Operator for commercial air transport operations or, for general aviation operations, to the State of the principal location of a general aviation operator.

***Aircraft.** Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface.*

***Aircraft operating manual**. A manual, acceptable to the State of the Operator, containing normal, abnormal and emergency procedures, checklists, limitations, performance information, details of the aircraft systems and other material relevant to the operation of the aircraft.*

Note: The aircraft operating manual is part of the operations manual.

***Air operator certificate (AOC).** A certificate authorizing an operator to carry out specified commercial air transport operations.*

***Air traffic service (ATS**). A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).*

***Airworthy**. The status of an aircraft, engine, propeller or part when it conforms to its approved design and is in a condition for safe operation.*

Alternate heliport. *A heliport to which a helicopter may proceed when it becomes either impossible or inadvisable to proceed to or to land at the heliport of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate heliports include the following:*

Take-off alternate. *An alternate heliport at which a helicopter would be able to land should this become necessary shortly after take-off and it is not possible to use the heliport of departure.*

En-route alternate. *An alternate heliport at which a helicopter would be able to land in the event that a diversion becomes necessary while en-route.*

Destination alternate. *An alternate heliport at which a helicopter would be able to land should it become either impossible or inadvisable to land at the heliport of intended landing.*

Note: The heliport from which a flight departs may be an en-route or a destination alternate heliport for that flight.

Approach and landing phase *— helicopters. That part of the flight from 300 m (1 000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or from the commencement of the descent in the other cases, to landing or to the balked landing point.*

Appropriate airworthiness requirements. *The comprehensive and detailed airworthiness codes established, adopted or accepted by a Contracting State for the class of aircraft, engine or propeller under consideration.*

Appropriate ATS authority. The relevant authority designated by the State responsible for providing air traffic services in the airspace concerned.

Area navigation (RNAV). *A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.*

Note: Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

Basic aircraft. *An aircraft which has the minimum equipment required to perform the intended take-off, approach or landing operation.*

Cabin crew member. *A crew member who performs, in the interest of safety of passengers, duties assigned by the operator or the pilot-in-command of the aircraft, but who shall not act as a flight crew member.*

COMAT. *Operator material carried on an operator's aircraft for the operator's own purposes.*

Combined vision system (CVS). *A system to display images from a combination of an enhanced vision system (EVS) and a synthetic vision system (SVS).*

Commercial air transport operation. *An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire.*

Configuration deviation list (CDL). *A list established by the organization responsible for the type design with the approval of the State of Design which identifies any external parts of an aircraft type which may be missing at the commencement of a flight, and which contains, where necessary, any information on associated operating limitations and performance correction.*

Congested area. *In relation to a city, town or settlement, any area which is substantially used for residential, commercial or recreational purposes.*

Congested hostile environment. *A hostile environment within a congested area.*

Continuing airworthiness. *The set of processes by which an aircraft, engine, rotor or part complies with the applicable airworthiness requirements and remains in a condition for safe operation throughout its operating life.*

Continuing airworthiness records. *Records which are related to the continuing airworthiness status of an aircraft, engine, rotor or associated part.*

Continuous descent final approach (CDFA). *A technique, consistent with stabilized approach procedures, for flying the final approach segment (FAS) of an instrument non-precision approach (NPA) procedure as* *a continuous descent, without level-off, from an altitude/height at or above the final approach fix altitude/height to a point approximately 15 m (50 ft) above the landing runway threshold or the point where the flare manoeuvre begins for the type of aircraft flown; for the FAS of an NPA procedure followed by a circling approach, the CDFA technique applies until circling approach minima (circling OCA/H) or visual flight manoeuvre altitude/height are reached.*

***Crew member**. A person assigned by an operator to duty on an aircraft during a flight duty period.*

***Dangerous goods**. Articles or substances which are capable of posing a risk to health, safety, property or the environment and which are shown in the list of dangerous goods in the Technical Instructions or which are classified according to those Instructions.*

Note: Dangerous goods are classified in Annex 18, Chapter 3.

***Decision altitude (DA) or decision height (DH).** A specified altitude or height in a three-dimensional (3D) instrument approach operation at which a missed approach must be initiated if the required visual reference to continue the approach has not been established.*

Note 1: Decision altitude (DA) is referenced to mean sea level and decision height (DH) is referenced to the threshold elevation.

Note 2: The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In Category III operations with a decision height the required visual reference is that specified for the particular procedure and operation.

Note 3: For convenience where both expressions are used they may be written in the form "decision altitude/height" and abbreviated "DA/H".

***Defined point after take-off (DPATO**). The point, within the take-off and initial climb phase, before which the helicopter's ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.*

Note: Defined points apply to helicopters operating in performance Class 2 only.

***Defined point before landing (DPBL).** The point, within the approach and landing phase, after which the helicopter's ability to continue the flight safely, with one engine inoperative, is not assured and a forced landing may be required.*

Note: Defined points apply to helicopters operating in performance Class 2 only.

***Duty**. Any task that flight or cabin crew members are required by the operator to perform, including flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue.*

***Duty period.** A period which starts when a flight- or cabin-crew member is required by an operator to report for or to commence a duty and ends when that person is free from all duties.*

***Electronic flight bag (EFB**). An electronic information system, comprised of equipment and applications for flight crew, which allows for the storing, updating, displaying and processing of EFB functions to support flight operations or duties.*

***Elevated heliport**. A heliport located on a raised structure on land.*

***Emergency locator transmitter (ELT**). A generic term describing equipment which broadcast distinctive signals on designated frequencies and, depending on application, may be automatically activated by impact or be manually activated. An ELT may be any of the following:*

***Automatic fixed ELT (ELT(AF)).** An automatically activated ELT which is permanently attached to an aircraft.*

***Automatic portable ELT (ELT(AP)).** An automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft.*

***Automatic deployable ELT (ELT(AD)).** An ELT which is rigidly attached to an aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided.*

***Survival ELT (ELT(S)).** An ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an* *emergency, and manually activated by survivors.*

Engine. *A unit used or intended to be used for aircraft propulsion. It consists of at least those components and equipment necessary for functioning and control, but excludes the propeller/rotors (if applicable).*

Enhanced vision system (EVS). *A system to display electronic real-time images of the external scene achieved through the use of image sensors.*

Note: EVS does not include night vision imaging systems (NVIS).

En-route phase*. That part of the flight from the end of the take-off and initial climb phase to the commencement of the approach and landing phase.*

Note: Where adequate obstacle clearance cannot be guaranteed visually, flights must be planned to ensure that obstacles can be cleared by an appropriate margin. In the event of failure of the critical engine, operators may need to adopt alternative procedures.

Fatigue*. A physiological state of reduced mental or physical performance capability resulting from sleep loss, extended wakefulness, circadian phase, and/or workload (mental and/or physical activity) that can impair a person's alertness and ability to perform safety-related operational duties.*

Fatigue Risk Management System (FRMS)*. A data-driven means of continuously monitoring and managing fatigue-related safety risks, based upon scientific principles and knowledge as well as operational experience that aims to ensure relevant personnel are performing at adequate levels of alertness.*

Filed flight plan (FPL or eFPL). The latest flight plan as submitted by the pilot, an operator or a designated representative for use by ATS units.

Note: The FPL denotes a filed flight plan exchanged using aeronautical fixed service while eFPL denotes a filed flight plan exchanged using FF-ICE services. The eFPL allows for the exchange of additional information not contained within the FPL

Final approach and take-off area (FATO*). A defined area over which the final phase of the approach manoeuvre to hover or landing is completed and from which the take-off manoeuvre is commenced. Where the FATO is to be used by helicopters operating in performance Class 1, the defined area includes the rejected take-off area available.*

Final approach segment (FAS). *That segment of an instrument approach procedure in which alignment and descent for landing are accomplished.*

Flight crew member. *A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.*

Flight duty period*. A period which commences when a flight or cabin crew member is required to report for duty that includes a flight or a series of flights and which finishes when the aircraft finally comes to rest and the engines are shut down at the end of the last flight on which he/she is a crew member.*

Flight manual*. A manual, associated with the certificate of airworthiness, containing limitations within which the aircraft is to be considered airworthy, and instructions and information necessary to the flight crew members for the safe operation of the aircraft.*

Flight operations officer/flight dispatcher*. A person designated by the operator to engage in the control and supervision of flight operations, whether licensed or not, suitably qualified in accordance with Annex 1, who supports, briefs and/or assists the pilot-in-command in the safe conduct of the flight.*

Flight plan*. Specified information relative to an intended flight or portion of a flight of an aircraft.*

Note 1: The term flight plan may be prefixed by the words "preliminary", "filed", "current" or "operational" to indicate the context and different stages of a flight.

Note 2: When the word "message" is used as a suffix to this term, it denotes the content and format of the flight plan data as transmitted.

Flight recorder*. Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.*

Automatic deployable flight recorder (ADFR). *A combination flight recorder installed on the aircraft which* *is capable of automatically deploying from the aircraft.*

***Flight safety documents system**. A set of interrelated documentation established by the operator, compiling and organizing information necessary for flight and ground operations, and comprising, as a minimum, the operations manual and the operator's maintenance control manual.*

***Flight simulation training device**. Any one of the following three types of apparatus in which flight conditions are simulated on the ground:*

***A flight simulator**, which provides an accurate representation of the flight deck of a particular aircraft type to the extent that the mechanical, electrical, electronic, etc. aircraft systems control functions, the normal environment of flight crew members, and the performance and flight characteristics of that type of aircraft are realistically simulated;*

***A flight procedures trainer**, which provides a realistic flight deck environment, and which simulates instrument responses, simple control functions of mechanical, electrical, electronic, etc. aircraft systems, and the performance and flight characteristics of aircraft of a particular class;*

***A basic instrument flight trainer**, which is equipped with appropriate instruments, and which simulates the flight deck environment of an aircraft in flight in instrument flight conditions.*

***Flight time — helicopters**. The total time from the moment a helicopter's rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight, and the rotor blades are stopped.*

***General aviation operation**. An aircraft operation other than a commercial air transport operation or an aerial work operation.*

***Ground handling**. Services necessary for an aircraft's arrival at, and departure from, an airport, other than air traffic services.*

***Head-up display (HUD**). A display system that presents flight information into the pilot's forwardexternal field of view.*

***Helicopter.** A heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes.*

Note: Some States use the term "rotorcraft" as an alternative to "helicopter"

***Helideck.** A heliport located on a floating or fixed offshore structure.*

***Heliport**. An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.*

Note 1: Throughout this Part, when the term "heliport" is used, it is intended that the term also applies to aerodromes primarily meant for the use of aeroplanes.

Note 2: Helicopters may be operated to and from areas other than heliports.

***Heliport operating minima**. The limits of usability of a heliport for:*

a) take-off, expressed in terms of runway visual range and/or visibility and, if necessary, cloud conditions;

b) landing in 2D instrument approach operations, expressed in terms of visibility and/or runway visual range, minimum descent altitude/height (MDA/H) and, if necessary, cloud conditions; and

c) landing in 3D instrument approach operations, expressed in terms of visibility and/or runway visual range and decision altitude/height (DA/H) as appropriate to the type and/or category of the operation.

***Hostile environment**. An environment in which:*

a) a safe forced landing cannot be accomplished because the surface and surrounding environment are inadequate; or

b) the helicopter occupants cannot be adequately protected from the elements; or

c) search and rescue response/capability are not provided consistent with anticipated exposure; or

d) there is an unacceptable risk of endangering persons or property on the ground.

***Human Factors principles**. Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.*

***Human performance**. Human capabilities and limitations which have an impact on the safety, security and efficiency of aeronautical operations.*

***Instrument approach operations**. An approach and landing using instruments for navigation guidance based on an instrument approach procedure. There are two methods for executing instrument approach operations:*

a) a two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and

b) a three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance.

Note: Lateral and vertical navigation guidance refers to the guidance provided either by:

a) a ground-based radio navigation aid; or

b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these.

***Instrument approach procedure (IAP).** A series of predetermined manoeuvres by reference to flight instruments with specified protection from obstacles from the initial approach fix, or where applicable, from the beginning of a defined arrival route to a point from which a landing can be completed and thereafter, if a landing is not completed, to a position at which holding or en-route obstacle clearance criteria apply. Instrument approach procedures are classified as follows:*

***Non-precision approach (NPA) procedure**. An instrument approach procedure designed for 2D instrument approach operations Type A.*

Note: Non-precision approach procedures may be flown using a continuous descent final approach (CDFA) technique. CDFAs with advisory VNAV guidance calculated by on-board equipment are considered 3D instrument approach operations. CDFAs with manual calculation of the required rate of descent are considered 2D instrument approach operations. For more information on CDFAs, refer to PANS-OPS (Doc 8168), Volume I, Part II, Section 5.

***Approach procedure with vertical guidance (APV).** A performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A.*

***Precision approach (PA) procedure**. An instrument approach procedure based on navigation systems (ILS, MLS, GLS and SBAS CAT I) designed for 3D instrument approach operations Type A or B.*

***Instrument meteorological conditions (IMC)**. Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.*

Note: The specified minima for visual meteorological conditions are contained in Chapter 4 of ICAO Annex 2.

***Interpretation and Explanatory Material (IEM).** Is guidance material pertaining to respective regulations.*

***Integrated survival suit**. A survival suit which meets the combined requirements of the survival suit and life jacket.*

***Landing decision point (LDP).** The point used in determining landing performance from which, an engine failure occurring at this point, the landing may be safely continued or a balked landing initiated.*

Note: LDP applies only to helicopters operating in performance Class 1.

***Low-visibility operations (LVO).** Approach operations in RVRs less than 550 m and/or with a DH less than 60 m (200 ft) or take-off operations in RVRs less than 400 m.*

***Maintenance.** The performance of tasks on an aircraft, engine, propeller or associated part required to ensure continuing airworthiness of an aircraft, engine, propeller or associated part including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair.*

***Maintenance organization's procedures manual.** A document endorsed by the head of the maintenance organization which details the maintenance organization's structure and management responsibilities, scope of work, description of facilities, maintenance procedures and quality assurance or inspection systems.*

***Maintenance programme**. A document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies.*

***Maintenance release**. A document which contains a certification confirming that the maintenance work to which it relates has been completed in a satisfactory manner in accordance with appropriate airworthiness requirements.*

***Master minimum equipment list (MMEL).** A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures.*

***Maximum mass**. Maximum certificated take-off mass.*

***Minimum descent altitude (MDA) or minimum descent height (MDH**). A specified altitude or height in a 2D instrument approach operation or circling approach operation below which descent must not be made without the required visual reference.*

Note 1: Minimum descent altitude (MDA) is referenced to mean sea level and minimum descent height (MDH) is referenced to the aerodrome elevation or to the threshold elevation if that is more than 2 m (7 ft) below the aerodrome

***elevation.** A minimum descent height for a circling approach is referenced to the aerodrome elevation.*

Note 2: The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path. In the case of a circling approach the required visual reference is the runway environment.

Note 3: For convenience when both expressions are used they may be written in the form "minimum descent altitude/ height" and abbreviated "MDA/H".

***Minimum equipment list (MEL).** A list which provides for the operation of aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.*

***Modification**. A change to the type design of an aircraft, engine or propeller.*

*Note: A modification may also include the embodiment of the modification which is a maintenance task subject to a: **maintenance release**. Further guidance on aircraft maintenance, modification and repair is contained in the Airworthiness Manual (Doc 9760).*

***Navigation specification**. A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:*

***Required navigation performance (RNP) specification**. A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.*

***Area navigation (RNAV) specification**. A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.*

Note 1: The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.

Note 2: The term RNP, previously defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613

***Night**. The hours between the end of evening civil twilight and the beginning of morning civil twilight or such other period between sunset and sunrise, as may be prescribed by the appropriate authority.*

Note: Civil twilight ends in the evening when the centre of the sun's disc is 6 degrees below the horizon and *begins in the morning when the centre of the sun's disc is 6 degrees below the horizon.*

Non-congested hostile environment*. A hostile environment outside a congested area.*

Non-hostile environment*. An environment in which:*

a) *a safe forced landing can be accomplished because the surface and surrounding environment are adequate;*

b) *the helicopter occupants can be adequately protected from the elements;*

c) *search and rescue response/capability are provided consistent with anticipated exposure; and*

d) *the assessed risk of endangering persons or property on the ground is acceptable.*

Note: Those parts of a congested area satisfying the above requirements are considered non-hostile. ***Obstacle clearance altitude (OCA) or obstacle clearance height (OCH).*** *The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable, used in establishing compliance with appropriate obstacle clearance criteria.*

Note 1: Obstacle clearance altitude is referenced to mean sea level and obstacle clearance height is referenced to the threshold elevation or in the case of non-precision approach procedures to the aerodrome elevation or the threshold elevation if that is more than 2 m (7 ft) below the aerodrome elevation. An obstacle clearance height for a circling approach procedure is referenced to the aerodrome elevation.

Note 2: For convenience when both expressions are used they may be written in the form "obstacle clearance altitude/height" and abbreviated "OCA/H".

Offshore operations*. Operations which routinely have a substantial proportion of the flight conducted over sea areas to or from offshore locations. Such operations include, but are not limited to, support of offshore oil, gas and mineral exploitation and sea-pilot transfer.*

Operation*. An activity or group of activities which are subject to the same or similar hazards and which require a set of equipment to be specified, or the achievement and maintenance of a set of pilot competencies, to eliminate or mitigate the risk of such hazards.*

Note: Such activities could include, but would not be limited to, offshore operations, Heli-hoist operations or emergency medical service.

Operational control. *The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.*

Operational credit. *A credit authorized for operations with an advanced aircraft enabling a lower aerodrome operating minimum than would normally be authorized for a basic aircraft, based upon the performance of advanced aircraft systems utilizing the available external infrastructure.*

Operational flight plan*. The operator's plan for the safe conduct of the flight based on considerations of helicopter performance, other operating limitations and relevant expected conditions on the route to be followed and at the heliports concerned.*

Operations in performance Class 1*. Operations with performance such that, in the event of a critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, unless the failure occurs prior to reaching the take-off decision point (TDP) or after passing the landing decision point (LDP), in which cases the helicopter must be able to land within the rejected take-off or landing area.*

Operations in performance Class 2*. Operations with performance such that, in the event of critical engine failure, performance is available to enable the helicopter to safely continue the flight to an appropriate landing area, except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required.*

Operations in performance Class 3. *Operations with performance such that, in the event of an engine failure at any time during the flight, a forced landing will be required.*

Operations manual*. A manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties.*

Operations specifications*. The authorizations including specific approvals, conditions and limitations* *associated with the air operator certificate and subject to the conditions in the operations manual.*

***Operator**. The person, organization or enterprise engaged in or offering to engage in an aircraft operation.*

***Operator's maintenance control manual**. A document which describes the operator's procedures necessary to ensure that all scheduled and unscheduled maintenance is performed on the operator's aircraft on time and in a controlled and satisfactory manner.*

***Performance-based aerodrome operating minimum (PBAOM**). A lower aerodrome operating minimum, for a given take-off, approach or landing operation, than, is available when using a basic aircraft.*

Note 1: The PBAOM is derived by considering the combined capabilities of the aircraft and available ground facilities. Additional guidance material on PBAOM may be found in the Manual of All-Weather Operations (Doc 9365).

Note 2: PBAOM may be based on operational credits.

Note 3: PBAOM are not limited to PBN operations.

***Performance-based communication (PBC**). Communication based on performance specifications applied to the provision of air traffic services.*

Note: An RCP specification includes communication performance requirements that are allocated to system components in terms of the communication to be provided and associated transaction time, continuity, availability, integrity, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

***Performance-based navigation (PBN)**. Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.*

Note: Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

***Performance-based surveillance (PBS).** Surveillance based on performance specifications applied to the provision of air traffic services.*

Note: An RSP specification includes surveillance performance requirements that are allocated to system components in terms of the surveillance to be provided and associated data delivery time, continuity, availability, integrity, accuracy of the surveillance data, safety and functionality needed for the proposed operation in the context of a particular airspace concept.

***Pilot-in-command**. The pilot designated by the operator, or in the case of general aviation, the owner, as being in command and charged with the safe conduct of a flight.*

***Point of no return**. The last possible geographic point at which an aircraft can proceed to the destination aerodrome as well as to an available en-route alternate aerodrome for a given flight.*

Preliminary flight plan (PFP). The information related to a flight submitted by an operator or a designated representative to conduct collaborative planning of a flight, prior to filing a flight plan.

***Psychoactive substances**. Alcohol, opioids, cannabinoids, sedatives and hypnotics, cocaine, other psychostimulants, hallucinogens, and volatile solvents, whereas coffee and tobacco are excluded.*

***Repair.** The restoration of an aircraft, engine or associated part to an airworthy condition in accordance with the appropriate airworthiness requirements after it has been damaged or subjected to wear.*

***Required communication performance (RCP) specification**. A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based communication.*

***Required surveillance performance (RSP) specification**. A set of requirements for air traffic service provision and associated ground equipment, aircraft capability, and operations needed to support performance-based surveillance.*

***Rest period**. A continuous and defined period of time, subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties.*

Runway visual range (RVR). *The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.*

Safe forced landing*. Unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface.*

Safety management system (SMS). *A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.*

Series of flights*. Series of flights are consecutive flights that:*

a) begin and end within a period of 24 hours; and

b) are all conducted by the same pilot-in-command.

Specific approval*. A specific approval is an approval which is documented in the operations specifications for commercial air transport operations or in the list of specific approvals for non-commercial operations.*

Note: The terms authorization, specific approval, approval and acceptance are further described in Attachment D.

Stateof Registry*. The State on whose register the aircraft is entered.*

Note: In the case of the registration of aircraft of an international operating agency on other than a national basis, the States constituting the agency are jointly and severally bound to assume the obligations which, under the Chicago Convention, attach to a State of Registry. See, in this regard, the Council Resolution of 14 December 1967 on Nationality and Registration of Aircraft Operated by International Operating Agencies which can be found in Policy and Guidance Material on the Economic Regulation of International Air Transport (Doc 9587).

State of the Aerodrome*. The State in whose territory the aerodrome is located.*

Note: State of the Aerodrome includes heliports and landing locations.

State of the Operator*. The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.*

State of the principal location of a general aviation operator*. The State in which the operator of a general aviation aircraft has its principal place of business or, if there is no such place of business, its permanent residence.*

Note: Guidance concerning the options for the principal location of a general aviation operator is contained in the Manual on the Implementation of Article 83 bis of the Convention on International Civil Aviation (Doc 10059).

Synthetic vision system (SVS). *A system to display data-derived synthetic images of the external scene from the perspective of the flight deck.*

Take-off and initial climb phase*. That part of the flight from the start of take-off to 300 m (1 000 ft) above the elevation of the FATO, if the flight is planned to exceed this height, or to the end of the climb in the other cases.*

Take-off decision point (TDP). *The point used in determining take-off performance from which, an engine failure occurring at this point, either a rejected take-off may be made or a take-off safely continued.*

Note: TDP applies only to helicopters operating in performance Class 1.

Visual meteorological conditions (VMC). *Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.*

Note: The specified minima are contained in Chapter 4 of ICAO Annex 2.

VTOSS. *The minimum speed at which climb shall be achieved with the critical engine inoperative, the remaining engines operating within approved operating limits.*

Note: The speed referred to above may be measured by instrument indications or achieved by a procedure specified in the flight manual.

CAR OPS-3.004 Operating rules

The holder of a commercial Helicopter operating certificate shall comply with the requirements of Rules of the Air as per CAR-180, unless otherwise specified in this CAR.

CAR OPS-3.005 General

(See Appendix 1&2 to CAR OPS 3.005, Appendix 1 to CAR OPS-3.005 (c), (d), (e), (f), (g), (h), (i), (j)and (k))

(a) An operator shall not operate a Helicopter for the purpose of commercial air transportation other than in accordance with CAR OPS-3.

(b) An operator regulated under this regulation shall comply with the requirements of CAR-M applicable to helicopters operated for the purpose of commercial air transportation.

(c) Each Helicopter shall be operated in compliance with the terms of its Certificate of Airworthiness and within the approved limitations contained in its Helicopter Flight Manual. (See Appendix 1 to CAR OPS-3.005(c).)

(d) Helicopter Emergency Medical Service (HEMS) operations shall be conducted in accordance with the requirements contained in CAR OPS–3 and variations contained in Appendix 1 to CAR OPS- 3.005(d). A specific approval from the CAA is required for HEMS.

(e) Helicopter operations over a hostile environment located outside a congested area shall be conducted in accordance with the requirements contained in CAR OPS-3 except for the variations contained in Appendix 1 to CAR OPS-3.005(e) for which a specific approval is required. This Appendix does not apply to operations conducted in accordance with Appendix 1 to CAR OPS-3.005(d).

(f) Operations with helicopters with a maximum certificated take-off mass (MCTOM) of 3175 kg or less; with a maximum approved passenger seating configuration (MAPSC) of 9 or less; by day; and over routes navigated by reference to visual landmarks shall be conducted in accordance with the requirements contained in CAR OPS-3 except for the variations contained in Appendix 1 to CAR OPS-3.005(f) for which a specific approval is required.

(g) Helicopter Hoist Operations shall be conducted in accordance with the requirements contained in Appendix 1 to CAR OPS-3.005(g) for which a specific approval is required.

(h) Helicopter operations to/from a public interest site shall be conducted in accordance with the requirements contained in Appendix 1 to CAR OPS-3.005 (h) for which a specific approval is required.

(i) Night VFR operations with the aid of Night Vision Imaging Systems (NVIS) shall only be conducted in accordance with CAR OPS-3 and procedures contained in Appendix 1 to CAR OPS 3.005(i). For NVIS operations a specific approval is required.

(j) Helicopter Offshore Operations. Helicopter Offshore Operations shall be conducted in accordance with the requirements contained in Appendix 1 to CAR OPS-3.005(j) for which a specific approval is required.

(k) Helicopter External Slung Load Operations. Helicopter External Slung Load Operations shall be conducted in accordance with the requirements contained in Appendix 1 to CAR OPS-3.005(k) for which a specific approval is required.

(l) All Synthetic Training Devices (STD), such as Flight Simulators or Flight Training Devices (FTD), replacing a helicopter for training and/or checking purposes are to be qualified in accordance with CAR-ORA (Subpart FSTD) requirements and user approved by the Authority for the exercises to be conducted.

CAR OPS-3.010 Exemptions

(a) The Authority may exceptionally and temporarily grant an exemption from the provisions of CAR OPS-3 when satisfied that there is a need and subject to compliance with any supplementary condition the Authority considers necessary in order to ensure an acceptable level of safety in the particular case.

(b) Application for any exemptions will be in accordance with CAR-10 – Exemptions and applied for on an individual basis.

CAR OPS-3.015 Operational Directives

(a) The Authority may direct by means of an Operational Directive that an operation shall be prohibited, limited or subject to certain conditions, in the interests of safe operations.

(b) Operational Directives state:

(1) The reason for issue;

(2) Applicability and duration; and

(3) Action required by the operator(s).

(c) Operational Directives are supplementary to the provisions of CAR OPS-3.

CAR OPS-3.020 Laws, Regulations and Procedures – Operator's Responsibilities

(a) An operator shall ensure that:

(1) All employees are made aware that they shall comply with the laws, regulations and procedures of those States in which operations are conducted and which are pertinent to the performance of their duties; and

(2) All crew members are familiar with the laws, regulations and procedures pertinent to the performance of their duties, prescribed for the areas to be traversed, the heliports/heliports to be used and the air navigation facilities relating thereto.

(3) Other members of the flight crew are familiar with such of these laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the helicopter.

(4) The operator or a designated representative shall have responsibility for operational control.

CAR OPS-3.025 Common Language

(a) An operator must ensure that flight crew members demonstrate the ability to speak and understand the language used for radiotelephony communications.

(b) An operator must ensure that all operations personnel are able to understand the language in those parts of Operations Manual which pertain to their duties and responsibilities are written.

CAR OPS-3.030 Minimum Equipment Lists – Operator's Responsibilities

(a) An operator shall establish, for each Helicopter, a Minimum Equipment List (MEL) approved by the Authority. This shall be based upon, but no less restrictive than, the relevant Master Minimum Equipment List (MMEL) (if this exists) accepted by the Authority.

(b) An operator shall not operate a Helicopter other than in accordance with the MEL unless permitted by the Authority. Any such permission will in no circumstances permit operation outside the constraints of the MMEL.

(c) The operator shall include in the operations manual a minimum equipment list (MEL), approved by the Authority which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative.

(d) Where the Authority is not the State of Registry, the Authority shall ensure that the MEL does not affect the Helicopter's compliance with the airworthiness requirements applicable in the State of Registry. (See 83 *bis Agreement Summary)*

CAR OPS-3.035 Quality system

(a) An operator shall establish one Quality System and designate one Quality Manager to monitor compliance with, and the adequacy of, procedures required to ensure safe operational practices and airworthy Helicopters. Compliance monitoring must include a feed-back system to the Accountable Manager to ensure corrective action as necessary.

(b) The Quality System must include a Quality Assurance Programme that contains procedures designed to verify that all operations are being conducted in accordance with all applicable requirements, standards and procedures.
(c) The Quality System and the Quality Manager must be acceptable to the Authority.
(d) The quality system must be described in relevant documentation.
(e) Notwithstanding sub-paragraph (a) above, the Authority may accept the nomination of two Quality Managers, one for operations and one for maintenance, provided that the operator has designated one Quality Management Unit to ensure that the Quality System is applied uniformly throughout the entire operation. (See AMC OPS 3.035)

CAR OPS-3.037 Safety Management
(See Appendix1 to OPS, AMC OPS 3.037)
(a) An operator shall establish and implement a safety management system as specified by ICAO SMS Document 9859 and CAR-100 – Safety Management Systems which is acceptable to the Authority.
(b) A safety management system shall commensurate with the size of the operator, the complexity of its aviation services and clearly define lines of safety accountability throughout the operator's organisation, including a direct accountability for safety on the part of senior management.
(c) An operator that operates Helicopters of a maximum certificated take-off mass in excess of 7,000 kg or having a passenger seating configuration of more than 9 and fitted with a flight data recorder shall establish and maintain a flight data analysis programme as part of its Safety Management System.
(d) A flight data analysis programme shall contain adequate safeguards to protect the source(s) of the data in accordance with the principles of Appendix 1 to OPS 3.161.
Note: The operator may contract the operation of a flight data analysis programme to another party while retaining overall responsibility for the maintenance of such a programme.
(e) An operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system. (See AMC-2 OPS-3.037(e))
(f) The Safety management system shall include an occurrence reporting scheme to enable the collation and assessment of relevant incident and accident t reports in order to identify adverse trends or to address deficiencies in the interests of flight safety. The Manager SMS shall ensure that the scheme protects identity of the reporter and include the possibility that reports being submitted anonymously.
(g) The Safety management system shall include evaluation of relevant information relating to accidents and incidents and promulgation of related information, but not attribution of blame.
(h) The Operator shall manage fatigue risks within the constraints of their approved Flight and Duty Time Schemes. If supplemental mitigations are required for Fatigue hazards identified as part of their SMS, operators shall introduce documented company rules to supplement the Flight and Duty Time scheme rules to demonstrably control their fatigue related risks.
(i) An operator shall ensure that a flight will not commence or continue as planned unless it has been ascertained by every reasonable mean guidance's available that the airspace containing the intended route from departure heliport to arrival heliport, including the intended takeoff, destination and en-route alternate heliports, can be safely used for the planned operation. When intending to operate over or near any conflict zones, a risk assessment shall be conducted and appropriate risk mitigation measures shall be taken to ensure a safe flight.
(j) The operator shall, assess the level of rescue and firefighting service (RFFS) protection available at any heliport intended to be specified in the operational flight plan in order to ensure that an acceptable level of protection is available for the Helicopter intended to be used.
(k) The SMS manager shall implement and maintain an updated "safety risk register" accessible to the Authority, including fatigue hazards.

CAR OPS-3.040 Additional crew members

An operator shall ensure that crew members who are not required flight or cabin crew members, have also been trained in, and are proficient to perform, their assigned duties. The requirements to be met by the operator when operating an aircraft with technical crew members in commercial air transport helicopter emergency medical service (HEMS), night vision imaging system (NVIS) operations or helicopter hoist operations (HHO) are as follows:

(a) Conditions for assignment to duties Conditions for assignment to duties.
- (1) Technical crew members in commercial air transport HEMS, HHO or NVIS operations shall only be assigned duties if they:
  - (i) are at least 18 years of age;
  - (ii) are physically and mentally fit to safely discharge assigned duties and responsibilities;
  - (iii) have completed all applicable training required by this Subpart to perform the assigned duties;
  - (iv) have been checked as proficient to perform all assigned duties in accordance with the procedures specified in the operations manual.
- (2) Before assigning to duties technical crew members who are self-employed and/or working on a freelance or part-time basis, the operator shall verify that all applicable requirements of CAR OPS 3.040 are complied with, taking into account all services rendered by the technical crew member to other operator(s) to determine in particular:
  - (i) the total number of aircraft types and variants operated;
  - (ii) the applicable flight and duty time limitations and rest requirements.

(b) Guidance for meeting the conditions as laid down above:
- (1) The technical crew member in HEMS, HHO or NVIS operations should undergo an initial medical examination or assessment and, if applicable, a re-assessment before undertaking duties.
- (2) Any medical assessment or re-assessment should be carried out according to best aero-medical practice by a medical practitioner who has sufficiently detailed knowledge of the applicant's medical history.
- (3) The operator should maintain a record of medical fitness for each technical crew member.
- (4) Technical crew members should:
  - (i) be in good health;
  - (ii) be free from any physical or mental illness that might lead to incapacitation or inability to perform crew duties;
  - (iii) have normal cardio-respiratory function;
  - (iv) have normal central nervous system;
  - (v) have adequate visual acuity 6/9 with or without glasses;
  - (vi) have adequate hearing;
  - (vii) have normal function of ear, nose and throat; and
  - (viii) be color safe for night operations.
- (5) Validity of medical assessments and reassessments
  - (i) The medical assessment or reassessment of points (4)(i) to (4)(iv) and (4)(vi) and (4)(vi) should have a validity period of:
    - (A) 60 months, until the technical crew member reaches the age of 40;
    - (B) 24 months, for technical crew members aged above 40.
  - (ii) The medical assessment or reassessment of point (4)(v) should have a validity period of:
    - (A) the duration defined in (5)(i)(A) and (5)(i)(B), until the technical crew member reaches the age of 50;
    - (B) 12 months, for technical crew members aged above 50.
  - (iii) The medical assessment of point (4)(viii) does not need to be repeated.
- (6) A class 2 medical certificate
- (7) A LAPL medical certificate.

(c) Training and Checking.
- (1) The operator shall establish a training programme in accordance with the applicable requirements of this Subpart to cover the duties and responsibilities to be performed by technical crew members.

(2) Following the completion of initial, operator conversion, and differences training, and following any required familiarisation flights, each technical crew member shall undergo a check to demonstrate their proficiency in carrying out normal and emergency procedures.
(3) Training and checking shall be conducted for each training course by personnel suitably qualified and experienced in the subject to be covered. The operator shall inform the competent authority about the personnel conducting the checks.
(4) The checks that follow the operator conversion training and any required familiarisation flights shall take place prior to operating as a required technical crew member in HEMS, HHO or NVIS operations.
(5) The validity of the technical crew member's check to demonstrate their proficiency in carrying out normal and emergency procedures shall be 12 calendar months. Release checks may be carried out by suitably experienced Flight Operations Inspector.

(d) Approved means of compliance for Training and Checking.
(1) Elements of training that require individual practice may be combined with practical checks.
(2) The checks should be accomplished by the method appropriate to the type of training including:
(i) practical demonstration;
(ii) computer-based assessment;
(iii) in-flight checks; and/or
(iv) oral or written tests.

(e) Validity period of recurrent checking.
(1) The validity period should be counted from the end of the month when the checking was taken.
(2) When the checking is completed within the last 3 months of the validity period, the new validity period should be counted from the original expiry date.

(f) CRM Training. The technical crew training programme for initial, operator conversion and recurrent training should include relevant CRM training elements as specified in CAR OPS 3.943

(g) Initial Training.
Before undertaking the operator conversion training, each technical crew member shall complete initial training, including:
(1) general theoretical knowledge on aviation and aviation regulations covering all elements relevant to the duties and responsibilities required of technical crew;
(2) fire and smoke training;
(3) survival training on ground and in water, appropriate to the type and area of operation;
(4) aero-medical aspects and first-aid;
(5) communication and relevant CRM elements

(h) Elements:
(1) The elements of initial training should include in particular:
(i) General theoretical knowledge on aviation and aviation regulations relevant to duties and responsibilities:
(A) the importance of crew members performing their duties in accordance with the operations manual;
(B) continuing competence and fitness to operate as a crew member with special regard to flight and duty time limitations and rest requirements;
(C) an awareness of the aviation regulations relating to crew members and the role of the competent and inspecting authority;
(D) general knowledge of relevant aviation terminology, theory of flight, passenger distribution, meteorology and areas of operation;
(E) pre-flight briefing of the crew members and the provision of necessary safety information with regard to their specific duties;
(F) the importance of ensuring that relevant documents and manuals are kept up-to-date with amendments provided by the operator;
(G) the importance of identifying when crew members have the authority and responsibility to initiate an evacuation and other emergency procedures; and

(H) the importance of safety duties and responsibilities and the need to respond promptly and effectively to emergency situations.

(2) Fire and smoke training:

(i) reactions to emergencies involving fire and smoke and identification of the fire sources;

(ii) the classification of fires and the appropriate type and techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space; and

(iii) the general procedures of ground-based emergency services at aerodromes.

(3) When conducting extended overwater operations, water survival training, including the use of personal flotation equipment.

(4) Before first operating on an aircraft fitted with life-rafts or other similar equipment, training on the use of this equipment, including practice in water.

(5) Survival training appropriate to the areas of operation (e.g. polar, desert, jungle, sea or mountain).

(6) Aero-medical aspects and first aid, including:

(i) instruction on first aid and the use of first-aid kits; and

(ii) the physiological effects of flying.

(7) Effective communication between technical crew members and flight crew members, including common language and terminology.

(8) All elements of CRM training applicable to flight crew members operating in a multi-pilot environment should be integrated into relevant parts of technical crew training and operations including checklists, briefings, abnormal and emergency procedures.

(i) Operator conversion training. Each technical crew member shall complete:

(1) operator conversion training, including relevant CRM elements,

(i) before being first assigned by the operator as a technical crew member; or

(ii) when changing to a different aircraft type or class, if any of the equipment or procedures mentioned in (b) are different.

(2) Operator conversion training shall include:

(i) the location and use of all safety and survival equipment carried on the aircraft;

(ii) all normal and emergency procedures;

(iii) on-board equipment used to carry out duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, HHO or NVIS operations.

(j) Approved means of compliance for Operator conversion training and differences training.

Elements:

(1) Operator conversion training mentioned in EASA ORO.TC.120(b) and differences training mentioned in EASA ORO.TC.125(a) should include the following:

(i) Fire and smoke training, including practical training in the use of all fire fighting equipment as well as protective clothing representative of that carried in the aircraft. Each technical crew member should:

(A) extinguish a fire characteristic of an aircraft interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and

(B) practice the donning and use of protective breathing equipment (when fitted) in an enclosed, simulated smoke-filled environment.

(ii) Practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits.

(iii) Evacuation procedures and other emergency situations, including:

(A) recognition of planned or unplanned evacuations on land or water — this training should include recognition of unusable exits or unserviceable evacuation equipment;

(B) in-flight fire and identification of fire source; and

(C) other in-flight emergencies.

(iv) When the flight crew is more than one, training on assisting if a pilot becomes incapacitated, including a demonstration of:

(A) the pilot's seat mechanism;
(B) fastening and unfastening the pilot's seat restraint system;
(C) use of the pilot's oxygen equipment, when applicable; and
(D) use of pilots' checklists.

(v) Training on, and demonstration of, the location and use of safety equipment, including the following:
(A) life rafts, including the equipment attached to, and/or carried in, the raft, where applicable;
(B) life jackets, infant life jackets and flotation devices, where applicable;
(C) fire extinguishers;
(D) crash axe or crow bar;
(E) emergency lights, including portable lights;
(F) communication equipment, including megaphones;
(G) survival packs, including their contents;
(H) pyrotechnics (actual or representative devices);
(I) first-aid kits, their contents and emergency medical equipment; and
(J) other safety equipment or systems, where applicable.

(vi) Training on passenger briefing/safety demonstrations and preparation of passengers for normal and emergency situations.
(vii) Training on the use of dangerous goods, if applicable.
(viii) Task-specific training.

GENERAL

(1) The operator should determine the content of the conversion or differences training taking account of the technical crew member's previous training as documented in the technical crew member's training records.
(2) Aircraft conversion or differences training should be conducted according to a syllabus and include the use of relevant equipment and emergency procedures and practice on a representative training device or on the actual aircraft.
(3) The operator should specify in the operations manual the maximum number of types or variants that can be operated by a technical crew member.

(k) Differences Training.

(1) Each technical crew member shall complete differences training when changing equipment or procedures on types or variants currently operated.
(2) The operator shall specify in the operations manual when such differences training is required.

(l) Familiarisation Flights

If the operator conversion training does not include training in an aircraft/FSTD, each technical crew member shall undertake familiarisation flights.

(m) Recurrent Training.

(1) Within every 12-month period, each technical crew member shall undergo recurrent training relevant to the type or class of aircraft and equipment that the technical crew member operates. Elements of CRM shall be integrated into all appropriate phases of the recurrent training.
(2) Recurrent training shall include theoretical and practical instruction and practice.

(n) Guidance for Recurrent Training.

(1) The 12-month period of validity of training should be counted from the last day of the month when the first checking was made. Further training should be undertaken within the last 3 calendar months of that period. The new 12-month period should be counted from the original expiry date.
(2) The recurrent practical training should include every year:
(i) emergency procedures, including pilot incapacitation;
(ii) evacuation procedures;
(iii) touch-drills by each technical crew member for opening normal and emergency exits for (passenger) evacuation;
(iv) the location and handling of emergency equipment and the donning by each technical crew member of life jackets and protective breathing equipment (PBE), when applicable;
(v) first aid and the contents of the first-aid kit(s);

(vi) stowage of articles in the cabin;
(vii) use of dangerous goods, if applicable;
(viii) incident and accident review; and
(ix) crew resource management: all topics of the initial CRM training should be covered over a period not exceeding 3 years.

(3) Recurrent training should include every 3 years:
(i) practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits;
(ii) practical training in the use of all firefighting equipment as well as protective clothing representative of that carried in the aircraft. Each technical crew member should:
(A) extinguish a fire characteristic of an aircraft interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and
(B) practice the donning and use of protective breathing equipment (when fitted) in an enclosed, simulated smoke-filled environment;
(iii) use of pyrotechnics (actual or representative devices); and
(iv) demonstration of the use of the life raft, where fitted.

(o) Refresher Training.
(1) Each technical crew member who has not undertaken duties in the previous six months shall complete the refresher training specified in the operations manual.
(2) The technical crew member who has not performed flying duties on one particular aircraft type or class during the preceding six months shall, before being assigned on that type or class, complete either:
(i) refresher training on the type or class; or
(ii) two familiarisation sectors on the aircraft type or class.

(p) Approved Means of Compliance for Refresher Training.

ELEMENTS

(1) Refresher training may include familiarisation flights.
(2) Refresher training should include at least the following:
(i) emergency procedures, including pilot incapacitation;
(ii) evacuation procedures;
(iii) practical training on operating and opening all normal and emergency exits for passenger evacuation in an aircraft or representative training device and demonstration of the operation of all other exits; and
(iv) the location and handling of emergency equipment, and the donning of life jackets and protective breathing equipment, when applicable.

CAR OPS-3.050 Search & Rescue information

(a) An operator shall ensure the pilot-in-command has available and easily accessible on board the Helicopter all the essential information concerning the search and rescue services in the area over which the Helicopter will be flown.
(b) All helicopters on all flights shall be equipped with the ground-air signal codes for search and rescue purposes.

CAR OPS-3.055 Information on emergency and survival equipment carried

An operator shall ensure that there are available for immediate communication to rescue coordination centres, lists containing information on the emergency and survival equipment carried on board all of his Helicopters. The information shall include, as applicable, the number, colour and type of life-rafts and pyrotechnics, details of emergency medical supplies, water supplies and the type and frequencies of emergency portable radio equipment.

CAR OPS-3.060 Ditching

An operator shall operate a helicopter over water in accordance with applicable operational and airworthiness codes as per the authority.

CAR OPS-3.065 Carriage of weapons of war and munitions of war

(See IEM OPS-3.065)

(a) An operator shall not transport weapons of war and munitions of war by air unless an approval to do so has been granted by all States concerned.

(b) An operator shall ensure that weapons of war and munitions of war are:

(1) Stowed in the Helicopter in a place which is inaccessible to passengers during flight; and

(2) In the case of firearms, unloaded, unless, before the commencement of the flight, approval has been granted by all States concerned that such weapons of war and munitions of war may be carried in circumstances that differ in part or in total from those indicated in this sub-paragraph.

(c) An operator shall ensure that the commander is notified before a flight begins of details and location of any weapons and munitions of war intended to be carried on board the Helicopter.

CAR OPS-3.070 Carriage of sporting weapons and ammunition

(See AMC OPS-3.070)

(a) An operator shall take all reasonable measures to ensure that any sporting weapons intended to be carried by air are reported to him.

(b) An operator accepting the carriage of sporting weapons shall ensure that they are:

(1) Stowed in the Helicopter in a place which is inaccessible to passengers during flight unless the Authority has determined that compliance is impracticable and has accepted that other procedures might apply; and

(2) In the case of firearms or other weapons that can contain ammunition, are unloaded.

(c) Ammunition for sporting weapons may be carried in passengers' checked baggage, subject to certain limitations, in accordance with the Technical Instructions (See CAR OPS-3.1260(b)(5)) as defined in CAR OPS 3.1150(a)(14).

CAR OPS-3.075 Method of carriage of persons

(a) An operator shall take all reasonable measures to ensure that no person is in any part of a Helicopter in flight which is not a part designed for the accommodation of persons unless temporary access has been granted by the commander to any part of the Helicopter:

(1) For the purpose of taking action necessary for the safety of the Helicopter or of any person, animal or goods therein; or

(2) In which cargo or stores are carried, being a part, which is designed to enable a person to have access thereto while the Helicopter is in flight.

CAR OPS-3.077 Offering Dangerous Goods for Transport by Air

The operator shall take all reasonable measures to ensure that no person offers or accepts dangerous goods for transport by air unless the person has been trained and the goods are properly classified, documented, certificated, described, packaged, marked, labelled and in a fit condition for transport as required by the Technical Instructions.

CAR OPS-3.080 Duties of flight operations officer/flight dispatcher

(a) A flight operations officer/flight dispatcher in conjunction with a method of control and supervision of flight operations shall:

(1) Assist the pilot-in-command in flight preparation and provide the relevant information;

(2) Assist the pilot-in-command in preparing the operational flight plan and the flight plan to be filed;

(3) when applicable, assist the pilot-in-command in preparing the preliminary flight plan, and submit it to a unit designated by the appropriate ATS authority;

(4) sign, when applicable, and file the flight plan to a unit designated by the appropriate ATS authority; and

(5) Furnish the pilot-in-command while in flight, by appropriate means, with information which may be necessary for the safe conduct of the flight.

Note 1: The requirements for flight plans are contained in Annex 2 — Rules of the Air *and the procedures relating to flight plans and associated services are contained in the* Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444)*.*

Note 2: Detailed guidance on the use of the FF-ICE services, including the use of a preliminary flight plan, can be found in the Manual on Flight and Flow — Information for a Collaborative Environment (FF-ICE) (Doc 9965).

(6) notify the appropriate ATS unit when the position of the Helicopter cannot be determined by a tracking capability, and attempts to establish communication are unsuccessful.

(b) In the event of an emergency, a flight operations officer/flight dispatcher shall:

(1) initiate such procedures as outlined in the operations manual while avoiding taking any action that would conflict with ATC procedures; and

(2) convey safety-related information to the pilot-in-command that may be necessary for the safe conduct of the flight, including information related to any amendments to the flight plan that become necessary in the course of the flight.

Note: It is equally important that the pilot-in-command also convey similar information to the flight operations officer/ flight dispatcher during the course of the flight, particularly in the context of emergency situations.

CAR OPS-3.085 Crew responsibilities

(a) A crew member shall be responsible for the proper execution of his duties that:

(1) Are related to the safety of the Helicopter and its occupants; and

(2) Are specified in the instructions and procedures laid down in the Operations Manual.

(b) A crew member shall:

(1) Report to the commander any fault, failure, malfunction or defect which he believes may affect the airworthiness or safe operation of the Helicopter including emergency systems.

(2) Report to the commander any incident that endangered, or could have endangered, the safety of operation; and

(3) Make use of the operator's occurrence reporting schemes in accordance with CAR OPS- 3.037(a). In all such cases, a copy of the report(s) shall be communicated to the commander concerned.

(c) Nothing in paragraph (b) above shall oblige a crew member to report an occurrence which has already been reported by another crew member.

(d) A crew member shall not perform duties on a Helicopter:

(1) While under the influence of any drugs or psychoactive substance that may affect his faculties in a manner contrary to safety;

(2) Until a reasonable time period has elapsed after deep water diving;

(3) Following blood donation except when a reasonable time period has elapsed

(4) If he is in any doubt of being able to accomplish his assigned duties; or

(5) If he knows or suspects that he is suffering from fatigue, or feels unfit to the extent that the flight may be endangered.

(e) A crew member shall be subject to appropriate requirements on the consumption of alcohol which shall be established by the operator and acceptable by the Authority, and which shall not be less restrictive than the following:

A crew member shall not:

(1) Consume alcohol less than 12 hours prior to the specified reporting time for flight duty or the commencement of standby;

(2) Commence a flight duty period with a blood alcohol level in excess of 0·02 promille;

(3) Consume alcohol during the flight duty period or whilst on standby.

(f) The pilot-in-command shall:

(1) Be responsible for the safe operations of the Helicopter and safety of all crew members, passengers and cargo on board, when the doors are closed and the engine(s) are started, until the helicopter finally comes to rest at the end of the flight, with the engines(s) shut down, rotor blades stopped and he leaves the Helicopter at the end of the flight;

(2) Be responsible for the operation and safety of the Helicopter from the moment the Helicopter is ready to move for the purpose of taking off until the moment it finally comes to rest at the end of the flight and the engine(s) used as primary propulsion units are shut down;

(3) Have Authority to give all commands he deems necessary for the purpose of securing the safety of the Helicopter and of persons or property carried therein;

(4) Have Authority to disembark any person, or any part of the cargo, which, in his opinion, may represent a potential hazard to the safety of the Helicopter or its occupants;

(5) Not allow a person to be carried in the Helicopter who appears to be under the influence of alcohol or drugs or Psychoactive substances to the extent that the safety of the Helicopter or its occupants is likely to be endangered;

(6) Have the right to refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage poses any risk to the safety of the Helicopter or its occupants;

(7) Ensure that all passengers are briefed on the location of emergency exits and the location and use of relevant safety and emergency equipment;

(8) Ensure that all operational procedures and checklists specified in CAR OPS-3.210(b) are complied with in accordance with the Operations Manual;

(9) Not permit any crew member to perform any activity during a critical phase of flight except those duties required for the safe operation of the Helicopter;

(10) Not permit:

(i) A flight data recorder to be disabled, switched off or erased during flight nor permit recorded data to be erased after flight in the event of an accident or an incident subject to mandatory reporting;

(ii) A cockpit voice recorder to be disabled or switched off during flight nor permit recorded data to be manually erased during or after flight in the event of an accident or an incident subject to mandatory reporting;

(11) Decide whether or not to accept a Helicopter with an unserviceability as allowed by the CDL or MEL; and

(12) Ensure that the pre-flight inspection has been carried out.

(13) Be responsible for reporting all known or suspected defects in the Helicopter, to the operator, at the termination of the flight.

(14) Be responsible for the journey log book or the general declaration containing the information listed in CAR OPS-3.1055.

(15) Ensure that at least one member of the flight crew holds a valid license authorising operations of the aeronautical radio transmitting equipment (VHF & HF) to be used.

(16) Be responsible for ensuring that a flight is not commenced if any flight crew member is incapacitated from performing duties by any cause such as injury, sickness, fatigue, the effects of any psychoactive substance; and

(17) Be responsible for ensuring that a flight is not continued beyond the nearest suitable heliport when flight crew members' capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness or lack of oxygen.

(g) The commander or the pilot to whom conduct of the flight has been delegated shall, in an emergency situation that requires immediate decision and action, take any action he considers necessary under the circumstances. In such cases he may deviate from rules, operational procedures and methods in the interest of safety.

CAR OPS-3.090 Authority of the commander

An operator shall take all reasonable measures to ensure that all persons carried in the Helicopter obey all lawful commands given by the commander for the purpose of securing the safety of the Helicopter and of persons or property carried therein.

CAR OPS-3.100 Admission to flight deck

(a) An operator must ensure that no person, other than a flight crew member assigned to a flight, is admitted to, or carried in, the flight deck unless that person is:

(1) An operating crew member;

(2) A representative of the Authority responsible for certification, licensing or inspection if this is required for the performance of his official duties; or

(3) Permitted by, and carried in accordance with instructions contained in the Operations Manual.

(b) The commander shall ensure that:

(1) In the interests of safety, admission to the flight deck does not cause distraction and/or interfere with the flight's operation; and

(2) All persons carried on the flight deck are made familiar with the relevant safety procedures.

(c) The final decision regarding the admission to the flight deck shall be the responsibility of the commander.

CAR OPS-3.105 Unauthorised carriage

An operator shall take all reasonable measures to ensure that no person secretes himself or secretes cargo on board a Helicopter.

CAR OPS-3.110 Portable electronic devices

(See AMC OPS-3.110 PED)

An operator shall not permit any person to use, and take all reasonable measures to ensure that no person does use, on board a Helicopter, a portable electronic device that can adversely affect the performance of the Helicopter's systems and equipment.

CAR OPS-3.115 Psychoactive substances

An operator shall not permit any person to enter or be in, and take all reasonable measures to ensure that no person enters or is in, a Helicopter when under the influence of Psychoactive substances to the extent that the safety of the Helicopter or its occupants is likely to be endangered.

CAR OPS-3.120 Endangering safety

(a) An operator shall take all reasonable measures to ensure that no person recklessly or negligently acts or omits to act:

(1) So as to endanger a Helicopter or person therein;
(2) So as to cause or permit a Helicopter to endanger any person or property.

(b) If an emergency situation which endangers the safety of the Helicopter or persons becomes known first to the flight operations officer/flight dispatcher, he shall take necessary action to notify the appropriate authorities of the nature of the situation without delay and requests for assistance if required.

CAR OPS-3.125 Documents to be carried

(See AMC OPS-3.125)

(a) An operator shall ensure that the following are carried on each flight:
(1) The Certificate of Registration;
(2) The Certificate of Airworthiness;
(3) The original or a certified copy of the Noise Certificate (if applicable), including an English translation, where one has been provided by the Authority responsible for issuing the noise certificate;
(4) The original or a certified true copy of the Air Operator Certificate and a copy of Operations Specification relevant to the Helicopter type, issued in conjunction with the certificate;
(5) The Aircraft Radio Station License;
(6) The Certificate of approval of aircraft Radio Installation;
(7) The original or a copy of the Insurance Certificate(s), which cover the aircraft, its crew, passengers and third party liability clauses.
(8) Airworthiness Review Certificates (ARC), if applicable
(9) Journey Log or General Declaration.
(10) When operating under Article 83 *bis,* the original or a certified true copy of any 83 *bis* Agreement Summary (translated if other than English) applicable to the aircraft as advised in the registration of that agreement with ICAO.

(b) Each flight crew member shall, on each flight, carry a valid flight crew license with appropriate rating(s) for the purpose of the flight.

(c) For operations of A to A or A to B operations within Oman paragraph (a) (1) and (a) (2) may be carried in readable certified true copy format.

CAR OPS-3.130 Manuals to be carried

(See: AMC OPS-3.130, AMC OPS-3.135(b))

An operator shall ensure that:

(a) The current parts of the Operations Manual relevant to the duties of the crew are carried on each flight;

(b) Those parts of the Operations Manual which are required for the conduct of a flight are easily accessible to the crew on board the Helicopter; and

(c) The current Helicopter Flight Manual is carried in the Helicopter unless the Authority has accepted that the Operations Manual prescribed in CAR OPS-3.1045, Appendix 1, Part B contains relevant information for that Helicopter.

(d) The current MEL manual which is in compliance

(e) The carriage of an approved electronic version of the Operations Manual is acceptable. The approval of Electronic Manuals requires an EFB approved in accordance with AMC OPS- 3.135(b).

CAR OPS-3.135 Additional information and forms to be carried

(See AMC OPS-3.135(b), Appendix 1 to CAR OPS-3.135)

(a) An operator shall ensure that, in addition to the documents and manuals prescribed in CAR OPS-3.125 and CAR OPS-3.130, the following information and forms, relevant to the type and area of operation, are carried on each flight:

(1) Operational Flight Plan containing at least the information required in CAR OPS- 3.1060 Operational flight plan;
(2) Operator's Helicopter technical log system;
(3) Details of the filed ATS flight plan;
(4) Appropriate NOTAM/AIP/AIRAC/AIC/AIS briefing documentation;
(5) Appropriate meteorological information;
(6) Mass and balance documentation as specified in CAR OPS-3, Subpart J;
(7) Notification of special categories of passenger such as security personnel, if not considered as crew, handicapped persons, inadmissible passengers, deportees and persons in custody;
(8) Notification of special loads including dangerous goods including written information to the commander as prescribed in CAR OPS 3.1215(d) and IEM-2 OPS-3.1160(c) Scope – Dangerous goods carried by passengers or crew;
(9) Current maps and charts and associated documents as prescribed in CAR OPS-3.290 Flight preparation (b)(7);
(10) Passenger manifest, cargo manifest, mail declaration, navigation certificates etc.; (if applicable) and
(11) Forms to comply with the reporting requirements of the Authority and the operator.

(b) The Authority may permit the information detailed in sub-paragraph (a) above, or parts thereof, to be presented in a form other than on printed paper. An acceptable standard of accessibility, usability and reliability must be assured.

CAR OPS-3.137 Electronic Flight Bag Approval

When applying for operational approval for the use of EFBs, the operator shall ensure that:

(a) the EFB equipment and its associated installation hardware, including interaction with Helicopter systems if applicable, meet the appropriate airworthiness certification requirements;
(b) the operator has assessed the safety risks associated with the operations supported by the EFB function(s);
(c) the operator has established requirements for redundancy of the information (if appropriate) contained in and displayed by the EFB function(s);
(d) the operator has established and documented procedures for the management of the EFB function(s) including any database it may use; and
(e) the operator has established and documented the procedures for the use of, and training requirements for, the EFB and the EFB function(s).

CAR OPS-3.138 Electronic Flight Bags (EFBs)

(See AMC OPS-3.138)

(a) Where portable EFBs are used on board, the operator shall ensure that they do not affect the performance of the Helicopter systems, equipment or the ability to operate the Helicopter.
(b) Where EFBs are used on board a Helicopter the operator shall:
    (1) assess the safety risk(s) associated with each EFB function;
    (2) establish and document the procedures for the use of, and training requirements for, the device and each EFB function; and
    (3) ensure that, in the event of an EFB failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.

Note: Guidance on safety risk assessments is contained in the SMM (Doc 9859) and CAR-100.

(c) The Authority, as the State of the Operator, shall issue a specific approval for the operational use of EFB functions to be used for the safe operations of helicopter.

CAR OPS-3.140 Information retained on the ground

(a) An operator shall ensure that:

(1) At least for the duration of each flight or series of flights;

(i) Information relevant to the flight and appropriate for the type of operation is preserved on the ground; and

(ii) The information is retained until it has been duplicated at the place at which it will be stored in accordance with CAR OPS-3.1065 Document storage periods; or, if this is impracticable,

(iii) The same information is carried in a fireproof container in the Helicopter.

(b) The information referred to in subparagraph (a) above includes:

(1) A copy of the operational flight plan where appropriate;

(2) Copies of the relevant part(s) of the Helicopter technical log;

(3) Route specific NOTAM documentation if specifically edited by the operator;

(4) Mass and balance documentation if required as CAR OPS-3.625 Mass and balance documentation refers); and

(5) Special loads notification.

CAR OPS-3.145 Power to conduct surveillance, inspections and audits

(a) CAA Inspectors shall maintain a continuous safety oversight and audit capability pertaining to the continued surveillance and certification of civil aviation activities and Helicopter operations as granted under Articles 7 and 8 of the Civil Aviation Law 76/2019, or any subsequent amendments.

Note: See ICAO Annex 6, Part III, Appendix 1, plus the Guidance on the inspection, certification and continued surveillance of operations is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (ICAO Doc 8335) and the Airworthiness Manual (ICAO Doc 9760).

(b) An operator shall ensure that any person authorised by the Authority is permitted at any time to board and fly in any Helicopter operated in accordance with an AOC or authorization issued by that Authority and to enter and remain on the flight deck provided that the commander may refuse access to the flight deck if, in his opinion, the safety of the Helicopter would thereby be endangered.

(c) CAA Inspectors have the rights of unrestricted access to Helicopter and associated aviation facilities for the performance of their functions and duties as granted under the Civil Aviation Law 76/2019 Article 8, or any subsequent amendments.

CAR OPS-3.150 Production of documentation and records

(a) An operator shall:

(1) Give any person authorised by the Authority access to any documents and records which are related to flight operations or maintenance; and

(2) Produce all such documents and records, when requested to do so by the Authority, within a reasonable period of time.

(b) The commander shall, within a reasonable time of being requested to do so by a person authorised by an Authority, produce to that person the documentation required to be carried on board.

CAR OPS-3.155 Preservation of documentation

(a) An operator shall ensure that:

(1) Any original documentation, or copies thereof, that he is required to preserve is preserved for the required retention period even if he ceases to be the operator of the Helicopter; and

(2) Where a crew member, in respect of whom an operator has kept a record in accordance with Subpart Q, becomes a crew member for another operator, that record is made available to the new operator.

CAR OPS-3.160 Preservation, production and use of flight recorder recordings

(AC OPS-3.160(a)(1) & (2) Preservation of Recordings)

The operator shall ensure, to the extent possible, in the event the helicopter becomes involved in an accident or incident, the preservation of all related flight recorder records, and if necessary the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with CAR 13.

(a) Preservation of recordings

(1) Following an accident, the operator of a Helicopter on which a flight recorder is carried shall, to the extent possible, preserve the original recorded data pertaining to that accident, as retained by the recorder for a period of sixty (60) days unless otherwise directed by the investigating Authority.

(2) Unless prior permission has been granted by the Authority, following an incident that is subject to mandatory reporting, the operator of a Helicopter on which a flight recorder is carried shall, to the extent possible, preserve the original recorded data pertaining to that incident, as retained by the recorder for a period of sixty (60) days unless otherwise directed by the investigating Authority.

(3) Additionally, when the Authority so directs, the operator of a Helicopter on which a flight recorder is carried shall preserve the original recorded data for a period of sixty (60) days unless otherwise directed by the investigating Authority.

(4) When a flight data recorder is required to be carried aboard a Helicopter, the operator of that Helicopter shall:

(i) Save the recordings for the period of operating time as required by CAR OPS-3.715, 3.720, 3.725 and 3.727 except that, for the purpose of testing and maintaining flight data recorders, up to one hour of the oldest recorded material at the time of testing may be erased; and

(ii) Keep a document which presents the information necessary to retrieve and convert the stored data into engineering units.

(iii) The documentation must be updated at regular intervals and shall contain;

(A) flight data recorder parameter allocations;

(B) conversion equations;

(C) periodic calibration records; and

(D) other serviceability/maintenance information.

Note: The documentation requirement concerning FDR parameters provided by operators to accident investigation authorities should be in electronic format and take account of industry specifications.

(iv) At all times preserve a record of not less than one representative flight, that is to say, a recording of a flight made within the last 12 months which includes a take-off, climb, cruise, descent, approach to landing and landing, together with a means of identifying the record with the flight to which it relates.

(b) Production of recordings. The operator of a Helicopter on which a flight recorder is carried shall, within a reasonable time after being requested to do so by the Authority, produce any recording made by a flight recorder which is available or has been preserved.

(c) Use of recordings

(1) The cockpit voice recorder recordings may not be used for purposes other than for the investigation of an accident or incident subject to mandatory reporting except with the consent of all crew members concerned.

(2) The flight data recorder recordings may not be used for purposes other than for the

investigation of an accident or incident subject to mandatory reporting except when such records are:

(i) Used by the operator for airworthiness or maintenance purposes only; or
(ii) De-identified; or
(iii) Disclosed under secure procedures.

CAR OPS 3.161 Use of Flight Recorder Recordings by Authority
(See Appendix 1 to OPS 3.1610)

(a) The Authority shall not allow the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident in accordance with CAR 13 except where the recordings or transcripts:
   (1) are related to a safety-related event identified in the context of a safety management system; are restricted to the relevant portions of a de-identified transcript of the recording; and are subject to the protections accorded by Safety Management Systems;
   (2) are sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to the protections accorded by Safety Management Systems; or
   (3) are used for inspections of flight recorder systems.

   Note: When an investigation under CAR 13, or under ICAO Annex 13 by another State, is instituted, investigation records are subject to the protections accorded by CAR 13.

(b) The Authority shall not allow the use of recordings or transcripts of FDR, ADRS as well as Class B and Class C AIR and AIRS for purposes other than the investigation of an accident or incident in accordance with CAR 13, except where the recordings or transcripts are subject to the protections accorded by Safety Management Systems; and:
   (1) are used by the operator for airworthiness or maintenance purposes;
   (2) are sought for use in proceedings not related to an event involving an accident or incident investigation;
   (3) are de-identified; or
   (4) are disclosed under secure procedures.

CAR OPS-3.165 Leasing

(a) Terminology – Terms used in this paragraph have the following meaning:
   (1) Dry lease – Is when the Helicopter is operated under the AOC or authorization of the lessee.
   (2) Wet lease – Is when the Helicopter is operated under the AOC or authorization of the lessor.
   (3) Damp lease – Is when the Helicopter is operated under the AOC or authorization of the lessor with partial crew.
(b) General requirements for leasing:
   (1) When an applicant for an AOC or an existing operator wishes to lease aircraft, the applicant or operator should provide to the Authority with the following information:
      (i) the helicopter type, model and serial number;
      (ii) the name and address of the registered owner;
      (iii) State of Registry, nationality and registration marks;
      (iv) Certificate of Airworthiness and statement from the registered owner that the aircraft fully complies with the airworthiness requirements of the State of Registry
      (v) Name, address and signature of lessee or person responsible for operational control of the aircraft under the lease agreement, including a statement that such individual and the parties to the lease agreement fully understand their respective

responsibilities under the applicable regulations;

(vi) copy of the lease agreement or description of lease provisions;

(vii) duration of the lease; and

(viii) The lease must include the routes on which it is proposed to operate, including a description of the area of operation.

(ix) Aircraft age limitation for passenger transportation and cargo operations will be decided at discretion of the CAA;

(x) The lease must include the commencement and termination date of the lease.

(xi) In the opinion of the CAA, the lease must be in the public interest.

(xii) The lease must clearly identify who retains custody and operational control of the aircraft.

(xiii) The lease must clearly identify who is responsible for the airworthiness of the leased aircraft.

(xiv) The lease must clearly identify all parties to the lease.

(2) On completion of review and liaison with other competent authorities, determination as to which party to the lease agreement is in fact responsible for conduct of the operations will be made considering the responsibilities of the parties under the lease agreement for:

(i) flight crew member licensing and training;

(ii) cabin crew member training;

(iii) airworthiness of the aircraft and the performance of maintenance;

(iv) operational control, including dispatch and flight following;

(v) scheduling of flight and cabin crew members; and

(vi) signing the maintenance release.

(3) Issuance of a CAA approval is contingent upon the following criteria being met:

(i) The helicopter must be of a type and model eligible for a standard Omani Certificate of Airworthiness and comply with all environmental and operational requirements.

(ii) Regulatory control of the aircraft operation must be equivalent to that of an Omani aircraft operated by its Omani registered owner, and in keeping with provisions of the Operating Certificate or equivalent document.

(iii) The aircraft must be operated in accordance with a Minimum Equipment List (MEL), which is acceptable to the CAA.

(iv) The lease must identify the organization which will maintain the aircraft, and all maintenance approvals held by that organization.

(v) The aircraft will be maintained to a Maintenance Program approved /accepted by the CAA.

(vi) The appropriate training and certification for the maintenance and operational staff approved /accepted by the CAA.

(c) Leasing of aircraft between an Omani operator and any entity

(1) ***Dry lease-in***:

(i) An Omani operator shall not dry lease-in an aircraft from an entity unless approved by the Authority. Any conditions which are part of this approval must be included in the lease agreement.

(ii) An Omani operator shall ensure that, with regard to aircraft that are dry leased-in, any differences from the requirements prescribed in Subparts K, L, and/or CAR-M, are notified to and are acceptable to the Authority.

(2) ***Wet lease-in***:

Note: See AC OPS-3.165(c)(2) Leasing of aircraft between an Omani operator and any entity

(i) An Omani operator shall not wet lease-in an aircraft from an entity without the approval of the Authority.

(ii) An Omani operator shall ensure that, with regard to aircraft that are wet leased-in:

(A) The safety standards of the lessor with respect to maintenance and operation are equivalent to CARs;

(B) The lessor is an operator holding an AOC issued by a State which is a signatory to the Chicago Convention;

(C) The Helicopter has a standard Certificate of Airworthiness issued in accordance with ICAO Annex 8;

(D) Any requirement made applicable by the lessee's Authority is complied with.

(3) ***Dry lease-out:***

(i) An Omani operator may dry lease-out an aircraft for the purpose of commercial or private air transportation to any operator of a State which is signatory to the Chicago Convention provided that the following conditions are met:

(A) The Authority has exempted the operator from the relevant provisions of CAR OPS-3 and, after the foreign regulatory Authority has accepted responsibility in writing for surveillance of the maintenance and operation of the Helicopter(s), has removed the Helicopter from its AOC; and

(B) The Helicopter is maintained according to an approved maintenance programme.

(4) ***Wet lease-out.*** An Omani operator providing a Helicopter and complete crew to another entity and retaining all the functions and responsibilities prescribed in Subpart C, shall remain the operator of the Helicopter.

(5) ***Damp lease-out.*** An Omani operator providing a Helicopter and flight crew to another entity and retaining all the functions and responsibilities prescribed in Subpart C shall remain the operator of the Helicopter.

(6) ***Lessors***. when first approved by the Authority, and any revalidations, remain valid for a period not exceeding twelve (12) months.

(7) ***Lessor.*** means a person or organization which lets an aircraft for lease. The party furnishing the aircraft under a lease

(8) ***Lessee.*** means a person or organization which hold the aircraft by lease. The party using the aircraft under the provisions of a lease. The lessee operator of the aircraft must hold the necessary economic and operating authority for the aircraft and must exercise operational control over the aircraft. Accordingly, the lessee must provide the necessary flight and cabin crewmembers, ground personnel, dispatchers and ground facilities to operate the aircraft.

(9) ***Lease.*** an agreement by a person (the lessor) to furnish an aircraft to another person (the lessee) to be used for compensation or hire purposes for a period or a defined number of flights.

(d) Leasing of Helicopters at short notice:

In circumstances where an Omani operator is faced with an immediate, urgent and unforeseen need for a replacement Helicopter, the approval required by sub-paragraph (c)(2)(i) above may be deemed to have been given, provided that:

(1) The lessor is an operator holding an AOC issued by a State which is a signatory to the Chicago Convention; and

(2) The lease-in period does not exceed 5 consecutive days; and

(3) The Authority is immediately notified in writing of the use of this provision.

(4) The Operator has a Short-Term Leasing Policy in the company Exposition Manual or similar document approved by the CAA.

(e) Transfer Agreements as ***State of Registry*** under article 83bis.:

Transfer of functions and duties as State of Registry under article 83bis of the Chicago Convention.

Note: See AMC OPS-3.165 (e)

(1) Oman may, by agreement with other foreign State, accept the transfer of all or part of the foreign State's functions and duties as State of Operator in respect of a foreign registered aircraft under Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention.

(2) In case Oman, as a State of the operator, decides to accept functions and duties from the State of Registry in respect to Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention, the Civil Aviation Regulations applicable to foreign state registered aircraft for the issuance/renewal of licenses/certificates will be applicable to the foreign registered aircraft in respect to responsibilities that have been transferred to CAA of Oman.

(3) The transfer shall not have effect in respect of other Contracting States of ICAO before either the agreement between States in which it is embodied has been registered with the Council of ICAO and made public pursuant to Article 83bis of the Convention, or the existence and scope of the agreement have been directly communicated to the Civil Aviation Authorities of the other Contracting State or States concerned.

(f) Transfer Agreement as ***State of Operator*** under article 83bis.:

Transfer of functions and duties as State of Operator under article 83bis of the Chicago Convention.

Note: See AMC OPS-3.165 (f)

(1) Oman may, by agreement with other foreign State, accept the transfer of all or part of the foreign State's functions and duties as State of Operator in respect of a foreign registered aircraft under Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention.

(2) In case Oman, as a State of the operator, decides to accept functions and duties from the State of Registry in respect to Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention, the Civil Aviation Regulations applicable to foreign state registered aircraft for the issuance/renewal of licenses/certificates will be applicable to the foreign registered aircraft in respect to the responsibilities that have been transferred to Oman.

(3) The transfer shall not have effect in respect of other Contracting States of ICAO before either the agreement between States in which it is embodied has been registered with the Council of ICAO and made public pursuant to Article 83bis of the Convention, or the existence and scope of the agreement have been directly communicated to the Civil Aviation Authorities of the other Contracting State or States concerned.

(g) Foreign Registered Aircraft Leased to Omani Operators

Foreign registered aircraft proposed for use in an Omani commercial air service should normally be removed from the foreign register and subsequently registered in Oman, in the name of the Omani operator, for the term of the lease. Where this is not practical, the lessee must make an application to the CAA as required pursuant to CAR OPS-3.165. The maximum term of the lease where the aircraft may remain in foreign registration is one year.

(h) Requirements for Type Certificated Aircraft with the CAA's Familiarisation

(1) Prior to operation in Oman, the aircraft and its records shall be inspected by the CAA for acceptability in accordance with standard procedures required for the inclusion of an aircraft on an Omani Operating Certificate.

(2) The airworthiness authority of the state of registry must provide a letter stating that it has no objection to the lease, and that the lease will not affect the registration of the aircraft in the state of registry or the certificate of airworthiness issued in respect of the aircraft by that state.

(3) All Omani Operators leasing U.S. registered aircraft should be aware, and take into account, that the requirement for maintenance programs approved under FAR Part 129 as amended applies to U.S. registered aircraft listed on operations specifications issued under FAR Section 129.1. In addition, FAA Advisory Circular No. 129.4 as amended provides information and guidance about acceptable maintenance programs for U.S. registered aircraft subject to FAR Part 129 as amended. Copies of the US Federal Aviation Regulations and Advisory Circulars are available from: The Superintendent of Documents U.S. Government Printing Office Mail stop SSOP Washington D.C. 20402 9328, USA.

(i) Requirements for Type Certificated Aircraft without the CAA's Familiarizations

The following airworthiness requirements must normally be met prior to aircraft operation:

(1) The aircraft must be listed by serial number, or other identification unique to the aircraft, on a Type Certificate accepted by the CAA. Details of an aircraft under a lease agreement, which are not identified on a Type Certificate, are to be submitted to the CAA.

(2) The aircraft must conform and be maintained in accordance with an approved configuration defined in the Type Certification

(j) Foreign Modifications

Prospective dry lessees of foreign registered aircraft shall provide a list of all modifications on the aircraft, e.g. STCs, field approvals (e.g. FAA ACA-337) or company approved modifications. The modifications shall be reviewed by the CAA for approval and/or familiarisation prior to the lease being approved, with particular attention to those modifications which may have been approved on the basis of airworthiness standards or regulations which are not recognised in Oman.

(1) When the aircraft being proposed for dry lease into Oman is from a country where a Bilateral Airworthiness Agreement or Technical Arrangement exists with Oman, the following factors shall be considered when determining a need for familiarisation of the modification:

(i) type of modification and possible safety implications;

(ii) type of operation proposed versus its previous role; and

(iii) the service history of the leased aircraft.

Note: Following consideration of the above, the aircraft may be accepted without prior familiarisation of those installed modifications, provided the aircraft continues to operate in its previous role.

(2) When the aircraft being proposed for any lease into Oman is from a country where no Bilateral Airworthiness Agreement or Technical Arrangement exists with Oman, the following factors shall be considered when determining eligibility requirements for installed modifications:

(i) aircraft source of export, State of Design, and service history;

(ii) type of operation proposed versus its previous role; and

(iii) type of modification and possible safety implications.

(3) The scope of the review will depend on the findings evolving from the evaluation requirements mentioned above. Each aircraft will be assessed on the basis of its history. Upon satisfactory review of the documentation provided, it may be determined that specific modifications may be acceptable for the duration of the lease period, while others may require a more formal validation.

(4) Possible exceptions to the above are applicable for the duration of the lease only. Should the operator decide to register the aircraft in Oman during or at the termination of the lease period, all documentation pertaining to modifications shall be submitted to the CAA at least 45 days prior to the planned registration date for formal familiarisation or validation.

(k) Oman Registered Commercial Aircraft Leased to Foreign Operators
In addition to the requirements of Section (b) the following conditions shall apply with respect to Oman registered aircraft leased to persons who do not qualify to be the registered owner:

(1) Omani Operators which elect to lease their aircraft to foreign Operators must make an application to the CAA.
(2) The airworthiness authority of the country of operation must issue a maintenance approval or equivalent to the organisation responsible for the maintenance of the aircraft. This will ensure that an evaluation of the intended organisation has been carried out by the foreign airworthiness authority.
(3) The CAA will establish any required formal lines of communication with the foreign airworthiness authorities and the affected foreign and Omani Operators.
(4) The CAA will evaluate the ability of the foreign Operator (lessee) to operate and maintain the aircraft to Omani standards and requirements by:
    (i) inspecting proposed facilities;
    (ii) reviewing personnel qualifications and training programs;
    (iii) ensuring that the operator is aware of Omani requirements;
    (iv) ensuring that on going surveillance is accomplished.
(5) The lessors must reimburse the CAA for all travel, accommodation and other expenses incurred by the person authorised by the CAA to perform surveillance and inspection duties with respect to the operation and maintenance of such aircraft.

(l) After authorisation of the lease, the CAA will be responsible for ongoing surveillance and, as such, will develop a surveillance schedule on a case by case basis. Regulatory surveillance of the leasing operation should normally be conducted every 90 days. Except in those cases where an arrangement has been agreed upon between the foreign regulatory authority and the CAA. The surveillance will ensure that aircraft leased to maintained to Omani standards.

(m) Omani Registered commercial Aircraft Leased to Other Omani Operators
The following additional conditions shall apply to Omani registered commercial aircraft when leased to other Omani Operators:

(1) The lessee must be appropriately approved and capable of performing required maintenance (unless maintenance is sub-contracted); and
(2) The lessee must hold the appropriate AOC.

(n) Omani Operators Providing Wet/Damp lease Operations

(1) When performing wet/Damp lease operations, CAR OPS-3 shall apply in addition to the lessee's civil aviation rules. Whichever rule (foreign or Omani) is more restrictive shall apply in each instance of application of the rules.
(2) In addition to the requirements of section 1.6, in the case where the aircraft is to be operated on behalf of a foreign operator in accordance with CAR OPS-3.165, the agreement should be authorised by the foreign Operator's civil aviation authority. The authorisation should be by letter and must include authorisation for CAA inspectors to conduct necessary inspections of flight operations and maintenance facilities, personnel and/or documents, as deemed necessary, in the operating country.
(3) The lessor must submit to the CAA a letter stating they will reimburse the CAA for all travel, accommodation and other expenses incurred by the CAA to perform surveillance duties relating

to the approval and continuing surveillance of such aircraft.

(4) When performing wet lease operations under CAR OPS-3.165, the lessor must maintain the aircraft in accordance with the conditions of its Maintenance Program. The lessor must have its Operation Manual amended to include any changes required to account for:
   (i) Location of maintenance facilities, personnel, spares supplies;
   (ii) Minimum Equipment List (MEL) compliance handling procedures, including
   (iii) submission of a copy or reference to the MEL that will be utilised and any required ii. changes with respect to the intended operation; and
   (iv) Changes and/or use of contract maintenance facilities.
   (v) The lessor must identify the aircraft Maintenance Program along with any proposed amendments as a result of the intended operation; and
   (vi) The agreement must clearly specify that the lessor retains airworthiness control and responsibility for the aircraft.

(o) The foregoing must be evaluated to determine if any changes are required to the aircraft inspection program, location of maintenance facilities, personnel, equipment, etc. prior to approving the arrangement.
   (1) A base inspection of the foreign facilities shall be conducted by the CAA flight operations and airworthiness inspectors. Discussions with the foreign civil aviation authorities may be required, regarding compliance with any special airworthiness / operations conditions required by either the CAA or the foreign authorities prior to approving the arrangement.

(p) Foreign Operators Providing Wet Damp Lease to Omani Operators
   (1) When performing wet lease operations for an Omani Operator, the foreign Operator shall be approved under CAR OPS-3.
   (2) When performing wet lease operations, CAR OPS-3 shall apply in addition to the lessor's civil aviation rules. Whichever rule (foreign or Omani) is more restrictive shall apply in each instance of application of the rules.
   (3) In addition to the requirements of section (b), the agreement must be authorised by the foreign Operator's civil aviation authority; e.g. operations specifications.
   (4) The lessor must maintain the aircraft in accordance with the conditions of its Maintenance Program. The lessor may be required to have its Operation Manual amended to include any changes required to account for:
   (5) location of maintenance facilities, personnel, spares supplies;
   (6) Minimum Equipment List (MEL) compliance handling procedures, including
      (i) submission of a copy or reference to the MEL that will be utilised and any required
      (ii) changes with respect to the intended operation; and
   (7) Changes and/or use of contract maintenance facilities. In addition:
      (i) The lessor must identify the aircraft Maintenance Program along with any proposed amendments as a result of the intended operation; and
      (ii) The agreement must clearly specify that the lessor retains airworthiness control and responsibility for the aircraft.
   (8) The lease agreement shall state that the Lessor has Operational Control of the aircraft.
   (9) The foregoing must be evaluated to determine if any changes are required to the aircraft inspection program, location of maintenance facilities, personnel, equipment, etc. prior to approving the arrangement.

(q) Leased Aircraft subject to Long Term Airworthiness Directives
Certain airworthiness directives (ADs), such as the Corrosion Prevention and Corrosion Protection (CPCP) ADS, have long term implementation times and are subject to additional compliance

requirements. Therefore, aircraft which are subject to these ADS must be inspected and the maintenance records reviewed to show conformity to that type design, with particular attention to the following (where & when applicable):

(1) corrosion related airworthiness directives;
(2) corrosion and structural related services bulletins;
(3) structural modifications;
(4) application of Supplemental Structural Inspection Programs;
(5) major and multiple site damage repairs;
(6) fatigue quality of multiple repairs;
(7) re-inspection of repaired structures to ensure continued integrity; and
(8) major repair documentation such as drawings, procedures and related technical data.

(r) Termination

Any of the above aircraft lease approvals may be terminated on the date:

(1) the lease is terminated;
(2) specified by the CAA in the lease approval;
(3) on which the aircraft registration is suspended or cancelled;
(4) on which the Operation Certificate issued to either the aircraft lessee or lessor, with respect to the aircraft type, is suspended or cancelled; or
(5) on which any of the leasing regulations or conditions as specified in the approval are breached.

CAR OPS-3.170 Aircraft Operated under an Article 83 *bis* Agreement

(a) A Helicopter, when operating under an Article 83 *bis* agreement entered into between the State of Registry and the State of the Operator, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format. When the summary is issued in a language other than English, an English translation shall be included.

(b) The Agreement Summary of an Article 83 *bis* agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred under the agreement by the State of Registry to the State of the Operator, when conducting surveillance activities, such as ramp checks. (See AMC OPS-3.125(a)(10))

Note: Guidance for the civil aviation safety inspector conducting an inspection of a Helicopter operated under an Article 83 bis agreement is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335) and ICAO Doc 10059 Manual on the Implementation of Article 83bis.

(c) The Agreement Summary shall be transmitted to ICAO together with the Article 83 *bis* agreement for registration with the ICAO Council by the State of Registry or the State of the Operator.

Note: The Agreement Summary transmitted with the Article 83 bis agreement registered with the ICAO Council contains the list of all aircraft affected by the agreement. However, the certified true copy to be carried on board, as per paragraph (a), will need to list only the specific aircraft carrying the copy.

(d) The agreement summary should contain the information in ICAO 6, Part III, Appendix 6 for the specific aircraft and should follow the layout of Appendix 6, paragraph 3.

Appendix 1 to CAR OPS-3.005 Operator Requirements for Operations

(a) Management system

(1) The operator shall establish, implement and maintain a management system that includes:

(i) clearly defined lines of responsibility and accountability throughout the operator, including a direct safety accountability of the accountable manager;

(ii) a description of the overall philosophies and principles of the operator with regard to safety, referred to as the safety policy;

(iii) the identification of aviation safety hazards entailed by the activities of the operator, their evaluation and the management of associated risks, including taking actions to mitigate the risk and verify their effectiveness;

(iv) maintaining personnel trained and competent to perform their tasks;

(v) documentation of all management system key processes, including a process for making personnel aware of their responsibilities and the procedure for amending this documentation;

(vi) a function to monitor compliance of the operator with the relevant requirements. Compliance monitoring shall include a feedback system of findings to the accountable manager to ensure effective implementation of corrective actions as necessary; and

(vii) any additional requirements that are prescribed in the relevant Subparts of this CAR.

(2) The management system shall correspond to the size of the operator and the nature and complexity of its activities, taking into account the hazards and associated risks inherent in these activities.

(b) Personnel requirements

(1) The operator shall nominate persons responsible for the management and supervision of the following areas:

(i) flight operations;

(ii) crew member training;

(iii) ground operations;

(iv) continuing airworthiness or for the continuing airworthiness management contract in accordance with CAR M and CAR 145 as the case may be.

(2) Adequacy and competency of personnel

(i) The operator shall employ sufficient personnel for the planned ground and flight operations.

(ii) All personnel assigned to, or directly involved in, ground and flight operations shall:

(A) be properly trained;

(B) demonstrate their capabilities in the performance of their assigned duties; and

(C) be aware of their responsibilities and the relationship of their duties to the operation as a whole.

(3) Supervision of personnel

(i) The operator shall appoint a sufficient number of personnel supervisors, taking into account the structure of the operator's organization and the number of personnel employed.

(ii) The duties and responsibilities of these supervisors shall be defined, and any other necessary arrangements shall be made to ensure that they can discharge their supervisory responsibilities.

(iii) The supervision of crew members and personnel involved in the operation shall be exercised by individuals with adequate experience and the skills to ensure the attainment of the standards specified in the operations manual.

(c) Facility requirements

The operator shall:

(1) make use of appropriate ground handling facilities to ensure the safe handling of its flights;

(2) arrange operational support facilities at the main operating base, appropriate for the area and type of operation; and

(3) ensure that the available working space at each operating base is sufficient for personnel whose actions may affect the safety of flight operations. Consideration shall be given to the needs of

ground crew, personnel concerned with operational control, the storage and display of essential records and flight planning by crews.

(d) Documentation requirements

(1) The operator shall make arrangements for the production of manuals and any other documentation required and associated amendments.

(2) The operator shall be capable of distributing operational instructions and other information without delay.

(e) Changes

(1) Any change affecting the scope of the authorisation or the authorised operations shall require prior approval of the competent authority. Any change not covered by the initial risk assessment, shall require the submission of an amended risk assessment and SOP to the competent authority.

(2) The application for approval of a change shall be submitted before any such change takes place, in order to enable the competent authority to determine continued compliance with Regulation. The operator shall provide the competent authority with any relevant documentation to assess compliance.

(3) The change shall only be implemented upon receipt of formal approval by the competent authority.

(4) The operator shall operate under the conditions prescribed by the competent authority during such changes, as applicable.

(f) Operator conversion training

(1) For helicopter operations, the flight crew member shall complete the operator conversion training course before commencing unsupervised line flying:

(i) when changing to an aircraft for which a new type or class rating is required;

(ii) when joining an operator.

(2) The operator conversion training course shall include training on the equipment installed on the aircraft as relevant to flight crew members' roles.

(g) Differences training, familiarisation, equipment and procedure training

(1) Flight crew members shall complete differences training or familiarisation when required by CAR FCL.

(2) Flight crew members shall complete equipment and procedure training when changing equipment or changing procedures requiring additional knowledge on types or variants currently operated.

(3) The operations manual shall specify when such differences training or familiarisation or equipment and procedure training is required.

(h) General recurrent training and checking

(1) Each flight crew member shall complete annual recurrent flight and ground training relevant to the type or variant, and associated equipment of aircraft on which he or she operates, including training on the location and use of all emergency and safety equipment carried on board the aircraft.

(2) Each flight crew member shall be periodically checked to demonstrate competence in carrying out normal, abnormal and emergency procedures.

(i) Pilot qualification to operate in either pilot's seat

Flight crew members who may be assigned to operate in either pilot's seat shall complete appropriate training and checking as specified in the operations manual.

(j) Operation on more than one type or variant

(1) Flight crew members that operate more than one type or variant of aircraft shall comply with the requirements prescribed in this Subpart for each type or variant, unless credits related to the

training, checking, and recent experience requirements are defined in the mandatory part of the operational suitability data established published by type certification CAA for the relevant types or variants.

(2) The operator may define groups of single-engined helicopter types. An operator proficiency check on one type shall be valid for all the other types within the group if both of the following conditions are met:

(i) the group either includes only single-engined turbine helicopters operated under VFR or it includes only single-engined piston helicopters operated under VFR;

(ii) for CAT operations, at least two operator proficiency checks per type shall be conducted within a 3-year cycle.

(3) For specialised operations, elements of the aircraft/FSTD training and operator proficiency check that cover the relevant aspects associated with the specialised task and are not related to the type or group of types may be credited towards the other groups or types, based on a risk assessment performed by the operator.

(4) For operations on more than one helicopter type or variant that are used for conducting sufficiently similar operations, if line checks rotate between types or variants, each line check shall revalidate the line check for the other helicopter types or variants.

(5) Appropriate procedures and any operational restrictions shall be specified in the operations manual for any operation on more than one type or variant.

(k) Provision of training, checking and assessment

(1) All training, checking and assessment required in this Subpart shall be conducted in accordance with the training programmes and syllabi established by the operator in the operations manual;

(2) When establishing the training programmes and syllabi, the operator shall include the relevant elements defined in the mandatory part of the operational suitability data.

(3) In the case of CAT operations, training and checking programmes, including syllabi and the use of the means to deliver the programme such as individual flight simulation training devices (FSTDs) and other training solutions, shall be approved by the competent authority.

(4) The FSTD used to meet the requirements of this Subpart shall be qualified in accordance with EASA regulations and it shall replicate the aircraft used by the operator, as far as practicable. Differences between the FSTD and the aircraft shall be described and addressed through a briefing or training, as appropriate.

(5) The operator shall establish a system to adequately monitor changes to the FSTD and to ensure that those changes do not affect the adequacy of the training programmes.

(6) The operator shall monitor the validity of each recurrent training and checking.

(7) The validity periods required in this Subpart shall be counted from the end of the month in which the recency, training or check was completed.

(l) Personnel providing training, checking and assessment

(1) All training, checking and assessment required in this Subpart shall be conducted by appropriately qualified personnel.

(2) In the case of flight and flight simulation training, checking and assessment, the personnel that provide the training and conduct the checking or assessment shall be qualified in accordance with CAR FCL. Additionally, the personnel providing training and conducting checking towards specialised operations shall be suitably qualified for the relevant operation.

(3) For an EBT programme, the personnel that performs assessment and provides training shall:

(i) hold a CAR FCL instructor or examiner certificate;

(ii) complete the operator's EBT instructor standardisation programme. This shall include an initial standardisation programme and a recurrent standardisation programme.

(iii) Completion of the operator's EBT initial standardisation will qualify the instructor to perform EBT practical assessment.

(4) Notwithstanding point (2), the line evaluation of competence may be conducted by a suitably qualified commander nominated by the operator that is standardised in EBT concepts and the assessment of competencies (line evaluator).

(5) Notwithstanding point (2), the aircraft/FSTD training and the operator proficiency check may be conducted by a suitably qualified commander holding a FI/TRI/SFI certificate and nominated by the operator for any of the following operations:

(i) CAT operations of helicopters meeting the criteria of certification by the EASA ORO.FC.005.

(ii) CAT operations of other than complex motor-powered helicopters by day and over routes navigated by reference to visual landmarks;

(6) Notwithstanding point (2), the aircraft/FSTD training and the demonstration of competence/operator proficiency check may be conducted by a suitably qualified pilot-in-command/commander nominated by the operator for any of the following operations:

(i) specialised operations;

(7) Notwithstanding point (2), the line check may be conducted by a suitably qualified commander nominated by the operator.

(8) The operator shall inform the competent authority about the persons nominated under points (5) to (7).

(m) Single-pilot operations under IFR or at night

In order to be able to fly under IFR or at night with a minimum flight crew of one pilot, the following shall be complied with:

(1) The operator shall include in the operations manual a pilot's conversion and recurrent training programme that includes the additional requirements for a single-pilot operation. The pilot shall have undertaken training on the operator's procedures, in particular regarding:

(i) engine management and emergency handling;

(ii) use of normal, abnormal and emergency checklist;

(iii) air traffic control (ATC) communication;

(iv) departure and approach procedures;

(v) autopilot management, if applicable;

(vi) use of simplified in-flight documentation;

(vii) single-pilot crew resource management.

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(3) For helicopter operations under IFR the pilot shall have:

(i) 25 hours total IFR flight experience in the relevant operating environment; and

(ii) 25 hours flight experience as a single pilot on the specific type of helicopter, approved for single-pilot IFR, of which 10 hours may be flown under supervision, including five sectors of IFR line flying under supervision using the single-pilot procedures; and

(iii) completed during the preceding 90 days:

(A) five IFR flights as a single pilot, including three instrument approaches, carried out on a helicopter approved for this purpose; or

(B) an IFR instrument approach check as a single pilot on the relevant type of helicopter, flight training device (FTD) or full flight simulator (FFS).

(n) Command course

(1) For helicopter operations, the command course shall include at least the following elements:

(i) training in an FSTD, which includes line oriented flight training (LOFT) and/or flight training;

(ii) the operator proficiency check, operating as commander;

(iii) command responsibilities training;
(iv) line training as commander under supervision, for a minimum of 10 hours, including at least 10 flight sectors, in the case of helicopters;
(v) completion of a line check as commander and demonstration of adequate knowledge of the route or area to be flown and of the aerodromes, including alternate aerodromes, facilities and procedures to be used; and
(vi) crew resource management training.

(o) Initial operator's crew resource management (CRM) training
(1) The flight crew member shall have completed an initial CRM training course before commencing unsupervised line flying.
(2) Initial CRM training shall be conducted by at least one suitably qualified CRM trainer who may be assisted by experts in order to address specific areas.
(3) If the flight crew member has not previously received theoretical training in human factors to the ATPL level, he/she shall complete, before or combined with the initial CRM training, a theoretical course provided by the operator and based on the human performance and limitations syllabus for the ATPL as established in CAR FCL.

(p) Operator conversion training and checking
(1) CRM training shall be integrated into the operator conversion training course.
(2) Once an operator conversion course has been commenced, the flight crew member shall not be assigned to flying duties on another type or class of aircraft until the course is completed or terminated. Crew members may be assigned to flights on single-engined helicopters during an operator conversion course on a single-engined helicopter, provided that the training is unaffected.
(3) The amount of training required by the flight crew member for the operator's conversion course shall be determined in accordance with the standards of qualification and experience specified in the operations manual, taking into account his/her previous training and experience.
(4) The flight crew member shall complete:
(i) the operator proficiency check and the emergency and safety equipment training and checking before commencing line flying under supervision (LIFUS); and
(ii) the line check upon completion of line flying under supervision.
(5) If operational circumstances, such as applying for a new AOC or adding a new aircraft type or class to the fleet, do not allow the operator to comply with the requirements in (4), the operator may develop a specific conversion course, to be used temporarily for a limited number of pilots.

(q) Recurrent training and checking
(1) Each flight crew member shall complete recurrent training and checking relevant to the type or variant, and associated equipment of aircraft on which they operate.
(2) Operator proficiency check
(i) Each flight crew member shall complete operator proficiency checks as part of the normal crew complement.
(ii) When the flight crew member will be required to operate under IFR, the operator proficiency check shall be conducted without external visual reference, as appropriate.
(iii) The validity period of the operator proficiency check shall be 6 calendar months. The proficiency check shall be undertaken before commencing CAT operations.
(3) Line check
Each flight crew member shall complete a line check on the aircraft. The validity period of the line check shall be 12 calendar months.
(4) Emergency and safety equipment training and checking

Each flight crew member shall complete recurrent training and checking on the location and use of all emergency and safety equipment carried on board the aircraft. The validity period of an emergency and safety equipment training and checking shall be 12 calendar months.

(5) CRM training

(i) Elements of CRM shall be integrated into all appropriate phases of the recurrent training.

(ii) Each flight crew member shall undergo specific modular CRM training. All major topics of CRM training shall be covered by distributing modular training sessions as evenly as possible over each 3-year period.

(6) Each flight crew member shall undergo ground training and flight training in an FSTD or an aircraft, or a combination of FSTD and aircraft training, at least every 12 calendar months.

(r) Evidence-based training

(1) EBT PROGRAMME

(i) The operator may substitute the requirements of (q) above, by establishing, implementing and maintaining a suitable EBT programme approved by the competent authority.

(ii) The operator shall demonstrate its capability to support the implementation of the EBT programme (including an implementation plan) and perform a safety risk assessment demonstrating how an equivalent level of safety is achieved.

(iii) The EBT programme shall:

(A) correspond to the size of the operator, and the nature and complexity of its activities, taking into account the hazards and associated risks inherent in those activities;

(B) ensure pilot competence by assessing and developing pilot competencies required for a safe, effective and efficient operation of aircraft;

(C) ensure that each pilot is exposed to the assessment and training topics derived in accordance with para (s) EBT programme assessment and training topics;

(D) include at least six EBT modules distributed across a 3-year programme; each EBT module shall consist of an evaluation phase and a training phase. The validity period of a EBT module shall be 12 months;

i. The evaluation phase comprises a line-orientated flight scenario (or scenarios) to assess all competencies and identify individual training needs.

ii. The training phase comprises:

a. the manoeuvres training phase, comprising training to proficiency in certain defined manoeuvres;

b. the scenario-based training phase, comprising a line-orientated flight scenario (or scenarios) to develop competencies and address individual training needs.

The training phase shall be conducted in a timely manner after the evaluation phase.

(iv) The operator shall ensure that each pilot enrolled in the EBT programme completes:

(A) a minimum of two EBT modules within the validity period of the type rating, separated by a period of not less than 3 months. The EBT module is completed when:

i. the content of the EBT programme is completed for that EBT module (exposure of the pilot to the assessment and training topics); and

ii. an acceptable level of performance in all observed competencies has been demonstrated;

(B) line evaluation(s) of competence; and

(C) ground training.

(v) The operator shall establish an EBT instructor standardisation and concordance assurance programme to ensure that the instructors involved in EBT are properly qualified to perform their tasks.

(A) All instructors must be subject to this programme;
(B) The operator shall use appropriate methods and metrics to assess concordance;
(C) The operator shall demonstrate that the instructors have sufficient concordance.

(vi) The EBT programme may include contingency procedures for unforeseen circumstances that could affect the delivery of the EBT modules. The operator shall demonstrate the need for those procedures. The procedures shall ensure that a pilot does not continue line operations if the performance observed was below the minimum acceptable level. They may include:
(A) a different separation period between EBT modules; and
(B) different order of the phases of the EBT module.

(2) COMPETENCY FRAMEWORK
The operator shall use a competency framework for all aspects of assessment and training within an EBT programme. The competency framework shall:
(i) be comprehensive, accurate, and usable;
(ii) include observable behaviours required for safe, effective and efficient operations;
(iii) include a defined set of competencies, their descriptions and their associated observable behaviours.

(3) TRAINING SYSTEM PERFORMANCE
(i) The EBT system performance shall be measured and evaluated through a feedback process in order to:
(ii) validate and refine the operator's EBT programme;
(A) ascertain that the operator's EBT programme develops pilot competencies.
(iii) The feedback process shall be included in the operator's management system.
(iv) The operator shall develop procedures governing the protection of EBT data.

(4) GRADING SYSTEM
(i) The operator shall use a grading system to assess the pilot competencies. The grading system shall ensure:
(A) a sufficient level of detail to enable accurate and useful measurements of individual performance;
(B) a performance criterion and a scale for each competency, with a point on the scale which determines the minimum acceptable level to be achieved for the conduct of line operations. The operator shall develop procedures to address low performance of the pilot;
(C) data integrity;
(D) data security.
(ii) The operator shall verify at regular intervals the accuracy of the grading system against a criterion-referenced system.

(5) SUITABLE TRAINING DEVICES AND VOLUME OF HOURS TO COMPLETE THE OPERATOR'S EBT PROGRAMME
(i) Each EBT module shall be conducted in an FSTD with a qualification level adequate to ensure the correct delivery of the assessment and training topics.
(ii) The operator shall provide a sufficient volume of hours in the suitable training device for the pilot to complete the operator's EBT programme. The criteria to determine the volume of the EBT programme are as follows:
(A) The volume corresponds to the size and complexity of the EBT programme;
(B) The volume is sufficient to complete the EBT programme;
(C) The volume ensures an effective EBT programme taking into account the recommendations provided by ICAO, the Agency, and the competent authority;

(D) The volume corresponds to the technology of the training devices used.

(6) EQUIVALENCY OF MALFUNCTIONS

(i) Each pilot shall receive assessment and training in the management of aircraft system malfunctions.

(ii) Aircraft system malfunctions that place a significant demand on a proficient crew shall be organised by reference to the following characteristics:

(A) immediacy;

(B) complexity;

(C) degradation of aircraft control;

(D) loss of instrumentation;

(E) management of consequences.

(iii) Each pilot shall be exposed to at least one malfunction for each characteristic at the frequency determined by the table of assessment and training topics.

(iv) Demonstrated proficiency in the management of one malfunction is considered equivalent to demonstrated proficiency in the management of other malfunctions with the same characteristics.

(7) EQUIVALENCY OF APPROACHES RELEVANT TO OPERATIONS

(i) The operator shall ensure that each pilot receives regular training in the conduct of approach types and approach methods relevant to operations.

(ii) This training shall include approaches that place an additional demand on a proficient crew.

(iii) This training shall include the approaches that require specific approval in accordance with Annex V (Part-SPA) to this Regulation.

(8) LINE EVALUATION OF COMPETENCE

(i) Each pilot shall periodically undertake a line evaluation of competence in an aircraft to demonstrate the safe, effective and efficient conduct of normal line operations described in the operations manual.

(ii) The validity period of a line evaluation of competence shall be 12 months.

(iii) The operator approved for EBT may, with the approval of the competent authority, extend the validity of the line evaluation of competence to:

(A) either 2 years, subject to a risk assessment;

(B) or 3 years, subject to a feedback process for the monitoring of line operations which identifies threats to the operations, minimises the risks of such threats, and implements measures to manage human error in the operations.

(iv) For successful completion of the line evaluation of competence, the pilot shall demonstrate an acceptable level of performance in all observed competencies.

(9) GROUND TRAINING

(i) Every 12 calendar months, each pilot shall undergo:

(A) technical ground training;

(B) assessment and training on the location and use of all emergency and safety equipment carried on the aircraft.

(ii) The operator may, with the approval of the competent authority and subject to a risk assessment, extend the period of assessment and training on the location and use of all emergency and safety equipment carried on the aircraft to 24 months.

(s) EBT programme assessment and training topics

(1) The operator shall ensure that each pilot is exposed to the assessment and training topics.

(2) The assessment and training topics shall be:

(i) derived from safety and operational data that are used to identify the areas for improvement and prioritisation of pilot training to guide in the construction of suitable EBT programmes;

(ii) distributed across a 3-year period at a defined frequency;

(iii) relevant to the type or variant of aircraft on which the pilot operates.

(t) Pilot qualification to operate in either pilot's seat — helicopters

(1) Helicopter pilots whose duties require them to operate in either pilot's seat shall complete additional training and checking to ensure that they are proficient in conducting the relevant normal, abnormal and emergency procedures from either seat. The validity period of this qualification shall be 12 calendar months.

(2) Current FIs or TRIs on the relevant type are considered to fulfil the requirement of point (a) if they have had a FI or TRI activity in the last 6 months on that type and on the helicopter.

(u) Operation on more than one type or variant

(1) The procedures or operational restrictions for operation on more than one type or variant established in the operations manual and approved by the competent authority shall cover:

(i) the flight crew members' minimum experience level;

(ii) the minimum experience level on one type or variant before beginning training for and operation of another type or variant;

(iii) the process whereby flight crew qualified on one type or variant will be trained and qualified on another type or variant; and

(iv) all applicable recent experience requirements for each type or variant.

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(v) Commanders holding a CPL(H)

(1) Holders of a CPL(H) (helicopter) shall only act as commanders in CAT operations on a single-pilot helicopter if:

(i) when operating under IFR, they have a minimum of 700 hours total flight time on helicopters, including 300 hours as pilot-in-command. The total flight time on helicopters shall include 100 hours under IFR. Up to 50 hours instrument time performed on an FFS(H) level B or FTD level 3 qualification or higher qualified for instrument training, may be credited towards the 100 hours. The 300 hours as pilot-in-command may be substituted by hours operating as co-pilot within an established multi-pilot crew system prescribed in the operations manual on the basis of 2 hours of flight time as co-pilot for 1 hour flight time as pilot-in command;

(ii) when operating under visual meteorological conditions (VMC) at night, he/she has:

(A) a valid instrument rating; or

(B) 300 hours of flight time on helicopters, including 100 hours as pilot-in-command and 10 hours as pilot flying at night.

(w) Operator conversion training and checking

The operator conversion course shall include an operator proficiency check.

(x) Equipment and procedure training and checking

If a flight crew member undergoes equipment and procedure training that requires training on a suitable FSTD or the aircraft, with regard to standard operating procedures related to a specialised operation, the flight crew member shall undergo an operator proficiency check.

(y) Recurrent training and checking — operator proficiency check

(1) Each flight crew member shall complete recurrent training and operator proficiency checks. In the case of specialised operations, the recurrent training and checking shall cover the relevant aspects associated with the specialised tasks described in the operations manual.

(2) Appropriate consideration shall be given when operations are undertaken under IFR or at night.

(3) The validity period of the operator proficiency check shall be 6 calendar months.

Appendix 2 to CAR OPS 3.005 Commercial Air Transport. General Requirements

(a) Crew responsibilities

(1) The crew member shall be responsible for the proper execution of his or her duties that are:

(i) related to the safety of the aircraft and its occupants; and

(ii) specified in the instructions and procedures in the operations manual.

(2) The crew member shall:

(i) report to the commander any fault, failure, malfunction or defect which the crew member believes may affect the airworthiness or safe operation of the aircraft including emergency systems, if not already reported by another crew member;

(ii) report to the commander any incident that endangered, or could have endangered, the safety of the operation, if not already reported by another crew member;

(iii) comply with the relevant requirements of the operator's occurrence reporting schemes;

(iv) comply with all flight and duty time limitations (FTL) and rest requirements applicable to their activities;

(v) when undertaking duties for more than one operator:

(A) maintain his or her individual records regarding flight and duty times and rest periods as referred to in the applicable FTL requirements;

(B) provide each operator with the data needed to schedule activities in accordance with the applicable FTL requirements; and

(C) provide each operator with the data needed regarding operations on more than one type or variant.

(3) The crew member shall not perform duties on an aircraft:

(i) when under the influence of psychoactive substances or when unfit due to injury, fatigue, medication, sickness or other similar causes;

(ii) until a reasonable time period has elapsed after deep water diving or following blood donation;

(iii) if applicable medical requirements are not fulfilled;

(iv) if he or she is in any doubt of being able to accomplish his or her assigned duties; or

(v) if he or she knows or suspects that he or she is suffering from fatigue or feels otherwise unfit, to the extent that the flight may be endangered.

(b) Responsibilities of the commander

(1) The commander, in addition to complying with crew responsibilities above, shall:

(i) be responsible for the safety of all crew members, passengers and cargo on board, as soon as the commander arrives on board the aircraft, until the commander leaves the aircraft at the end of the flight;

(ii) be responsible for the operation and safety of the aircraft:

(A) for helicopters, when the rotors are turning;

(iii) have authority to give all commands and take any appropriate actions for the purpose of securing the safety of the aircraft and of persons and/or property carried therein in.

(iv) have authority to disembark any person, or any part of the cargo, that may represent a potential hazard to the safety of the aircraft or its occupants;

(v) not allow a person to be carried in the aircraft who appears to be under the influence of alcohol or drugs to the extent that the safety of the aircraft or its occupants is likely to be endangered;

(vi) have the right to refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage increases the risk to the safety of the aircraft or its occupants;

(vii) ensure that all passengers are briefed on the location of emergency exits and the location and use of relevant safety and emergency equipment;

(viii) ensure that all operational procedures and checklists are complied with in accordance with the operations manual;

(ix) not permit any crew member to perform any activity during critical phases of flight, except duties required for the safe operation of the aircraft;

(x) ensure that:

(A) flight recorders are not disabled or switched off during flight;

(B) in the event of an occurrence other than an accident or a serious incident that shall be reported according to CAD 1-02, flight recorders' recordings are not intentionally erased; and

(C) in the event of an accident or a serious incident, or if preservation of recordings of flight recorders is directed by the investigating authority:

(A) flight recorders' recordings are not intentionally erased;

(B) flight recorders are deactivated immediately after the flight is completed; and

(C) precautionary measures to preserve the recordings of flight recorders are taken before leaving the flight crew compartment;

(xi) decide on acceptance of the aircraft with unserviceabilities in accordance with the configuration deviation list (CDL) or the minimum equipment list (MEL);

(xii) ensure that the pre-flight inspection has been carried out in accordance with the requirements of CAR OPS-3.

(xiii) be satisfied that relevant emergency equipment remains easily accessible for immediate use;

(xiv) record, at the termination of the flight, utilisation data and all known or suspected defects of the aircraft in the aircraft technical log or journey log of the aircraft to ensure continued flight safety.

(2) The commander, or the pilot to whom conduct of the flight has been delegated, shall, in an emergency situation that requires immediate decision and action, take any action he/she considers necessary under the circumstances in the interest of safety. Any deviation from rules, regulations or procedures will be immediately notified to the CAA/ OTSB.

(3) Whenever an aircraft in flight has manoeuvred in response to an airborne collision avoidance system (ACAS) resolution advisory (RA), the commander shall submit an ACAS report to the competent authority.

(4) Bird hazards and strikes:

(i) Whenever a potential bird hazard is observed, the commander shall inform the air traffic service (ATS) unit as soon as flight crew workload allows.

(ii) Whenever an aircraft for which the commander is responsible suffers a bird strike that results in significant damage to the aircraft or the loss or malfunction of any essential service, the commander shall submit a written bird strike report after landing to the competent authority.

(5) The commander shall, as soon as possible, report to the appropriate air traffic services (ATS) unit any hazardous weather or flight conditions encountered that are likely to affect the safety of other aircraft.

(c) Authority of the commander

The operator shall take all reasonable measures to ensure that all persons carried in the aircraft obey all lawful commands given by the commander for the purpose of securing the safety of the aircraft and of persons or property carried therein.

(d) Personnel or crew members other than cabin crew in the passenger compartment

The operator shall ensure that personnel or crew members, other than operating cabin crew members, carrying out their duties in the passenger compartment of an aircraft:

(1) are not confused by the passengers with operating cabin crew members;
(2) do not occupy required cabin crew assigned stations;
(3) do not impede operating cabin crew members in their duties.

(e) Taxiing of aircraft
The operator shall establish procedures for taxiing of aircraft in order to ensure safe operation and in order to enhance runway safety.

(f) Rotor engagement — helicopters
A helicopter rotor shall only be turned under power for the purpose of flight with a qualified pilot at the controls.

(g) Admission to the flight crew compartment
(1) The operator shall ensure that no person, other than a flight crew member assigned to a flight, is admitted to, or carried in, the flight crew compartment unless that person is:
(i) an operating crew member;
(ii) a representative of the competent or inspecting authority, if required to be there for the performance of his/her official duties; or
(iii) permitted by and carried in accordance with instructions contained in the operations manual.
(2) The commander shall ensure that:
(i) admission to the flight crew compartment does not cause distraction or interference with the operation of the flight; and
(ii) all persons carried in the flight crew compartment are made familiar with the relevant safety procedures.
(3) The commander shall make the final decision regarding the admission to the flight crew compartment.

(h) Portable electronic devices
The operator shall not permit any person to use a portable electronic device (PED) on board an aircraft that could adversely affect the performance of the aircraft's systems and equipment, and shall take all reasonable measures to prevent such use.

(i) Use of electronic flight bags (EFBs)
(1) Where an EFB is used on board an aircraft, the operator shall ensure that it does not adversely affect the performance of the aircraft systems or equipment, or the ability of the flight crew member to operate the aircraft.
(2) The operator shall not use a type B EFB application unless it is approved by CAA.

(j) Information on emergency and survival equipment carried
The operator shall at all times have available for immediate communication to rescue coordination centres (RCCs) lists containing information on the emergency and survival equipment carried on board any of their aircraft.

(k) Carriage of weapons of war and munitions of war
(1) The operator shall only transport weapons of war or munitions of war by air if an approval to do so has been granted by all States whose airspace is intended to be used for the flight.
(2) Where an approval has been granted, the operator shall ensure that weapons of war and munitions of war are:
(i) stowed in the aircraft in a place that is inaccessible to passengers during flight; and
(ii) in the case of firearms, unloaded.

(c) The operator shall ensure that, before a flight begins, the commander is notified of the details and location on board the aircraft of any weapons of war and munitions of war intended to be carried.

(l) Carriage of sporting weapons and ammunition
(1) The operator shall take all reasonable measures to ensure that any sporting weapons intended to

be carried by air are reported to the operator.

(2) The operator accepting the carriage of sporting weapons shall ensure that they are:

(i) stowed in the aircraft in a place that is inaccessible to passengers during flight; and

(ii) in the case of firearms or other weapons that can contain ammunition, unloaded.

(3) Ammunition for sporting weapons may be carried in passengers' checked baggage, subject to certain limitations, in accordance with the technical instructions.

(m) Carriage of sporting weapons and ammunition — alleviations

Notwithstanding sub para l (2) above, for helicopters with a maximum certified take-off mass (MCTOM) of 3 175 kg or less operated by day and over routes navigated by reference to visual landmarks, a sporting weapon may be carried in a place that is accessible during flight, provided that the operator has established appropriate procedures and it is impracticable to stow it in an inaccessible stowage during flight.

(n) Method of carriage of persons

The operator shall take all measures to ensure that no person is in any part of an aircraft in flight that is not designed for the accommodation of persons unless temporary access has been granted by the commander:

(1) for the purpose of taking action necessary for the safety of the aircraft or of any person, animal or goods therein; or

(2) to a part of the aircraft in which cargo or supplies are carried, being a part that is designed to enable a person to have access thereto while the aircraft is in flight.

(o) Psychoactive substances

(1) The operator shall take all reasonable measures to ensure that no person enters or is in an aircraft when under the influence of psychoactive substances to the extent that the safety of the aircraft or its occupants is likely to be endangered.

(2) The operator shall develop and implement a policy on the prevention and detection of misuse of psychoactive substances by flight and cabin crew members and by other safety-sensitive personnel under its direct control, in order to ensure that the safety of the aircraft or its occupants is not endangered.

(3) Without prejudice to the applicable national legislation on data protection concerning testing of individuals, the operator shall develop and implement an objective, transparent and non-discriminatory procedure for the prevention and detection of cases of misuse of psychoactive substances by its flight and cabin crew and other safety-sensitive personnel.

(4) In case of a confirmed positive test result, the operator shall inform its competent authority and the authority responsible for the personnel concerned, such as a medical assessor of the licensing authority.

(p) Endangering safety

(1) The operator shall take all reasonable measures to ensure that no person recklessly, intentionally or negligently acts or omits to act so as to:

(i) endanger an aircraft or person therein; or

(ii) cause or permit an aircraft to endanger any person or property.

(2) The operator shall ensure that flight crew has undergone a psychological assessment before commencing line flying in order to:

(i) identify psychological attributes and suitability of the flight crew in respect of the work environment; and

(ii) reduce the likelihood of negative interference with the safe operation of the aircraft.

(3) Considering the size, nature and complexity of the activity of an operator, an operator may replace the psychological assessment referred to in point (2) with an internal assessment of the

psychological attributes and suitability of flight crew.

(q) Documents, manuals and information to be carried

(1) The following documents, manuals and information shall be carried on each flight, as originals or copies unless otherwise specified:

(i) the aircraft flight manual (AFM), or equivalent document(s);

(ii) the original certificate of registration;

(iii) the original certificate of airworthiness (CofA);

(iv) the noise certificate, including an English translation, where one has been provided by the authority responsible for issuing the noise certificate;

(v) a certified true copy of the air operator certificate (AOC), including an English translation when the AOC has been issued in another language;

(vi) the operations specifications relevant to the aircraft type, issued with the AOC, including an English translation when the operations specifications have been issued in another language;

(vii) the original aircraft radio licence, if applicable;

(viii) the third party liability insurance certificate(s);

(ix) the journey log, or equivalent, for the aircraft;

(x) the aircraft technical log,

(xi) details of the filed ATS flight plan, if applicable;

(xii) current and suitable aeronautical charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;

(xiii) procedures and visual signals information for use by intercepting and intercepted aircraft;

(xiv) information concerning search and rescue services for the area of the intended flight, which shall be easily accessible in the flight crew compartment;

(xv) the current parts of the operations manual that are relevant to the duties of the crew members, which shall be easily accessible to the crew members;

(xvi) the MEL;

(xvii) appropriate notices to airmen (NOTAMs) and aeronautical information service (AIS) briefing documentation;

(xviii) appropriate meteorological information;

(xix) cargo and/or passenger manifests, if applicable;

(xx) mass and balance documentation;

(xxi) the operational flight plan, if applicable;

(xxii) notification of special categories of passenger (SCPs) and special loads, if applicable; and

(xxiii) any other documentation that may be pertinent to the flight or is required by the States concerned with the flight.

(r) Information to be retained on the ground

(1) The operator shall ensure that at least for the duration of each flight or series of flights:

(i) information relevant to the flight and appropriate for the type of operation is preserved on the ground;

(ii) the information is retained until it has been duplicated at the place at which it will be stored; or, if this is impracticable

(iii) the same information is carried in a fireproof container in the aircraft.

(2) The information referred to in (a) includes:

(i) a copy of the operational flight plan, where appropriate;

(ii) copies of the relevant part(s) of the aircraft technical log;

(iii) route-specific NOTAM documentation if specifically edited by the operator;

(iv) mass and balance documentation if required; and

(v) special loads notification.

(s) Provision of documentation and records

The commander shall, within a reasonable time of being requested to do so by a person authorised by an authority, provide to that person the documentation required to be carried on board.

(t) Handling of flight recorder recordings: preservation, production, protection and use

(1) Following an accident, a serious incident or an occurrence identified by the investigating authority, the operator of an aircraft shall preserve the original recorded data of the flight recorders for a period of 60 days or until otherwise directed by the investigating authority.

(2) The operator shall conduct operational checks and evaluations of the recordings to ensure the continued serviceability of the flight recorders which are required to be carried under this Regulation.

(3) The operator shall ensure that the recordings of flight parameters and data link communication messages required to be recorded on flight recorders are preserved. However, for the purpose of testing and maintaining those flight recorders, up to 1 hour of the oldest recorded data at the time of testing may be erased.

(4) The operator shall keep and maintain up to date documentation that presents the necessary information to convert raw flight data into flight parameters expressed in engineering units.

(5) The operator shall make available any flight recorder recordings that have been preserved, if so determined by the competent authority.

(6) Without prejudice to Civil Aviation Law,

(i) Except for ensuring flight recorder serviceability, audio recordings from a flight recorder shall not be disclosed or used unless all of the following conditions are fulfilled:

(A) a procedure related to the handling of such audio recordings and of their transcript is in place;

(B) all crew members and maintenance personnel concerned have given their prior consent;

(C) such audio recordings are used only for maintaining or improving safety.

(ii) When inspecting flight recorder audio recordings to ensure flight recorder serviceability, the operator shall protect the privacy of those audio recordings and make sure that they are not disclosed or used for purposes other than for ensuring flight recorder serviceability.

(iii) Flight parameters or data link messages recorded by a flight recorder shall not be used for purposes other than for the investigation of an accident or an incident which is subject to mandatory reporting, unless such recordings meet any of the following conditions:

(A) are used by the operator for airworthiness or maintenance purposes only;

(B) are de-identified;

(C) are disclosed under secure procedures.

(iv) Except for ensuring flight recorder serviceability, images of the flight crew compartment that are recorded by a flight recorder shall not be disclosed or used unless all of the following conditions are fulfilled:

(A) a procedure related to the handling of such image recordings is in place;

(B) all crew members and maintenance personnel concerned have given their prior consent;

(C) such image recordings are used only for maintaining or improving safety.

(v) When images of the flight crew compartment that are recorded by a flight recorder are inspected for ensuring the serviceability of the flight recorder, then:

(A) those images shall not be disclosed or used for purposes other than for ensuring flight recorder serviceability;

(B) if body parts of crew members are likely to be visible on the images, the operator shall ensure the privacy of those images.

(u) Transport of dangerous goods

(1) The transport of dangerous goods by air shall be conducted in accordance with Annex 18 to the Chicago Convention as last amended and amplified by the 'Technical instructions for the safe transport of dangerous goods by air' (ICAO Doc 9284-AN/905), including its supplements and any other addenda or corrigenda.

(2) Dangerous goods shall only be transported by an operator approved in accordance with CAR 92 and CAD 2-02.

(3) An operator shall establish procedures to ensure that all reasonable measures are taken to prevent dangerous goods from being carried on board inadvertently.

(v) Support programme

(1) The operator shall enable, facilitate and ensure access to a proactive and non-punitive support programme that will assist and support flight crew in recognising, coping with, and overcoming any problem which might negatively affect their ability to safely exercise the privileges of their licence. Such access shall be made available to all flight crew.

(2) Without prejudice to applicable national legislation on the protection of individuals with regard to the processing of personal data and on the free movement of such data, the protection of the confidentiality of data shall be a precondition for an effective support programme as it encourages the use of such a programme and ensures its integrity.

Appendix 1 to CAR OPS-3.005(c) Helicopter Flight Manual Limitations

(a) For helicopters certificated in Category A, a momentary flight through the height velocity (HV) envelope is allowed during the take-off and landing phases when the helicopter is operated according to any of the following requirements:

(1) CAR OPS-3.517; or

(2) Appendix 1 to CAR OPS-3.005(e); or

(3) Appendix 1 to CAR OPS-3.005(g).

Appendix 1 to CAR OPS-3.005(d) Helicopter Emergency Medical Service

(See AC Appendix 1 to CAR OPS-3.005(d))

Note: The Authority is empowered to decide which operation is a HEMS operation in the sense of this Appendix.

(I) Requirements (1)

(a) Helicopter emergency medical service (HEMS) operations

(1) Helicopters shall only be operated for the purpose of HEMS operations if the operator has been approved by the competent authority.

(2) To obtain such approval by the competent authority, the operator shall:

(i) operate in CAT and hold a CAT AOC;

(ii) demonstrate to the competent authority compliance with the requirements contained in this Subpart.

(3) Night operations to non-pre-surveyed HEMS operating sites outside congested areas that provide sufficient artificial ambient light shall be conducted under an approval issued in accordance with point EASA SPA.NVIS.100.

(b) Equipment requirements for HEMS operations

The installation of all helicopter dedicated medical equipment and any subsequent modifications and, where appropriate, its operation shall be approved in accordance with CAR M.

(1) The installation on a helicopter of all dedicated medical equipment and any subsequent modifications to that equipment and, where appropriate, its operation, shall be approved in accordance with CAR M.

(2) For VFR flights over routes navigated by reference to visual landmarks, the helicopter shall be equipped with a device that provides a moving map display with own-ship position and obstacles. The map and obstacle database(s) shall be kept up to date.

(3) non-pressurised helicopters operated in HEMS with a MOPSC of nine or less shall comply with the oxygen requirements applicable to other than complex, non-pressurised helicopters.

(4) For single-pilot operations at night, the helicopter shall be equipped as follows:

(i) for a helicopter first issued with an individual CofA before 25 May 2024 or earlier, with a suitable stability augmentation system or autopilot;

(ii) for a helicopter first issued with an initial CofA on or after 25 May 2024, with an autopilot.

(5) For HEMS operations by day, the helicopter shall be equipped with the flight instruments required for IFR flying.

(6) The helicopter shall be equipped with a radio altimeter capable of emitting an audio warning below a pre-set height and a visual warning at a height selectable by the pilot.

(7) Instruments and equipment required in points (4) to (6) shall be approved in accordance with the applicable airworthiness requirements.

(8) The operator shall ensure that all relevant information is documented in the minimum equipment list.

(c) Communication

Helicopters conducting HEMS flights shall have communication equipment capable of conducting two-way communication with the organisation for which the HEMS is being conducted and, where possible, to communicate with ground emergency service personnel.

(d) HEMS operating minima

(1) HEMS flights operated under VFR shall comply with the HEMS-specific weather minima for the dispatch and en-route phase of the HEMS flight.

(2) If during the en-route phase the weather conditions fall below the cloud base or visibility minima, helicopters certified for flights only under VMC shall abandon the flight or return to base. Helicopters equipped and certified for instrument meteorological conditions (IMC) operations may abandon the flight, return to base or convert in all respects to a flight conducted under instrument flight rules (IFR), provided the flight crew are suitably qualified.

(3) The VFR operating minima shall be as defined by the applicable airspace requirements, except in the following cases where reduced ceiling, visibility and vertical distances from obstacles may be used:

(i) multi-pilot operations;

(ii) single-pilot operations with a technical crew member seated in a forward-facing front seat, who is suitably qualified and tasked to mitigate the additional risk.

(e) Performance requirements for HEMS operations

(1) Performance class 3 operations over a hostile environment shall only be conducted provided one of the following conditions are met:

(i) The HEMS operating site used for take-off, landing or HEMS HEC operations is located above 7000-ft altitude and the helicopter is certified as Category A or equivalent, as determined by the CAA;

(ii) The planned HEMS operation does not require the transportation of medical personnel, medical supplies or ill or injured persons, and either the helicopter is certified as Category A or equivalent, as determined by the CAA, or all the following conditions are met:

(A) the helicopter is equipped with crash-resistant fuel systems;

(B) the helicopter is equipped with a safety belt with upper torso restraint system for use on each passenger seat for each passenger aged 24 months or more;

(C) the altitude of at least one of the HEMS operating sites used during the HEMS operation is not lower than 3 000 ft;

(D) the operator has been granted an approval by the competent authority

(iii) At least one HEMS operating site used for take-off, landing or HEMS HEC operations during the HEMS operation is located at or above 8 000-ft altitude and all the following conditions are met:

(A) the helicopter is equipped with crash-resistant fuel systems;

(B) the helicopter is equipped with a safety belt with upper torso restraint system for use on each passenger seat for each passenger aged 24 months or more;

(C) a helicopter certified as Category A or equivalent, as determined by the Agency, is not available or not suitable for the operation due to either of the following reasons:

i. insufficient performance margins to operate at the HEMS operating site, or no capability to conduct HEMS HEC operations, if applicable;

ii. helicopters certified as Category A or equivalent, as determined by the Agency, and that might otherwise be dispatched, are on a HEMS mission or not yet ready for the next mission, leading to a delay in the intervention incompatible with the emergency;

(D) the operator has established a procedure to achieve compliance with point (C);

(E) the operator shall record all missions flown with a helicopter that is not certified as Category A or equivalent, as determined by the CAA.

(2) If the criteria of point (1)(i) are met, then helicopter night operations may be conducted in performance class 3.

(3) Take-off and landing

(i) Helicopters that conduct operations to or from a final approach and take-off area (FATO) at a hospital that is located in a congested hostile environment and that is used as a HEMS operating base shall be operated in accordance with performance class 1.

(ii) Helicopters that conduct operations to or from a FATO at a hospital that is located in a congested hostile environment and that is not a HEMS operating base shall be operated in accordance with performance class 1 except when the operator holds a specific approval.

(iii) Helicopters that conduct operations to or from a HEMS operating site located in a hostile environment shall be:

(A) operated in accordance with performance class 2, or if the conditions defined in point (1) are met, in performance class 3;

(iv) The HEMS operating site features shall provide adequate clearance from all obstructions, and shall provide for safe operations. For night operations, the helicopter lighting system shall adequately illuminate the landing site and surrounding obstacles.

(f) Crew requirements

(1) Selection. The operator shall establish criteria for the selection of flight crew members for the HEMS task, taking their previous experience into account.

(2) INTENTIONALLY LEFT BLANK

(3) Operational training. Crew members shall successfully complete operational training in accordance with the HEMS procedures contained in the operations manual.

(4) Flight training by sole reference to instruments. Flight crew members that conduct HEMS operations

without a valid instrument rating shall complete flight training to proficiency by sole reference to instruments in a helicopter or in an FSTD to have the skills to escape unintended IMC conditions. The validity period of the flight training shall be 6 calendar months.

(5) Crew composition

(i) Day flight. The minimum crew composition shall at least satisfy the following requirements:

(A) comprise either two pilots or one pilot and one HEMS technical crew member;

(B) the crew composition may be reduced to only one pilot only if one of the situations below occur; once the crew composition is reduced to one pilot, the commander shall only operate to or from HEMS operating sites if they have previously conducted an in-flight reconnaissance with two crew members during the same HEMS mission:

i. the commander is required to fetch additional medical supplies, refuel, or reposition while the HEMS technical crew member provides medical assistance on the ground;

ii. the medical passenger requires the assistance of the HEMS technical crew member in flight;

iii. the HEMS technical crew member disembarks to supervise a HEMS HEC cargo sling operation from outside the helicopter;

(ii) Night flight. The minimum crew composition shall be:

(a) either two pilots or one pilot and one HEMS technical crew member;

(b) one pilot where the following conditions are met:

i. the medical passenger requires the assistance of the HEMS technical crew member during the flight;

ii. neither the departure nor the destination is a HEMS operating site.

(iii) The operator shall ensure that the continuity of the crew concept is maintained throughout the HEMS mission.

(6) Flight and technical crew training and checking

(i) Training and checking shall be conducted by suitably qualified personnel in accordance with a detailed syllabus that is included in the operations manual and approved by the competent authority.

(ii) Crew members

(A) All relevant elements of the crew training programmes including helicopter/FSTD training, should improve the crew's knowledge of the HEMS working environment and equipment, improve crew coordination, and include measures to minimise the risks associated with en-route transit in low-visibility conditions, the selection of HEMS operating sites, and approach and departure profiles. The training programme shall be approved by CAA.

(B) The measures referred to in point (A) shall be assessed during both of the following:

i. VMC day proficiency checks, or VMC night proficiency checks when night HEMS operations are undertaken by the operator;

ii. line checks.

(C) the HEMS components of the proficiency checks and line checks referred to in point (B) shall both have a validity period of 12 calendar months.

(g) HEMS medical passenger and other personnel briefing

(1) Medical passenger. Prior to any HEMS flight, or series of flights, medical passengers shall have been briefed to ensure that they are familiar with the HEMS working environment and equipment, can operate on-board medical and emergency equipment and can take part in normal and emergency

entry and exit procedures.

(2) Ground emergency service personnel. The operator shall take all reasonable measures to ensure that ground emergency service personnel are familiar with the HEMS working environment and equipment and the risks associated with ground operations at a HEMS operating site.

(3) Medical patient. A briefing shall only be conducted if the medical condition makes this practicable.

(h) Information, procedures and documentation

(1) The operator shall assess, mitigate, and minimise the risks associated with the HEMS environment as part of its risk analysis and management process. The operator shall describe the mitigating measures, including operating procedures, in the operations manual.

(2) The operator shall ensure that the HEMS commander assesses specific risks associated with the particular HEMS mission.

(3) Relevant extracts from the operations manual shall be made available to the organisation for which the operator performs HEMS operations.

(i) HEMS operating base facilities

(1) If crew members are required to be on standby with a reaction time of less than 45 minutes, dedicated suitable accommodation shall be provided close to each operating base.

(2) At each operating base the pilots shall be provided with facilities for obtaining current and forecast weather information and shall be provided with satisfactory communications with the appropriate air traffic services (ATS) unit. Adequate facilities shall be available for the planning of all tasks.

(j) Fuel/energy supply – alleviation

When the helicopter emergency medical services (HEMS) mission is conducted under visual flight rules (VFR) within a local and defined geographical area, the fuel/energy policy shall ensure that on completion of the mission, the final reserve fuel/energy is sufficient for:

(1) 30-minute flying time at best-range speed; or

(2) 20-minute flying time at best-range speed by day, when operating within an area providing continuous and suitable operating sites.

(k) Aircraft tracking system

The operator shall establish and maintain a monitored aircraft tracking system for HEMS operations for the entire duration of the HEMS mission.

(l) Refuelling with passengers on board

A refuelling procedure with either rotors stopped or rotors turning shall be provided in accordance with duly approved procedures ‘Special refuelling or defuelling of the aircraft’.

(II) Requirements (2)

(a) Terminology

(1) Ground emergency service personnel. Any ground emergency service personnel (such as policemen, firemen, etc.) involved with HEMS and whose tasks are to any extent pertinent to helicopter operations.

(2) HEMS crew member. A person who is assigned to a HEMS flight for the purpose of attending to any person in need of medical assistance carried in the helicopter and assisting the pilot during the mission. This person is subject to specific training as detailed in sub-paragraph (e)(2) below.

(3) ‘HEMS flight’ means a flight by a helicopter operating under a HEMS approval, where immediate and rapid transportation is essential and the purpose of which is either of the following:

(i) to facilitate emergency medical assistance by carrying one or more of the following:

(A) medical personnel;

(B) medical supplies (equipment, blood, organs, drugs);
(C) ill or injured persons and other persons directly involved;
(ii) to perform an operation where a person faces an imminent or anticipated health risk posed by the environment and either of the following conditions is met:
(A) that person needs to be rescued or provided with supplies;
(B) persons, animals or equipment need to be transported to and from the HEMS operating site;

(4) HEMS HEC operation' means air and ground operations for the purpose of transporting one or more persons as human external cargo (HEC) within a HEMS flight;
(i) HEMS dispatch centre. A place where, if established, the coordination or control of the HEMS flight takes place. It may be located in a HEMS Operating Base.
(ii) HEMS operating base. A heliport/ aerodrome at which the HEMS crew members and the HEMS helicopter may be on standby for HEMS operations.
(iii) HEMS operating site. A site selected by the commander during a HEMS HEC Operation, landing or take-off.

(5) Medical passenger. A medical person carried in a helicopter during a HEMS flight, including but not limited to doctors, nurses and paramedics. This passenger shall receive a briefing as detailed in sub-paragraph (e)(3) below.

(6) Technical crew member: means a crew member in commercial air transport HEMS, HEMS HEC, HHO or NVIS operations, other than a flight or cabin crew member, assigned by the operator to duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, HEMS HEC, HHO or NVIS operations, which may require the operation of specialised on-board equipment;

(7) Helicopter Emergency Medical Services (HEMS) Flight
(i) A HEMS flight (or more commonly referred to as HEMS mission) normally starts and ends at the HEMS operating base following tasking by the 'HEMS dispatch centre'. Tasking can also occur when airborne, or on the ground at locations other than the HEMS operating base.
(ii) The following elements should be regarded as integral parts of the HEMS mission:
(A) flights to and from the HEMS operating site when initiated by the HEMS dispatch centre;
(B) flights to and from an aerodrome/operating site for the delivery or pick-up of medical supplies and/or persons required for completion of the HEMS mission; and
(C) flights to and from an aerodrome/operating site for refuelling required for completion of the HEMS mission.

(b) Operations Manual.
The operator must ensure that the Operations Manual includes a supplement specifying operational considerations specific to HEMS operations. Relevant extracts from the Operations Manual shall be made available to the organisation for which the HEMS is being provided. (See AC to Appendix 1 to CAR OPS-3.005(d) sub-paragraph (b).)

(c) Operating requirements
(1) The helicopter. Performance Class 3 operations shall not be conducted over a hostile environment.
(2) Performance requirements
(i) Take-off and landing - helicopters with a MTOM of 5 700 kg or less
(A) Helicopters conducting operations to/from a heliport at a hospital which is located in a hostile environment, shall be operated in accordance with Subpart G (Performance Class 1) except when the operator holds an approval to operate under Appendix 1 to CAR OPS-3.005(i).
(B) Helicopters conducting operations to/from a HEMS operating site located in a hostile environment shall as far as possible be operated in accordance with Subpart G (Performance

Class 1). The commander shall make every reasonable effort to minimise the period during which there would be danger to helicopter occupants and persons on the surface in the event of failure of a power (See AC to Appendix 1 to CAR OPS-3.005(d) sub-paragraph (c)(2)(i)(B)).

(C) The HEMS operating site must be big enough to provide adequate clearance from all obstructions. For night operations, the site must be illuminated (from the ground or from the helicopter) to enable the site and any obstructions to be identified. (See AC to Appendix 1 to CAR-3.005(d), subparagraph (c)(2)(i)(C).)

(D) Guidance on take-off and landing procedures at previously un-surveyed HEMS operating sites shall be contained in the Operations Manual.

(ii) Take-off and landing - helicopters with a MTOM exceeding 5700 kg. Helicopters conducting HEMS shall be operated in accordance with Performance Class 1.

(3) The crew. Notwithstanding the requirements prescribed in Subpart N, the following apply to HEMS operations:

(i) Selection. The Operations Manual shall contain specific criteria for the selection of flight crew members for the HEMS task, taking previous experience into account.

(ii) Experience. The minimum experience level for commanders conducting HEMS flights shall not be less than:

(A) Either:

(A1) 1000 hours pilot in command of aircraft of which 500 hours is as pilot-in- command on helicopters; or

(A2) 1000 hours as co-pilot in HEMS operations of which 500 hours is as pilot-in- command under supervision; and, 100 hours pilot-in-command of helicopters.

(B) 500 hours operating experience in helicopters gained in an operational environment similar to the intended (See AC to Appendix 1 to CAR-OPS 3.005(d) sub-paragraph (c)(3)(ii)(B)); and

(C) For pilots engaged in night operations, 20 hours VMC at night as pilot-in-command; and

(D) Successful completion of training in accordance with sub-paragraph (e) of this Appendix.

(iii) Recency. All pilots conducting HEMS operations shall have completed a minimum of 30 minutes flight by sole reference to instruments in a helicopter or in a synthetic training device (FSTD) within the last 6 months. (See AC to Appendix 1 to CAR OPS-3.005(d) subparagraph (c)(3)(iii).)

(iv) Crew composition. See AC to Appendix 1 to CAR OPS-3.005(d), subparagraph (c)(3)(iv);

(A) Day flight. The minimum crew by day shall be one pilot and one HEMS crew member. This can be reduced to one pilot only in exceptional circumstances.

(B) Night flight. The minimum crew by night shall be two pilots. However, one pilot and one HEMS crew member may be employed in specific geographical areas defined by the operator in the Operations Manual to the satisfaction of the Authority taking into account the following:

(B1) Adequate ground reference

(B2) Flight following system for the duration of the HEMS mission (see AMC to Appendix 1 to CAR OPS-3.005(d), sub-paragraph (c)(3)(iv)(B)(B2));

(B3) Reliability of weather reporting facilities;

(B4) HEMS minimum equipment list;

(B5) Continuity of a crew concept;

(B6) Minimum crew qualification, initial and recurrent training;

(B7) Operating procedures, including crew co-ordination;

(B8) Weather minima;

(B9) Additional considerations due to specific local conditions.

(4) HEMS operating minima.

(i) Performance Class 1 and 2 operations. The weather minima for the despatch and en-route phase of a HEMS flight are shown in the following Table. In the event that during the en- route phase the weather conditions fall below the cloud base or visibility minima shown, VMC only capable helicopters must abandon the flight or return to base. Helicopters equipped and certificated for IMC Operations may abandon the flight, return to base or convert in all respects to a flight conducted under IFR, provided the flight crew are suitably qualified.

Table 1 - HEMS Operating Minima

2 PILOTS		**1 PILOTS**	
DAY			
Ceiling	**Visibility**	**Ceiling**	**Visibility**
500 ft and above	(See OPS 3.465)	500 ft and above	(See OPS 3.465)
499–400 ft	1 000m (Note 1)	499–400 ft	2 000 m
399–300 ft	2 000 m	399–300 ft	3 000 m
NIGHT			
Cloud base	Visibility	Cloud base	Visibility
1 200 ft (Note 2)	2 500 m	1 200 ft (Note 2)	3 000 m

Note 1: Visibility may be reduced to 800 m for short periods when in sight of land if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe any obstacles in time to avoid a collision.

Note 2: Cloud base may be reduced to 1 000 ft for short periods.

(ii) Performance Class 3 operations. The weather minima for the dispatch and en-route phase of a HEMS flight shall be a cloud ceiling of 600 ft and a visibility of 1 500 m. Visibility may be reduced to 800 m for short periods when in sight of land if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe any obstacle and avoid a collision.

(d) Additional requirements

(1) Helicopter medical equipment

(i) The installation of all helicopter dedicated medical equipment and, where appropriate, its operation including any subsequent modifications shall be approved.

(ii) The operator shall ensure that procedures are established for the use of portable equipment on board.

(2) Helicopter communication and navigation equipment. Helicopters conducting HEMS flights shall be provided with communications equipment, in addition to that required by CAR OPS-3, Subpart L, capable of conducting two-way communication with the organisation for which the HEMS is being provided and, where possible, to communicate with ground emergency service personnel. Any such additional equipment will require airworthiness approval.

(3) HEMS operating base facilities

(i) If crew members are required to be on standby with a reaction time of less than 45 minutes, dedicated suitable accommodation shall be provided close to each operating base.

(ii) At each operating base the pilots shall be provided with facilities for obtaining current and forecast weather information and shall be provided with satisfactory communications with the appropriate ATS unit. Satisfactory facilities shall be available for the planning of all tasks.

(4) Refuelling with passengers on board. When specifically authorised by the Authority and when the commander considers refuelling with passengers on board to be necessary, it can be undertaken either rotors stopped or rotors turning provided the following requirements are met:

(i) Door(s) on the refuelling side of the helicopter shall remain closed;

(ii) Door(s) on the non-refuelling side of the helicopter shall remain open, weather permitting;
(iii) Firefighting facilities of the appropriate scale shall be positioned so as to be immediately available in the event of a fire; and
(iv) Sufficient personnel shall be immediately available to move patients clear of the helicopter in the event of a fire.

(e) Training and checking
(1) Flight crew members
(i) CAR OPS-3, Subpart N training with the following additional items:
(A) AC to Appendix 1 to CAR OPS-3.005Preparing the helicopter and specialist medical equipment for subsequent HEMS departure;
(B) Practice of HEMS departures;
(C) The assessment from the air of the suitability of HEMS operating sites; and
(D) The medical effects air transport may have on the patient.
(ii) OPS 3 Subpart N checking with the following additional items:
(A) VMC proficiency day and/or night checks as appropriate including flying landing and take-off profiles likely to be used at HEMS operating sites.
(B) Line checks with special emphasis on the following (See AMC Appendix 1 to CAR OPS-3.005(d) (e)(1)(ii)(B):
(B1) Local area meteorology;
(B2) HEMS flight planning;
(B3) HEMS departures;
(B4) The selection from the air of HEMS operating sites;
(B5) Low level flight in poor weather; and
(B6) Familiarity with established HEMS operating sites in operator's local area register.
(2) HEMS crew member. The HEMS crew member shall be trained in accordance with the requirements of Subpart O with the following additional items:
(i) Duties in the HEMS role;
(ii) Navigation (map reading, navigation aid principles and use);
(iii) Operation of radio equipment;
(iv) Use of on-board medical equipment;
(v) Preparing the helicopter and specialist medical equipment for subsequent HEMS departure;
(vi) Instrument reading, warnings, use of normal and emergency check lists in assistance of the pilot as required;
(vii) Basic understanding of the helicopter type in terms of location and design of normal and emergency systems and equipment;
(viii) Crew coordination;
(ix) Practice of response to HEMS call out;
(x) Conducting refuelling and rotors running refuelling;
(xi) HEMS operating site selection and use;
(xii) Techniques for handling patients, the medical consequences of air transport and some knowledge of hospital casualty reception;
(xiii) Marshalling signals;
(xiv) Under slung load operations as appropriate;
(xv) Winch operations as appropriate;
(xvi) The dangers to self and others of rotor running helicopters including loading of patients;
(xvii) The use of the helicopter inter-communications system.
(3) Medical passengers. Prior to any HEMS flight, or series of flights, medical passengers shall be briefed

on the following:
(i) Familiarisation with the helicopter type(s) operated;
(ii) Entry and exit under normal and emergency conditions both for self and patients;
(iii) Use of the relevant on-board specialist medical equipment;
(iv) The need for the commander's approval prior to use of specialised equipment;
(v) Method of supervision of other medical staff;
(vi) The use of helicopter inter-communication systems; and
(vii) Location and use of on-board fire extinguishers.

(4) Ground emergency service personnel. The operator shall take all reasonable measures to ensure that ground emergency service personnel are familiar with the following (see AMC Appendix 1 to CAR OPS-3.005(d), sub-paragraph (e)(4)):
(i) Two way radio communication procedures with helicopters;
(ii) The selection of suitable HEMS operating sites for HEMS flights;
(iii) The physical danger areas of helicopters;
(iv) Crowd control in respect of helicopter operations; and
(v) The evacuation of helicopter occupants following an on-site helicopter accident.

Appendix 1 to OPS CAR-3.005(e) Helicopter Operations over a Hostile Environment Located Outside a Congested Area

(See AMC Appendix 1 to CAR OPS-3.005(e))

(a) Approval. The operator wishing to conduct operations in accordance with this Appendix must have the prior approval of the Authority issuing the AOC and the Authority of the State in which it is intended to conduct such operations. Such an approval will specify:
(1) The type of helicopter; and
(2) The type of operation.

(b) Applicability. This Appendix shall only be applicable to turbine-powered helicopters operating over a hostile environment located outside a congested area where it has been substantiated that helicopter limitations, or other justifiable considerations, preclude the use of the appropriate performance criteria.

(c) Performance Class 2 Alleviation. Helicopters operating in Performance Class 2 over a hostile environment located outside a congested area and with a maximum approved passenger seating configuration (MAPSC) of 9 or less passengers are exempt from the following requirements of CAR OPS-3, Subpart H:
(1) CAR OPS-3.520(a)(2);
(2) CAR OPS-3.535(a)(2).

(d) Performance Class 3 Alleviation. Helicopters operating in Performance Class 3 over a hostile environment located outside a congested area and with a maximum approved passenger seating configuration (MAPSC) of 6 or less are exempt from the requirement of CAR OPS-3.240(a)(5) provided that the operator complies with Appendix 1 to CAR OPS-3.517(a), subparagraphs (a)(2)(i) & (ii).

(e) Operation. Specific procedures to be followed in the event of a power unit failure during takeoff and landing must be established in the Operations Manual.

(f) Supplemental Oxygen for non-pressurised helicopters. Operations may be conducted with non-pressurised helicopters at pressure altitudes above 10000 ft without the provision of supplemental oxygen equipment capable of storing and dispensing the oxygen supplies required, provided the cabin altitude does not exceed 10000 ft for a period in excess of 30 minutes and never exceeds 13000 ft pressure altitude. Supplemental oxygen needs to be carried for 10% of passengers for the entire flying time after 30 minutes at pressure altitudes above 10, 000 ft but not exceeding 13,000 ft.

Appendix 1 to CAR OPS-3.005(f) Operations for Small Helicopters (VFR Day Only)

(a) Terminology.

(1) Local Operations. Flight conducted within a local and defined geographical area acceptable to the Authority, which start and end at the same location on same day.

(b) Approval. The operator wishing to conduct operations in accordance with this Appendix must have the prior approval of the Authority issuing the AOC in accordance with AOC manual. Such an approval shall specify:

(1) The type of helicopter; and

(2) The type of operation.

(3) The geographical limitations of local operations in the context of this appendix

(c) Prohibition. The following activities are prohibited:

(1) CAR OPS-3.065. Carriage of weapons of war and munitions of war.

(2) CAR OPS-3.265. Carriage of inadmissible passengers, deportees or persons in custody.

(3) CAR OPS-3.305. Refuelling/de-fuelling with passengers embarking, on board or disembarking.

(4) CAR OPS-3.335. Smoking on board.

(d) Alleviation. The following rules are alleviated:

(1) CAR OPS-3.100 Admission to cockpit:

(i) The operator must establish rules for the carriage of passengers in a pilot seat, if applicable.

(ii) The commander must ensure that:

(A) carriage of passengers in the pilot seat does not cause distraction and/or interference with the flight's operation; and

(B) the passenger occupying a pilot seat is made familiar with the relevant restrictions and safety procedures.

(2) CAR OPS-3.220 Authorisation of Heliports by the operator. The operator shall establish a procedure to qualify the Commanders for the selection of heliports or landing sites, suitable for the type of helicopter and the type of operation.

(3) CAR OPS-3.255 Fuel policy. Subparagraphs (b) to (d) are not applicable when the fuel policy prescribed in CAR OPS-3.255(a) ensures that, on completion of the flight, or series of flights, the fuel remaining is not less than an amount of fuel sufficient for 30 minutes flying time at normal cruising (this may be reduced to 20 minutes when operating within an area providing continuous and suitable precautionary landing sites). Final reserve fuel must be specified in the operations manual in order to be able to comply with OPS 3.375(c).

(4) CAR OPS-3.280 Passenger seating. Procedures are not required to be established.

Note: The intent of this paragraph is achieved by the pilot using normal judgement. CAR OPS-3.260 is applicable and is considered to address the need for procedures.

(5) CAR OPS-3.285 Passenger briefing.

(i) Paragraph (a)(1). Unless to do so would be unsafe, passengers are verbally briefed about safety matters, parts or all of which may be given by an audiovisual presentation. Prior approval must be given for the use of portable electronic devices.

Appendix 1 to CAR OPS-3.005(g) Helicopter Hoist Operations (HHO)

Note: The Authority is empowered to decide which operation is a HHO operation in the sense of this Appendix.

(I) Requirements (1)

(a) Helicopter hoist operations (HHO)

(1) Helicopters shall only be operated for the purpose of CAT hoist operations if the operator has been approved by the competent authority.

(2) To obtain such approval by the competent authority, the operator shall:
   (i) operate in CAT and hold a CAT AOC;
   (ii) demonstrate to the competent authority compliance with the requirements contained in this Appendix.

(b) Equipment requirements for HHO
   (1) The installation of all helicopter hoist equipment other than a simple PCDS, including any radio equipment to comply with point SPA.HHO.115, and any subsequent modifications, shall have an airworthiness approval appropriate to the intended function. Ancillary equipment shall be designed and tested to the appropriate standard as required by the competent authority.
   (2) Maintenance instructions for HHO equipment and systems shall be established by the operator in liaison with the manufacturer and included in the operator's helicopter maintenance programme as provided for by CAR M.

(c) HHO communication
Two-way radio communication shall be established with the organisation for which the HHO is being provided and, where possible, a means of communicating with ground personnel at the HHO site for:
   (1) day and night offshore operations;
   (2) night onshore operations, except for HHO at a helicopter emergency medical services (HEMS) operating site.

(d) Performance requirements for HHO
Except for HHO at a HEMS operating site, HHO shall be capable of sustaining a critical engine failure with the remaining engine(s) at the appropriate power setting without hazard to the suspended person(s)/cargo, third parties or property.

(e) Crew requirements for HHO
   (1) *Selection*. The operator shall establish criteria for the selection of flight crew members for the HHO task, taking previous experience into account.
   (2) *Experience.* The minimum experience level for the commander conducting HHO flights shall not be less than:
      (i) Offshore:
         (A) 1000 hours as pilot-in-command/commander of helicopters, or 1000 hours as co-pilot in HHO of which 200 hours is as pilot-in-command under supervision; and
         (B) 50 hoist cycles conducted offshore, of which 20 cycles shall be at night if night operations are being conducted, where a hoist cycle means one down-and-up cycle of the hoist hook.
      (ii) Onshore:
         (A) 500 hours as pilot-in-command/commander of helicopters, or 500 hours as co-pilot in HHO of which 100 hours is as pilot-in-command under supervision;
         (B) 200 hours operating experience in helicopters gained in an operational environment similar to the intended operation; and
         (C) 50 hoist cycles, of which 20 cycles shall be at night if night operations are being conducted.
   (3) *Operational training and experience*. Successful completion of training in accordance with the HHO procedures contained in the operations manual and relevant experience in the role and environment under which HHO are conducted.
   (4) *Recency*. All pilots and HHO crew members conducting HHO shall have completed in the last 90 days:
      (i) when operating by day: any combination of three day or night hoist cycles, each of which shall include a transition to and from the hover;
      (ii) when operating by night: three night hoist cycles, each of which shall include a transition to and from the hover.
   (5) *Crew composition*. The minimum crew for day or night operations shall be as stated in the operations manual. The minimum crew will be dependent on the type of helicopter, the weather conditions, the type of task, and, in addition for offshore operations, the HHO site environment, the sea state and the movement of the vessel. In no case shall the minimum crew be less than one pilot and one HHO crew member.
   (6) Training and checking
   Training and checking shall be conducted in accordance with a detailed syllabus approved by the

competent authority and included in the operations manual.

(i) Crew members:

(A) Crew training programmes shall: improve knowledge of the HHO working environment and equipment; improve crew coordination; and include measures to minimise the risks associated with HHO normal and emergency procedures and static discharge.

(B) The measures referred to in (f)(2)(i) shall be assessed during visual meteorological conditions (VMC) day proficiency checks, or VMC night proficiency checks when night HHO are undertaken by the operator.

(f) HHO passenger briefing

Prior to any HHO flight, or series of flights, HHO passengers shall have been briefed and made aware of the dangers of static electricity discharge and other HHO considerations.

(g) Information and documentation

(1) The operator shall ensure that, as part of its risk analysis and management process, risks associated with the HHO environment are minimised by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated.

(2) Relevant extracts from the operations manual shall be available to the organisation for which the HHO is being provided.

(II) Requirements (2)

(a) Terminology

(1) Helicopter Hoist Operations (HHO) Flight. A flight by a helicopter operating under an HHO approval, the purpose of which is to facilitate the transfer of persons and/or cargo by means of a helicopter hoist.

(2) HHO Crew Member. A crew member who performs assigned duties relating to the operation of a hoist.

(3) HHO Offshore. A flight by a helicopter operating under a HHO approval, the purpose of which is to facilitate the transfer of persons and/or cargo by means of a helicopter hoist from or to a vessel or structure in a sea area.

(4) Hoist Cycle. For the purpose of the setting of crew qualifications of this appendix; is one down-and-up cycle of the hoist hook.

(5) HHO Site. A specified area at which a helicopter performs a hoist transfer.

(6) HHO Passenger. A person who is to be transferred by means of a helicopter hoist.

(7) Personnel-carrying device system (PCDS). means a system including one or more devices that is either attached to a hoist or cargo hook or mounted to the rotorcraft airframe during human external cargo (HEC) or helicopter hoist operations (HHO). The devices have the structural capability and features needed to transport occupants external to the helicopter e.g. a life safety harness with or without a quick release and strop with a connector ring, a rigid basket or a cage;

(b) Operations Manual. The operator must ensure that the Operations Manual includes a supplement containing material specific to HHO. In particular it will address:

(1) Performance criteria.

(2) If required, the conditions under which offshore HHO transfer may be conducted including the relevant limitations on vessel movement and wind speed.

(3) The weather limitations for HHO.

(4) The criteria for determining minimum size of HHO site - appropriate to the task.

(5) The procedures for determining minimum crew.

(6) The method by which crew members record hoist cycles.

When required, relevant extracts from the Operations Manual supplement shall be made available to the organisation for which the HHO is being provided.

(c) Maintenance of HHO equipment. Maintenance instructions for HHO systems must be established by the operator, in liaison with the manufacturer, included in the operator's helicopter maintenance programme prescribed in CAR M, and be approved by the Authority.

(d) Operating requirements

(1) The Helicopter. During HHO, the helicopter must be capable of sustaining a critical power unit failure with the remaining engine(s) at the appropriate power setting, without hazard to the suspended person(s)/cargo, third parties, or property. (Except for HEMS HHO at a HEMS operating site where the requirement need not be applied.)

(2) The Crew. Notwithstanding the requirements prescribed in Subpart N, the following apply to HHO operations:

(i) Selection. The Operations Manual shall contain criteria for the selection of flight crew members for the HHO task, taking previous experience into account.

(ii) Experience. The minimum experience level for commanders conducting HHO flights shall not be less than:

(A) Offshore:

(A1) 1000 hours pilot-in-command of helicopters or 1 000 hours as co-pilot in HHO operations of which 200 hours is as pilot-in-command under supervision; and

(A2) 50 hoist cycles conducted offshore, of which 20 cycles shall be at night if night operations are being conducted.

(B) Onshore:

(B1) 500 hours pilot-in-command of helicopters or 500 hours as co-pilot in HHO operations of which 100 hours is as pilot-in-command under supervision;

(B2) 200 hours operating experience in helicopters gained in an operational environment similar to the intended operation (see AMC Appendix 1 to CAR OPS-3.005(d), paragraph (c)(3)(ii)(B)); and

(B3) 50 hoist cycles, of which 20 cycles shall be at night if night operations are being conducted.

(C) Successful completion of training in accordance with the procedures contained in the Operations Manual and relevant experience in the role and environment under which HHO conducted.

(iii) Recency. All pilots and HHO crew members conducting HHO shall, in addition to the requirements of CAR OPS-3.970(a), have completed in the last 90 days:

(A) When operating by day: Any combination of 3 day or night hoist cycles, each of which shall include a transition to and from the hover.

(B) When operating by night: 3 night hoist cycles, each of which shall include a transition to and from the hover.

(iv) Crew Composition. The minimum crew for day or night operations shall be as stated in the Operations Manual supplement and will be dependent on the type of helicopter, the weather conditions, the type of task, and, in addition for offshore operations, the HHO site environment, the sea state and the movement of the vessel but, in no case will be less than one pilot and one HHO crew member (See AC to Appendix 1 to CAR OPS-3.005(h) paragraph (d)(2)(iv).)

(e) Additional Requirements

(1) HHO Equipment. The installation of all helicopter hoist equipment including any subsequent modifications and where appropriate, its operation, shall have an airworthiness approval appropriate to the intended function. Ancillary equipment must be designed and tested to the appropriate standard and acceptable to the Authority.

(2) Helicopter Communication Equipment. Radio equipment, in addition to that required by Subpart L, will require airworthiness approval. The following shall require two-way communication with the organisation for which the HHO is being provided and, where possible, communication with ground personnel:

(ii) Day and night offshore operations; or

(iii) Night onshore operations,

(d) Training and Checking.

(1) Flight Crew Members. The Flight crew member shall be trained in the following subjects:

(i) Subpart N training with the following additional items:

(A) Fitting and use of the hoist;

(B) Preparing the helicopter and hoist equipment for HHO;

(C) Normal and emergency hoist procedures by day and, when required, by night;

(D) Crew co-ordination concept specific to HHO;

(E) Practice of HHO procedures; and

(F) The dangers of static electricity discharge.

(ii) Subpart N checking with the following additional items:

(A) Proficiency checks, as appropriate to day operations which must also be conducted by night if such operations are undertaken by the operator. The checks should include procedures likely to be used at HHO sites with special emphasis on:

(A1) Local area meteorology;

(A2) HHO flight planning;

(A3) HHO departures;

(A4) A transition to and from the hover at the HHO site;

(A5) Normal and simulated emergency HHO procedures; and

(A6) Crew co-ordination.

(2) HHO Crew Member. The HHO crew member shall be trained in accordance with the requirements of Subpart O with the following additional items:

(i) Duties in the HHO role;

(ii) Fitting and use of the hoist;

(iii) Operation of hoist equipment;

(iv) Preparing the helicopter and specialist equipment for HHO;

(v) Normal and emergency procedures;

(vi) Crew co-ordination concepts specific to HHO;

(vii) Operation of inter-communications and radio equipment;

(viii) Knowledge of emergency hoist equipment;

(ix) Techniques for handling HHO passengers;

(x) Effect of the movement of personnel on the centre of gravity and mass during HHO;

(xi) Effect of the movement of personnel on performance during normal and emergency flight conditions;

(xii) Techniques for guiding pilots over HHO sites;

(xiii) Awareness of specific dangers relating to the operating environment; and

(xiv) The dangers of static electricity discharge.

(3) HHO Passengers. Prior to any HHO flight, or series of flights, HHO passengers shall be briefed and made aware of the dangers of static electricity discharge and other HHO considerations.

Appendix 1 to CAR OPS-3.005(h) Helicopter Operations at a Public Interest Site

(a) Approval - The operator wishing to conduct operations in accordance with this Appendix must have the prior approval of the Authority issuing the AOC and the Authority of the State in which it is intended to conduct such operations. Such an approval shall specify:

(1) The public interest site(s) see AC to Appendix 1 to CAR OPS-3.005(h) paragraph (a);
(2) The type(s) of helicopter; and
(3) The type of operation.

(b) Terminology
(1) Public interest site: A site, used exclusively for operations in the public interest.

(c) Applicability: This Appendix shall only be applicable to multi-engine turbine powered helicopter types, with a maximum approved passenger seating configuration (MAPSC) of six or less, operating to/from public interest sites.
(1) located in a hostile environment; and
(2) which were established as heliports before 01 December 2013.

(d) Alleviation:
(1) Operations to/from a public interest site shall be conducted in accordance with Subpart G (Performance Class 1).
(2) An exemption may be approved by the Authority for operations to/from a public interest site in accordance with Subpart H (Performance Class 2) provided;
(i) for operations in a non-congested hostile environment, the helicopter mass does not exceed the maximum mass specified in the Helicopter Flight Manual for an AEO OGE hover in still air with all power units operating at an appropriate power rating; and
(ii) for operations in a congested hostile environment, the helicopter mass does not exceed the maximum mass specified in the Helicopter Flight Manual for a climb gradient of 8% in still air; at the appropriate take-off safety speed (Vtoss) with the critical power unit inoperative and the remaining power units operating at an appropriate power rating (See AC to Appendix 1 to OPS CAR OPS-3.005(h) sub-paragraph (d)(2)).

(e) Operation. Site specific procedures must be established in the Operations Manual to minimise the period during which there would be danger to helicopter occupants and persons on the surface in the event of a power unit failure during take-off and landing at a public interest site. Part C of the Operations Manual shall contain for each public interest site; a diagram or annotated photograph showing the main aspects, the dimensions, the non-conformance with Subpart G (Performance Class 1), the main risks and the contingency plan should an incident occur.

Appendix 1 to CAR OPS-3.005(i) Helicopter Operations with Night Vision Imaging Systems
(Refer to AC to Appendix 1 to CAR OPS-3.005(i) Helicopter Operations with Night Vision Imaging Systems)

(a) Night vision imaging system (NVIS) operations
(1) Helicopters shall only be operated under VFR at night with the aid of NVIS if the operator has been approved by the competent authority.
(2) To obtain such approval by the competent authority, the operator shall:
(i) operate in commercial air transport (CAT) and hold a CAT AOC in accordance with Annex III (Part-ORO);
(ii) demonstrate to the competent authority:
(A) compliance with the applicable requirements contained in this Subpart;
(B) the successful integration of all elements of the NVIS.

(b) Equipment requirements for NVIS operations
(1) Before conducting NVIS operations each helicopter and all associated NVIS equipment shall have been issued with the relevant airworthiness approval.
(2) Radio altimeter. The helicopter shall be equipped with a radio altimeter capable of emitting an audio

warning below a pre-set height and an audio and visual warning at a height selectable by the pilot, instantly discernible during all phases of NVIS flight.

(3) Aircraft NVIS compatible lighting. To mitigate the reduced peripheral vision cues and the need to enhance situational awareness, the following shall be provided:
  (i) NVIS-compatible instrument panel flood-lighting, if installed, that can illuminate all essential flight instruments;
  (ii) NVIS-compatible utility lights;
  (iii) portable NVIS compatible flashlight; and
  (iv) a means for removing or extinguishing internal NVIS non-compatible lights.

(4) Additional NVIS equipment. The following additional NVIS equipment shall be provided:
  (i) a back-up or secondary power source for the night vision goggles (NVG);
  (ii) a helmet with the appropriate NVG attachment.

(5) All required NVG on an NVIS flight shall be of the same filter class and shall provide for sufficiently equivalent visual acuity

(6) Continuing airworthiness
  (i) Procedures for continuing airworthiness shall contain the information necessary for carrying out ongoing maintenance and inspections on NVIS equipment installed in the helicopter and shall cover, as a minimum:
    (A) helicopter windscreens and transparencies;
    (B) NVIS lighting;
    (C) NVGs; and
    (D) any additional equipment that supports NVIS operations.
  (ii) Any subsequent modification or maintenance to the aircraft shall be in compliance with the NVIS airworthiness approval.

(c) NVIS operating minima
  (1) Operations shall not be conducted below the weather minima for the type of night operations being conducted.
  (2) The operator shall establish the minimum transition height from where a change to/from aided flight may be continued.

(d) Crew requirements for NVIS operations
  (1) Selection. The operator shall establish criteria for the selection of crew members for the NVIS task.
  (2) Experience. The minimum experience for the commander shall not be less than 20 hours VFR at night as pilot-in-command/commander of a helicopter before commencing training.
  (3) Operational training. All pilots shall have completed the operational training in accordance with the NVIS procedures contained in the operations manual.
  (4) Recency. All pilots and NVIS technical crew members conducting NVIS operations shall have completed three NVIS flights in the last 90 days. Recency may be re-established on a training flight in the helicopter or an approved full flight simulator (FFS), which shall include the elements of (6)(i).
  (5) Crew composition. The minimum crew shall be the greater of that specified:
    (i) in the aircraft flight manual (AFM);
    (ii) for the underlying activity; or
    (iii) in the operational approval for the NVIS operations.
  (6) Crew training and checking
    (i) Training and checking shall be conducted in accordance with a detailed syllabus approved by the competent authority and included in the operations manual.
    (ii) Crew members
      (A) Crew training programmes shall: improve knowledge of the NVIS working environment and

equipment; improve crew coordination; and include measures to minimise the risks associated with entry into low visibility conditions and NVIS normal and emergency procedures.

(B) The measures referred to in (6)(ii)(A) shall be assessed during:

i. night proficiency checks; and

ii. line checks.

(e) Information and documentation

The operator shall ensure that, as part of its risk analysis and management process, risks associated with the NVIS environment are minimized by specifying in the operations manual: selection, composition and training of crews; levels of equipment and dispatch criteria; and operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated.

Appendix 1 to CAR OPS-3.005(j) Helicopter Offshore Operations

(a) Helicopter offshore operations (HOFO)

The requirements of this Subpart apply to:

(1) a commercial air transport operator holding a valid AOC;

(2) a specialized operations operator having declared its activity in accordance with the CAR;

(3) a non-commercial operator having declared its activity in accordance with CAR OPS 4.

(4) a non-commercial operator having declared its activity in accordance with Part-ORO.

(b) Approval for helicopter offshore operations

(1) Prior to engaging in operations under this Subpart, a specific approval by the competent authority shall have been issued to the operator.

(2) To obtain such approval, the operator shall submit an application to the competent authority for approval of special operation in Op Spec along with necessary procedures in Operations Manual, and shall demonstrate compliance with the requirements of this Subpart.

(c) Operating procedures

(1) The operator shall, as part of its safety management process, mitigate and minimize risks and hazards specific to helicopter offshore operations. The operator shall specify in the operations manual the:

(i) selection, composition and training of crews;

(ii) duties and responsibilities of crew members and other involved personnel;

(iii) required equipment and dispatch criteria; and

(iv) operating procedures and minima, such that normal and likely abnormal operations are described and adequately mitigated.

(2) The operator shall ensure that:

(i) an operational flight plan is prepared prior to each flight;

(ii) the passenger safety briefing also includes any specific information on offshore related items and is provided prior to boarding the helicopter;

(iii) each member of the flight crew wears an approved life jacket with emergency breathing equipment:

(iv) where established, the offshore route structure provided by the appropriate ATS is followed;

(v) pilots make optimum use of the automatic flight control systems (AFCS) throughout the flight;

(vi) specific offshore approach profiles are established, including stable approach parameters and the corrective action to be taken if an approach becomes unstable;

(vii) for multi-pilot operations, procedures are in place for a member of the flight crew to monitor the flight instruments during an offshore flight, especially during approach or departure, to ensure that a safe flight path is maintained;

(viii) the flight crew takes immediate and appropriate action when a height alert is activated;

(ix) procedures are in place to require the emergency flotation systems to be armed, when safe to do so, for all overwater arrivals and departures; and

(x) operations are conducted in accordance with any restriction on the routes or the areas of operation specified by the competent authority or the appropriate authority responsible for the airspace.

(d) Use of offshore locations

The operator shall only use offshore locations that are suitable in relation to size and mass of the type of helicopter and to the operations concerned.

(e) Selection of aerodromes and operating sites

(1) Onshore destination alternate aerodrome. The pilot-in command/commander does not need to specify a destination alternate aerodrome in the operational flight plan when conducting flights from an offshore location to a land destination aerodrome provided that sufficient operational contingency is in place to ensure a safe return from offshore.

(2) Offshore destination alternate helideck. The operator may select an offshore destination alternate helideck when all of the following criteria are met:

(i) An offshore destination alternate helideck shall be used only after the point of no return (PNR) and when an onshore destination alternative aerodrome is not geographically available. Prior to the PNR, an onshore destination alternate aerodrome shall be used.

(ii) One engine inoperative (OEI) landing capability shall be attainable at the offshore destination alternate helideck.

(iii) To the extent possible, helideck availability shall be guaranteed prior to PNR. The dimensions, configuration and obstacle clearance of individual helidecks or other sites shall be suitable for its use as an alternate helideck by each helicopter type intended to be used.

(iv) Weather minima shall be established taking into account the accuracy and reliability of meteorological information.

(v) The MEL shall contain specific provisions for this type of operation.

(vi) An offshore destination alternate helideck shall only be selected if the operator has established a procedure in the operations manual.

(f) Offshore standard approach procedures (OSAPs)

(1) An operator shall establish procedures to ensure that offshore standard approach procedures (OSAPs) are followed only if:

(i) the helicopter is capable of providing navigation and real-time obstacle environment information for obstacle clearance; and

(ii) either:

(A) the minimum descent height (MDH) is determined from a radio altimeter or a device that provides equivalent performance; or

(B) the minimum descent altitude (MDA) is applied and it includes an adequate margin.

(2) If the operator follows OSAPs to rigs or vessels in transit, the flight shall be conducted in multi-pilot operations.

(3) The decision range shall provide adequate obstacle clearance in the missed approach from any destination for which an OSAP is planned.

(4) The approach shall only be continued beyond decision range or below the minimum descent altitude/height (MDA/H) when visual reference to the destination has been established.

(5) For single-pilot operations, where specifically approved, appropriate increments shall be added to the MDA/H and decision range.

(6) When an OSAP is followed to a non-moving offshore location (i.e. fixed installation or moored vessel) and a reliable GNSS position for the location is available in the navigation system, the GNSS/area

navigation system shall be used to enhance the safety of the OSAP.

(7) The operator shall include OSAPs in its initial and recurrent training and checking programmes.

(g) Meteorological conditions

When flying between offshore locations located in class G airspace where the overwater sector is less than 10 NM, VFR flights may be conducted when the limits are at, or better than, the following:

Minima for flying between offshore locations located in class G airspace

When flying between offshore locations located in class G airspace where the overwater sector is less than 10 NM, VFR flights may be conducted when the limits are at, or better than, the following: **Minima for flying between offshore locations located in class G airspace**				
Day			**Night**	
Height*		**Visibility**	**Height***	**Visibility**
Single pilot	300 feet	3 km	500 feet	5 km
Two pilots	300 feet	2 km**	500 feet	5 km***

*The cloud base shall allow flight at the specified height to be below and clear of cloud.

** Helicopters may be operated in flight visibility down to 800 m, provided the destination or an intermediate structure is continuously visible.

*** Helicopters may be operated in flight visibility down to 1500 m, provided the destination or an intermediate structure is continuously visible.

(h) Wind limitations for operations to offshore locations

Operation to an offshore location shall only be performed when the wind speed at the helideck is reported to be not more than 60 knots including gusts or as restricted below that by the CAA.

(i) Performance requirements at offshore locations

Helicopters taking off from and landing at offshore locations shall be operated in accordance with the performance requirements as stipulated in the CAR and approved by CAA.

(j) Flight data monitoring (FDM) programme

(1) When conducting CAT operations with a helicopter equipped with a flight data recorder, the operator shall establish and maintain a FDM programme, as part of its safety management system.

(2) The FDM programme shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

(k) Aircraft tracking system

An operator shall establish and maintain a monitored aircraft tracking system for offshore operations in a hostile environment from the time the helicopter departs until it arrives at its final destination.

(l) Vibration health monitoring (VHM) system

(1) The following helicopters conducting CAT offshore operations in a hostile environment shall be fitted with a VHM system capable of monitoring the status of critical rotor and rotor drive systems by 1 January 2019:

(i) complex motor-powered helicopters first issued with an individual Certificate of Airworthiness (CofA) after 31 December 2016;

(ii) all helicopters with a maximum operational passenger seating configuration (MOPSC) of more than 9 and first issued with an individual CofA before 1 January 2017;

(iii) all helicopters first issued with an individual CofA after 31 December 2018.

(2) The operator shall have a system to:

(i) collect the data including system generated alerts;

(ii) analyse and determine component serviceability; and

(iii) respond to detected incipient failures.

(m) Equipment requirements

(1) The operator shall comply with the following equipment requirements:

(i) Public Address (PA) system in helicopters used for CAT and non-commercial operations with complex motor-powered helicopters (NCC):

(A) Helicopters with a maximum operational passenger seat configuration (MOPSC) of more than 9 shall be equipped with a PA system.

(B) Helicopters with a MOPSC of 9 or less need not be equipped with a PA system if the operator can demonstrate that the pilot's voice is understandable at all passengers' seats in flight.

(ii) Radio altimeter

Helicopters shall be equipped with a radio altimeter that is capable of emitting an audio warning below a pre-set height and a visual warning at a height selectable by the pilot.

(2) Emergency exits

All emergency exits, including crew emergency exits, and any door, window or other opening that is suitable for emergency egress, and the means for opening them shall be clearly marked for the guidance of occupants using them in daylight or in the dark. Such markings shall be designed to remain visible if the helicopter is capsized or the cabin is submerged.

(3) Helicopter terrain awareness warning system (HTAWS)

Helicopters used in CAT operations with a maximum certificated take-off mass of more than 3 175 kg or a MOPSC of more than 9 and first issued with an individual CofA after 31 December 2018 shall be equipped with an HTAWS that meets the requirements for class A equipment as specified in an acceptable standard.

(n) Additional procedures and equipment for operations in a hostile environment

(1) Life jackets

Approved life jackets shall be worn at all times by all persons on board unless integrated survival suits that meet the combined requirement of the survival suit and life jacket are worn.

(2) Survival suits

All passengers on board shall wear an approved survival suit:

(i) when the weather report or forecasts available to the commander/pilot-in-command indicate that the sea temperature will be less than plus 10 °C during the flight; or

(ii) when the estimated rescue time exceeds the calculated survival time; or

(iii) when the flight is planned to be conducted at night.

(3) Emergency breathing system

All persons on board shall carry and be instructed in the use of emergency breathing systems.

(4) Life rafts

(i) All life rafts carried shall be installed so as to be usable in the sea conditions in which the helicopter's ditching, flotation, and trim characteristics were evaluated for certification.

(ii) All life rafts carried shall be installed so as to facilitate their ready use in an emergency.

(iii) The number of life rafts installed:

(A) in the case of a helicopter carrying less than 12 persons, at least one life raft with a rated capacity of not less than the maximum number of persons on board; or

(B) in the case of a helicopter carrying more than 11 persons, at least two life rafts, sufficient together to accommodate all persons capable of being carried on board and, if one is lost, the remaining life raft(s) having the overload capacity sufficient to accommodate all persons on the helicopter.

(iv) Each life raft shall contain at least one survival emergency locator transmitter (ELT(S)); and

(v) Each life raft shall contain life-saving equipment, including means of sustaining life, as appropriate to the flight to be undertaken.

(5) Emergency cabin lighting

The helicopter shall be equipped with an emergency lighting system with an independent power supply to provide a source of general cabin illumination to facilitate the evacuation of the helicopter.

(6) Automatically deployable emergency locator transmitter (ELT(AD))

The helicopter shall be equipped with an ELT(AD) that is capable of transmitting simultaneously on 121,5 MHz and 406 MHz.

(7) Securing of non-jettisonable doors

Non-jettisonable doors that are designated as ditching emergency exits shall have a means of securing them in the open position so that they do not interfere with the occupants' egress in all sea conditions up to the maximum sea conditions required to be evaluated for ditching and flotation.

(8) Emergency exits and escape hatches

All emergency exits, including crew emergency exits, and any door, window or other opening suitable to be used for the purpose of underwater escape shall be equipped so as to be operable in an emergency.

(9) Notwithstanding (1), (2) and (3) above the operator may, based on a risk assessment, allow passengers, medically incapacitated at an offshore location, to partly wear or not wear life jackets, survival suits or emergency breathing systems on return flights or flights between offshore locations.

(o) Crew requirements

(1) The operator shall establish:

(i) criteria for the selection of flight crew members, taking into account the flight crew members' previous experience;

(ii) a minimum experience level for a commander/pilot-in-command intending to conduct offshore operations; and

(iii) a flight crew training and checking programme that each flight crew member shall complete successfully. Such programme shall be adapted to the offshore environment and include normal, abnormal and emergency procedures, crew resource management, water entry and sea survival training.

(2) Recency requirements

A pilot shall only operate a helicopter carrying passengers:

(i) at an offshore location, as commander or pilot-in-command, or co-pilot, when he or she has carried out in the preceding 90 days at least 3 take-offs, departures, approaches and landings at an offshore location in a helicopter of the same type or a full flight simulator (FFS) representing that type; or

(ii) by night at an offshore location, as commander or pilot-in-command, or co-pilot, when he/she has carried out in the preceding 90 days at least 3 take-offs, departures, approaches and landings at night at an offshore location in a helicopter of the same type or an FFS representing that type. The 3 take-offs and landings shall be performed in either multi-pilot or single-pilot operations, depending on the operation to be performed.

(3) Specific requirements for CAT:

(i) The 90-day period presented in points (2)(i) and (ii) above may be extended to 120 days as long as the pilot undertakes line flying under the supervision of a type rating instructor or examiner.

(ii) If the pilot does not comply with the requirements in (i), he/she shall complete a training flight in the helicopter or an FFS of the helicopter type to be used, which shall include at least the requirements described in (2)(i) and (ii) before he or she can exercise his or her privileges.

Appendix 1 to CAR OPS-3.005(k) Helicopter External Slung Load Operations

(Refers AC to Appendix 1 to CAR OPS-3.005(k) Helicopter External Slung Load Operations)

(a) Standard operating procedures

The standard operating procedures for HESLO shall specify:

(1) the equipment to be carried, including its operating limitations and appropriate entries in the MEL, as applicable;
(2) crew composition and experience requirements of crew members and task specialists;
(3) the relevant theoretical and practical training for crew members to perform their tasks, the relevant training for task specialists to perform their tasks, and the qualification and nomination of persons providing such training to crew members and task specialists;
(4) responsibilities and duties of crew members and task specialists;
(5) helicopter performance criteria necessary to be met to conduct HESLO operations;
(6) normal, abnormal and emergency procedures.

(b) Specific HESLO equipment
The helicopter shall be equipped with at least:
(1) one cargo safety mirror or alternative means to see the hook(s)/load; and
(2) one load meter, unless there is another method of determining the weight of the load.

(c) Transportation of dangerous goods
The operator transporting dangerous goods to or from unmanned sites or remote locations shall apply to the competent authority for an exemption from the provisions of the Technical Instructions if they intend not to comply with the requirements of those Instructions.

(d) Standard operating procedures
The standard operating procedures for HEC (Human External Cargo) shall specify:
(1) the equipment to be carried, including its operating limitations and appropriate entries in the MEL, as applicable;
(2) crew composition and experience requirements of crew members and task specialists;
(3) the relevant theoretical and practical training for crew members to perform their tasks, the relevant training for task specialists to perform their tasks, and the qualification and nomination of persons providing such training to crew members and task specialists;
(4) responsibilities and duties of crew members and task specialists;
(5) helicopter performance criteria necessary to be met to conduct HEC operations;
(6) normal, abnormal and emergency procedures.

Appendix 1 to CAR OPS-3.037 Framework for a Safety Management System (SMS)
(See OPS 3.037)

This Appendix specifies the framework for the implementation and maintenance of an SMS. The framework comprises four components and twelve elements as the minimum requirements for SMS implementation:

(a) Safety policy and objectives
 (1) Management commitment
  (i) The operator shall define its safety policy in accordance with international and national requirements. The safety policy shall:
   (A) reflect organisational commitment regarding safety, including the promotion of a positive safety culture;
   (B) include a clear statement about the provision of the necessary resources for the implementation of the safety policy;
   (C) include safety reporting procedures;
   (D) clearly indicate which types of behaviours are unacceptable related to the operator’s aviation activities and include the circumstances under which disciplinary action would not apply;
   (E) be signed by the accountable manager of the organisation;
   (F) be communicated, with visible endorsement, throughout the organisation; and

(G) be periodically reviewed to ensure it remains relevant and appropriate to the operator.

(ii) Taking due account of its safety policy, the operator shall define safety objectives. The safety objectives shall:

(A) form the basis for safety performance monitoring and measurement;

(B) reflect the operator's commitment to maintain or continuously improve the overall effectiveness of the SMS;

(C) be communicated throughout the organisation; and

(D) be periodically reviewed to ensure they remain relevant and appropriate to the operator.

(2) Safety accountability and responsibilities

(i) The operator shall:

(A) identify the accountable executive who, irrespective of other functions, is accountable on behalf of the organisation for the implementation and maintenance of an effective SMS;

(B) clearly define lines of safety accountability throughout the organisation, including a direct accountability for safety on the part of senior management;

(C) identify the responsibilities of all members of management, irrespective of other functions, as well as of employees, with respect to the safety performance of the organisation;

(D) document and communicate safety accountability, responsibilities and authorities throughout the organisation; and

(E) define the levels of management with authority to make decisions regarding safety risk tolerability.

(3) Appointment of key safety personnel

The operator shall appoint a safety manager who is responsible for the implementation and maintenance of the SMS.

Note 1: Depending on the size of the operator and the complexity of its services, the responsibilities for the implementation and maintenance of the SMS may be assigned to one or more persons, fulfilling the role of safety manager, as their sole function or combined with other duties, provided these do not result in any conflicts of interest.

Note 2: The person(s) with responsibilities for fulfilling the role of safety manager shall have received training, acceptable to the Authority, on safety management systems (SMS) and have a detailed knowledge of the safety management system within the approved organisation.

(4) Coordination of emergency response planning

The operator required to establish and maintain an emergency response plan for accidents and incidents in aircraft operations and other aviation emergencies shall ensure that the emergency response plan is properly coordinated with the emergency response plans of those organisations it must interface with during the provision of its services.

(5) SMS documentation

(i) The operator shall develop and maintain an SMS manual that describes its:

(A) safety policy and objectives;

(B) SMS requirements;

(C) SMS processes and procedures; and

(D) accountability, responsibilities and authorities for SMS processes and procedures.

(ii) The operator shall develop and maintain SMS operational records as part of its SMS documentation.

Note: Depending on the size of the operator and the complexity of its aviation services, the SMS manual and SMS operational records may be in the form of stand-alone documents or may be integrated with other organisational documents (or documentation) maintained by the operator.

(b) Safety risk management

(1) Hazard identification

(i) The operator shall develop and maintain a process to identify hazards associated with its services.

(ii) Hazard identification shall be based on a combination of reactive and proactive methods.

(2) Safety risk assessment and mitigation

The operator shall develop and maintain a process that ensures analysis, assessment and control of the safety risks associated with identified hazards.

Note: The process may include predictive methods of safety data analysis.

(c) Safety assurance

(1) Safety performance monitoring and measurement

(i) The operator shall develop and maintain the means to verify the safety performance of the organisation and to validate the effectiveness of safety risk controls.

Note: An internal audit process is one means to monitor compliance with safety regulations, the foundation upon which SMS is built, and assess the effectiveness of these safety risk controls and the SMS.

(ii) The operator's safety performance shall be verified in reference to the safety performance indicators and safety performance targets of the SMS in support of the organisation's safety objectives.

(2) The management of change

The operator shall develop and maintain a process to identify changes which may affect the level of safety risk associated with its services and to identify and manage the safety risks that may arise from those changes.

(3) Continuous improvement of the SMS

The operator shall monitor and assess its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.

(d) Safety promotion

(1) Training and education

(i) The operator shall develop and maintain a safety training programme that ensures that personnel are trained and competent to perform their SMS duties.

(ii) The scope of the safety training programme shall be appropriate to each individual's involvement in the SMS.

(2) Safety communication

(i) The operator shall develop and maintain a formal means for safety communication that:

(A) ensures personnel are aware of the SMS to a degree commensurate with their positions;

(B) conveys safety-critical information;

(C) explains why particular actions are taken to improve safety; and

(D) explains why safety procedures are introduced or changed.

Appendix 1 to CAR OPS-3.125 Documents to be carried

(See CAR OPS-3.125 Documents to be carried)

In case of loss or theft of documents specified in CAR OPS-3.125, the operation is allowed to continue until the flight reaches the base or a place where a replacement document can be provided.

Appendix 1 to CAR OPS-3.135 Additional information and forms to be carried

(See CAR OPS-3.135 Additional information and forms to be carried)

The Authority may authorize an alleviation against the non-carriage of specific documents for flights within the Oman FIR.

Appendix 1 to CAR OPS-3.161 Principles for Protection of Safety Data, Safety Information and Related Sources

(See CAR OPS-3.161)

(a) General principles
  (1) The Authority shall, through national laws, regulations and policies protecting safety data, safety information and related sources, ensure that:
    (i) a balance is struck between the need for the protection of safety data, safety information and related sources to maintain or improve aviation safety, and the need for the proper administration of justice;
    (ii) safety data, safety information and related sources are protected in accordance with OPS 3 and the Appendix to CAR 13, Chapter 5, as applicable;
    (iii) the conditions under which safety data, safety information and related sources qualify for protection are specified; and
    (iv) safety data and safety information remain available for the purpose of maintaining or improving aviation safety.
(b) Principles of protection
  (1) The Authority shall ensure that safety data or safety information is not used for:
    (i) disciplinary, civil, administrative and criminal proceedings against employees, operational personnel or organizations;
    (ii) disclosure to the public; or
    (iii) any purposes other than maintaining or improving safety;
    unless a principle of exception applies.
  (2) The Authority shall accord protection to safety data, safety information and related sources by ensuring that:
    (i) the protection is specified based on the nature of safety data and safety information;
    (ii) a formal procedure to provide protection to safety data, safety information and related sources is established;
    (iii) safety data and safety information will not be used in a way different from the purposes for which they were collected, unless a principle of exception applies; and
    (iv) to the extent that a principle of exception applies, the use of safety data and safety information in disciplinary, civil, administrative and criminal proceedings will be carried out only under authoritative safeguards.

Note 1: The formal procedure may include that any person seeking disclosure of safety data or safety information will provide the justification for its release.

Note 2: Authoritative safeguards include legal limitations or restrictions such as protective orders, closed proceedings, in-camera review, and de-identification of data for the use or disclosure of safety information in judicial or administrative proceedings.

(c) Principles of exception

(1) Exceptions to the protection of safety data, safety information and related sources shall only be granted when the Authority;

(i) determines that there are facts and circumstances reasonably indicating that the occurrence may have been caused by an act or omission considered, in accordance with national laws, to be conduct constituting gross negligence, willful misconduct or criminal activity;

(ii) after reviewing the safety data or safety information, determines that its release is necessary for the proper administration of justice, and that the benefits of its release outweigh the adverse domestic and international impact such release is likely to have on the future collection and availability of safety data and safety information; or

(iii) after reviewing the safety data or safety information, determines that its release is necessary for maintaining or improving safety, and that the benefits of its release outweigh the adverse domestic and international impact such release is likely to have on the future collection and availability of safety data and safety information.

Note 1: In administering the decision, the Authority takes into account the consent of the source of the safety data and safety information.

Note 2: Different competent authorities may be designated for different circumstances. The competent authority could include, but is not limited to, judicial authorities or those otherwise entrusted with aviation responsibilities designated in accordance with national law.

(d) Public disclosure

(1) The Authority shall, in the context of requests made for public disclosure, create exceptions from public disclosure to ensure the continued confidentiality of voluntarily supplied safety data and safety information.

Note: Laws, regulations and policies commonly referred to as right-to-know laws (freedom-of information or open records) allow for public access to information held by the Authority.

(2) Where disclosure is made in accordance with Section 3 above, the Authority shall ensure that:

(i) public disclosure of relevant personal information included in the safety data or safety information complies with applicable privacy laws; or

(ii) public disclosure of the safety data or safety information is made in a de-identified, summarised or aggregate form.

AC to Appendix 1 to CAR OPS-3.005(d) The HEMS Philosophy

(See Appendix 1 to CAR OPS-3.005(d))

(a) **Introduction:** This AC outlines the HEMS philosophy. Starting with a description of acceptable risk and introducing a taxonomy used in other industries, it describes how risk has been addressed in the HEMS appendix to provide a system of safety to the appropriate standard. It discusses the difference between HEMS, Air Ambulance and SAR - in regulatory terms. It also discusses the application of Operations to Public Interest Sites in the HEMS context.

(b) **Acceptable risk:** The broad aim of any aviation legislation is to permit the widest spectrum of operations with the minimum risk. In fact, it may be worth considering who/what is at risk and who/what is being protected. Three groups are being protected:

(1) Third parties (including property) - highest protection.
(2) Passengers (including patients)
(3) Crew members (including task specialists) - lowest

It is for the Authority to facilitate a method for the assessment of risk - or as it is more commonly known, safety management.

(c) **Risk management:** Safety management textbooks describe four different approaches to the management of risk. All but the first have been used in the production of the HEMS appendix and, if we consider that the engine failure accountability of Class I performance equates to zero risk, then all four are used (this of course is not strictly true as there are a number of helicopter parts - such as the tail rotor which, due to a lack of redundancy, cannot satisfy the criteria):

Applying the taxonomy to HEMS gives:

(1) Zero Risk; no risk of accident with a harmful consequence - Class 1 performance (within the qualification stated above) - the HEMS Operating Base.
(2) De Minimis; minimised to an acceptable safety target - for example the exposure time concept where the target is less than 5×10^{-8} (in the case of elevated landing sites at hospitals in a congested hostile environment the risk is contained to the deck edge strike case - and so in effect minimised to an exposure of seconds).
(3) Comparative Risk; comparison to other exposure - the carriage of a patient with a spinal injury in an ambulance that is subject to ground effect compared to the risk of a HEMS flight (consequential and comparative risk).
(4) As Low as Reasonably Practical; where additional controls are not economically or reasonably practical - operations at the HEMS operational site (the accident site).

It is stated in CAR OPS-3.005(d) that "...HEMS operations shall be conducted in accordance with the requirement contained in OPS 3 except for the variations contained in Appendix 1 to CAR OPS-3.005(d) for which a special approval is required."

In simple terms there are three areas in HEMS operations where risk, beyond that allowed in the main body of CAR OPS-3, is defined and accepted:

(1) in the en-route phase; where alleviation is given from height and visibility rules;
(2) at the accident site; where alleviation is given from the performance and size requirement; and
(3) at an elevated hospital site in a congested hostile environment; where alleviation is given from the deck edge strike-providing elements of the Appendix 1 to CAR OPS-3.517(a) are satisfied.

In mitigation against these additional and considered risks, experience levels are set, specialist training is required (such as instrument training to compensate for the increased risk of inadvertent entry into cloud); and operation with two crew (two pilots, or one pilot and a HEMS crew member) is mandated.

(HEMS crews - including medical passengers - are also expected to operate in accordance with good CRM principles.)

(d) **Air ambulance:** In regulatory terms, air ambulance is considered to be a normal transport task where the risk is no higher than for operations to the full CAR OPS-3 compliance. This is not intended to contradict/complement medical terminology but is simply a statement of policy; none of the risk elements of HEMS should be extant and therefore none of the additional requirements of HEMS need be applied.

If we can provide a road ambulance analogy:

(1) If called to an emergency; an ambulance would proceed at great speed, sounding its siren and proceeding against traffic lights - thus matching the risk of operation to the risk of a potential death (HEMS operations).

(2) For a transfer of a patient (or equipment) where life and death (or consequential injury of ground transport) is not an issue; the journey would be conducted without sirens and within normal rules of motoring - once again matching the risk to the task (air ambulance operations).

The underlying principle is; the aviation risk should be proportional to the task.

It is for the medical professional to decide between HEMS or air ambulance - not the pilot. For that reason, medical staff who undertake to task medical sorties should be fully aware of the additional risks that are (potentially) present under HEMS operations (and the pre-requisite for the operator to hold a HEMS approval). For example, in some countries, hospitals have principle and alternative sites. The patient may be landed at the safer alternative site (usually in the grounds of the hospital) thus eliminating risk - against the small inconvenience of a short ambulance transfer from the site to the hospital.)

Once the decision between HEMS or air ambulance has been taken by the medical professional, the commander makes an operational judgement over the conduct of the flight.

Simplistically, the above type of air ambulance operations could be conducted by any operator holding an AOC (HEMS operators hold an AOC) - and usually are when the carriage of medical supplies (equipment, blood, organs, drugs etc.) is undertaken and when urgency is not an issue.

(e) **Search and rescue (SAR):** SAR operations, because they are conducted with substantial alleviations from operational and performance standards; are strictly controlled; the crews are trained to the appropriate standard; and they are held at a high state of readiness. Control and tasking is usually exercised by the Police (or the Military or Coastguard in a maritime State) and mandated under State Regulations.

It was not intended when CAR OPS-3 was introduced, that HEMS operations would be conducted by operators not holding an AOC or operating to other than HEMS standards. It was also not expected that the SAR label would be used to circumvent the intent of OPS 3 or permit HEMS operations to a lesser standard.

(f) **Operating under HEMS approval:** The HEMS appendix originally contained the definitions for Air Ambulance and SAR - introduced to clarify the differences between the three activities. In consideration that, in some States, confusion has been the result, all references to activities other than HEMS have now been removed from the appendix and placed into AC material.

There are only two possibilities; transportation as passengers or cargo under the full auspices of OPS 3 (this does not permit any of the alleviations of the HEMS appendix - landing and take-off performance must be in compliance with the performance subparts of OPS 3); or operations under a HEMS approval.

(g) **HEMS operational sites:** The HEMS philosophy attributes the appropriate levels of risk for each operational site; this is derived from practical considerations and in consideration of the probability of use. The risk is expected to be inversely proportional to the amount of use of the site. The types of site are:

HEMS operating base; from which all operations will start and finish. There is a high probability of a large number of take-offs and landings at this heliport and for that reason no alleviation from operating procedures or performance rules are contained in the HEMS appendix.

HEMS operating site; because this is the primary pick up site related to an incident or accident, its use can never be pre-planned and therefore attracts alleviations from operating procedures and performance rules - when appropriate.

The hospital site; is usually at ground level in hospital grounds or, if elevated, on a hospital building. It may have been established during a period when performance criteria were not a consideration. The amount of use of such sites depends on their location and their facilities; normally, it will be greater than that of the HEMS operating site but less than for a HEMS operating base. Such sites attract some alleviations under the HEMS rules.

(h) **Problems with hospital sites:** During implementation of CAR OPS-3, it was established that a number of States had encountered problems with the impact of performance rules where helicopters were operated for HEMS. Although States accept that progress should be made towards operations where risks associated with a critical power unit failure are eliminated, or limited by the exposure time concept, a number of landing sites exist which do not (or never can) allow operations to Performance Class 1 or 2 requirements.

These sites are generally found in a congested hostile environment:

(1) in the grounds of hospitals; or
(2) on hospital buildings;

The problem of hospital sites is mainly historical and, whilst the Authority could insist that such sites not be used - or used at such a low weight that critical power unit failure performance is assured, it would seriously curtail a number of existing operations.

Even though the rule for the use of such sites in hospital grounds for HEMS operations (Appendix 1 to CAR OPS-3.005(d) sub-paragraph (c)(2)(i)(A)) attracts alleviation until 2013, it is only partial and will still impact upon present operations.

Because such operations are performed in the public interest, it was felt that the Authority should be able to exercise its discretion so as to allow continued use of such sites provided that it is satisfied that an adequate level of safety can be maintained - notwithstanding that the site does not allow operations to Performance Class 1 or 2 standards. However, it is in the interest of continuing improvements in safety that the alleviation of such operations be constrained to existing sites, and for a limited period. It is felt that the use of public interest sites should be controlled. This will require that a directory of sites be kept and approval given only when the operator has an entry in the Route Manual Section of the Operations Manual. The directory (and the entry in the Operations Manual) should contain for each approved site; the dimensions; any non-conformance with Annex 14; the main risks; and, the contingency plan should an incident occur. Each entry should also contain a diagram (or annotated photograph) showing the main aspects of the site.

(i) **Summary:** In summary, the following points are considered to be germane to the philosophy and HEMS regulations:

(1) Absolute levels of safety are conditioned by society.
(2) Potential risk must only be to a level appropriate to the task.
(3) Protection is afforded at levels appropriate to the occupants.
(4) The HEMS appendix addresses a number of risk areas and mitigation is built in.
(5) Only HEMS operations are dealt with by the appendix.
(6) There are three main categories of HEMS sites and each is addressed appropriately.
(7) State alleviation from the requirement at a hospital site is available but such alleviations should be strictly controlled by a system of registration.

(8) SAR is a State controlled activity and the label should not be used by operators to circumvent HEMS regulations.

AC to Appendix 1 to CAR OPS-3.005(d), paragraph (a)(4) HEMS Mission

(See Appendix 1 to OPS 3.005(d), paragraph (a)(4))

(a) A HEMS mission normally starts and ends at the HEMS Operating Base following tasking by the "HEMS Dispatch Centre". Tasking can also occur when airborne, or on the ground at locations other than the HEMS Operating Base.

(b) It is intended that the following elements be regarded as integral parts of the HEMS mission

(1) flights to and from the HEMS Operating Site when initiated by the HEMS Dispatch Centre;

(2) flights to and from a heliport for the delivery or pick-up of medical supplies and/or persons required for completion of the HEMS mission;

(3) flights to and from a heliport for refuelling required for completion of the HEMS mission.

All these flights are subject to the applicable requirements and alleviations of the HEMS appendix.

AC to Appendix 1 to CAR OPS-3.005(d) sub-paragraph (b) HEMS - Contents of the Operations Manual

(See Appendix 1 to OPS 3.005(d) sub-paragraph (b))

(a) The Operations Manual should contain instructions for the conduct of flights, adapted to the operations area, including at least the following: a. operating minima;

(1) recommended routes for regular flights to surveyed sites (with the minimum flight altitude);

(2) guidance for the selection of the HEMS operating site in case of a flight to an unsurveyed site;

(3) the safety altitude for the area over flown; and

(4) procedures to be followed in case of inadvertent entry into cloud.

AC to Appendix 1 to CAR OPS-3.005(d) sub-paragraph (c)(2)(i)(B) Operations to a HEMS Operating Site Located in a Hostile Environment

(See Appendix 1 to OPS 3.005(d) sub-paragraph (c)(2)(i)(B))

The alleviation from engine failure accountability at a HEMS Operating Site extends to HEMS/HHO where: a HEMS crew member; or a medical passenger; or ill or injured persons and other persons directly involved in the HEMS flight - are required to be hoisted as part of the HEMS flight.

AMC Appendix 1 to CAR OPS-3.005(d), sub-paragraph (c)(2)(i)(C) HEMS Operating Site

(See Appendix 1 to OPS 3.005(d) sub-paragraph (c)(2)(i)(C))

When selecting a HEMS operating site it should have a minimum dimension of at least 2D. For night operations, unsurveyed HEMS operating sites should have dimensions of at least 4D in length and 2D in width.

AC to Appendix 1 to CAR OPS-3.005(d) sub-paragraph (c)(3)(ii)(B) Relevant Experience

(See Appendix 1 to OPS 3.005(d) sub-paragraph (c)(3)(ii)(B))

The experience considered should take into account the geographical characteristics (sea, mountain, big cities with heavy traffic, etc.)

AC to Appendix 1 to CAR OPS-3.005(d) sub-paragraph (c)(3)(iii) Recency

(See Appendix 1 to OPS 3.005(d) sub-paragraph(c)(3)(iii))

For the purposes of this requirement, recency may be obtained in a VFR helicopter using vision limiting devices such as goggles or screens, or in a FSTD.

AC to Appendix 1 to CAR OPS-3.005(d), sub-paragraph (c)(3)(iv) HEMS Crew Member

(See Appendix 1 to OPS 3.005(d), sub-paragraph (c)(3)(iv))

(a) When the crew is composed of one pilot and one HEMS crew member, the latter should be seated in the front seat (co-pilot seat) during the flight, so as to be able to accomplish the tasks that the commander may delegate, as necessary: a. assistance in navigation;
   (1) assistance in radio communication/ radio navigation means selection;
   (2) reading of check-lists;
   (3) monitoring of parameters;
   (4) collision avoidance;
   (5) assistance in the selection of the landing site;
   (6) assistance in the detection of obstacles during approach and take-off phases;

(b) The commander may also delegate to the HEMS crew member tasks on the ground:
   (1) assistance in preparing the helicopter and dedicated medical specialist equipment for subsequent HEMS departure;

   AC to Appendix 1 to OPS 3.005(d), sub-paragraph (c)(3)(iv)b. assistance in the application of safety measures during ground operations with rotors turning (including: crowd control, embarking and disembarking of passengers, refuelling etc.).

(c) When a HEMS crew member is measures during ground operations with rotors turning (including: crowd control, embarking and disembarking of passengers, refuelling etc.). carried it is his primary task to assist the commander. However, there are occasions when this may not be possible:
   (1) At a HEMS operating site a commander may be required to fetch additional medical supplies, the HEMS crew member may be left to give assistance to ill or injured persons whilst the commander undertakes this flight. (This is to be regarded as exceptional and is only to be conducted at the discretion of the commander, taking into account the dimensions and environment of the HEMS operating site.)
   (2) After arriving at the HEMS Operating Site, the installation of the stretcher may preclude the HEMS crew member from occupying the front seat.
   (3) If the medical passenger requires the assistance of the HEMS crew member in flight.
   (4) If the alleviations of 3.a, 3.b or 3.c are used, reduction of operating minima contained in Appendix 1 to CAR OPS-3.005(d), sub-paragraph (c)(4) should not be used.
   (5) With the exception of 3.a above, a commander should not land at a HEMS operating site without the HEMS crew member assisting from the front seat (co-pilot seat).

(d) When two pilots are carried, there is no requirement for a HEMS crew member provided that the pilot non-flying (PNF) performs the aviation tasks of a HEMS crew member.

AMC to Appendix 1 to CAR OPS-3.005(d), sub-paragraph (c)(3)(iv)(B)(B2) Helicopter Emergency Medical Service

(See Appendix 1 to OPS 3.005(d), sub-paragraph (c)(3)(iv)(B)(B2))

A flight following system is a system providing contact with the helicopter throughout its operational area.

AC to Appendix 1 to CAR OPS-3.005(d), sub-paragraph (e)(1)(ii)(B) Line checks

(See Appendix 1 to OPS 3.005(d), sub-paragraph (e)(1)(ii)(B))

Where due to the size, the configuration, or the performance of the helicopter, the line check cannot be conducted on an operational flight, it may be conducted on a specially arranged representative flight. This flight may be immediately adjacent to, but not simultaneous with, one of the biannual proficiency checks.

AMC Appendix 1 to CAR OPS-3.005(d), sub-paragraph (e)(4) Ground Emergency Service Personnel

(See Appendix 1 to OPS 3.005(d), sub-paragraph (e)(4))

The task of training large numbers of emergency service personnel is formidable. Wherever possible, helicopter operators should afford every assistance to those persons responsible for training emergency service personnel in HEMS support.

AMC Appendix 1 to CAR OPS-3.005(e) Helicopter Operations over a Hostile Environment Located Outside a Congested Area

(See Appendix 1 to OPS 3.005(e))

(a) The subject Appendix has been produced to allow a number of existing operations to continue. It is expected that the alleviation will be used only in the following circumstances:
   (1) *Mountain Operations;* where present generation multi-engined aircraft cannot meet the requirement of Performance Class 1 or 2 at altitude.
   (2) *Operations in Remote Areas;* where existing operations are being conducted safely; and where alternative surface transportation will not provide the same level of safety as single-engined helicopters; and where, because of the low density of population, economic circumstances do not justify the replacement of single-engined by multi-engined helicopters (as in the case of remote arctic settlements).

(b) The Authority should give prior approval.

AC to Appendix 1 to CAR OPS-3.005(g), sub-paragraph (d)(2)(iv) Criteria for Two Pilot HHO

(See Appendix 1 to OPS 3.005(h), sub-paragraph (d)(2)(iv))

A crew of two pilots may be required when:

(a) The weather conditions are below VFR minima at the offshore vessel or structure.
(b) There are adverse weather conditions at the HHO site (i.e. turbulence, vessel movement, visibility).
(c) The type of helicopter requires a second pilot to be carried because of cockpit visibility; or handling characteristics; or lack of automatic flight control systems.

AC to Appendix 1 to OPS 3.005(h) Helicopter Operations to/from a Public Interest Site

(See Appendix 1 to OPS 3.005(h))

(a) General

Appendix 1 to OPS 3.005(h) - containing alleviations for public interest sites - was introduced to address problems that had been encountered at hospital (and lighthouse) sites due to the applicable performance requirements of Subparts G and H. These problems were enumerated in AC to Appendix 1 to OPS 3.005(d) paragraph 8, part of which is reproduced below.

"8 Problems with hospital sites

During implementation of CAR OPS-3, it was established that a number of States had encountered problems with the impact of performance rules where helicopters were operated for HEMS. Although States accept that progress should be made towards operations where risks associated with a critical power unit failure are eliminated, or limited by the exposure time concept, a number of landing sites exist which do not (or never can) allow operations to Performance Class 1 or 2 requirements.

These sites are generally found in a congested hostile environment:

(1) *in the grounds of hospitals; or*
(2) *on hospital buildings;*

The problem of hospital sites is mainly historical and, whilst the Authority could insist that such sites not be used - or used at such a low weight that critical power unit failure performance is assured, it would seriously curtail a number of existing operations.

Even though the rule for the use of such sites in hospital grounds for HEMS operations (Appendix 1 to CAR OPS-3.005(d) sub-paragraph (c)(2)(i)(A)) attracts alleviation until 2013, it is only partial and will still impact upon present operations. Because such operations are performed in the public interest, it was felt that the Authority should be able to exercise its discretion so as to allow continued use of such sites provided that it is satisfied that an adequate level of safety can be maintained - notwithstanding that the site does not allow operations to Performance Class 1 or 2 standards. However, it is in the interest of continuing improvements in safety that the alleviation of such operations be constrained to existing sites, and for a limited period. ".

(b) Public Interest Sites after 01 January 2013

Although elimination of such sites would remove the problem, it is recognized that phasing out, or rebuilding existing hospital and lighthouse heliports, is a long-term goal which may not be cost effective, or even possible, in some States.

It should be noted however that existing paragraph (c) of the appendix limits the problem by confining approvals to public interest sites established before 01 January 2013 (established in this context means either: built before that date; or brought into service before that date – this precise wording was used to avoid problems associated with a ground level heliport where no building would be required). Thus the problem of these sites is contained and reducing in severity. This date was set approximately 6 months after the intended implementation of this original appendix.

From 01 January 2013 the approval of a public interest site will be confined to those sites where a CAT A procedure alone cannot solve the problem. The determination of whether the helicopter can or cannot be operated in accordance with Subpart G (Performance Class 1) should be established with the helicopter at a realistic payload and fuel to complete the mission. However, in order to reduce the risk at those sites, the application of the requirements contained in paragraph (d)(2) of the appendix will be required.

Additionally, and in order to promote understanding of the problem, the text contained in paragraph (e) of the appendix has been amended to refer to Subpart G of OPS 3 and not to Annex 14 as in the original appendix. Thus Part C of the Operations Manual should reflect the non-conformance with that Subpart. The following paragraphs discusses problem and solutions.

(c) The problem associated with public interest sites

There are a number of problems: some of which can be solved with the use of appropriate helicopters and procedures; and others which, because of the size of the heliport or the obstacle environment, cannot. They consist of:

(1) Helicopters that cannot meet the performance criteria required by Subpart G;
(2) The size of the FATO of the heliport (smaller than that required by the manufacturers' procedure);
(3) An obstacle environment that prevents the use of the manufacturers procedure (obstacles in the back-up area)
(4) An obstacle environment that does not allow recovery following a power unit failure in the critical phase of take-off (a line of buildings requiring a demanding gradient of climb) at a realistic payload and fuel to complete the mission.
(5) A ground level heliport (exposure is not permitted);

(C1) Problems associated with 1; it was recognised at the time of the adoption of the original appendix that, although the number of helicopters not meeting the absolute performance criteria of a. above were dwindling, existing HEMS and lighthouse fleets could not be replaced until 2005. (There is still a possibility that limited production will not allow the complete replacement of such limited power helicopters before the 2004 date; it is therefore suggested that Authorities should, providing an order position can be established by the operator, allow the continued use of such helicopters for a limited period, without the additional mitigation required by paragraph

(d)(2) of the appendix.)

(C2) Problems associated with 2.; the inability to climb and conduct a rejected landing back to the heliport following an engine failure before the Decision Point (DP).

(C3) Problems associated with 3.; as in 2.

(C4) Problems associated with 4; climb into an obstacle following an engine failure after DP.

(C5) Problems associated with 5.; may be related to;

(1) the size of the FATO which is too small for the manufacturers' procedure;

(2) no room for back-up;

(3) an obstacle in the take-off path; or - a mixture of all three.

With the exception of case a., problems cannot be solved in the immediate future but can, when mitigated with the use of the latest generation of helicopters (operated at a weight that can allow useful payloads and endurance), minimise exposure to risk.

(d) Long Term Solution

Although not offering a complete solution, it was felt that a significant increase in safety could be achieved by applying an additional performance margin to such operations. This solution could also be seen as mitigation proportional to the problem and would allow the time restriction of 2004 to be removed. The required performance level of 8% climb gradient in the first segment, reflects ICAO Annex 14 Volume II in Table 4-3 – Dimensions and slopes of obstacle limitations surfaces for Performance Class 2.

The performance delta is achieved without the provision of further manufacturers data by using existing graphs to provide the RTOM.

If we examine the solution in relation to the original problem the effects can be seen.

(D1) *Solution with relation to b.;* although the problem still exists, the safest procedure is a dynamic take-off reducing the time taken to achieve Vstayup and thus allowing VFR recovery – if the failure occurs at or after Vy and 200 feet, an IFR recovery is possible.

(D2) *Solution with relation to c.;* as in b. above.

(D3) *Solution with relation to d.;* once again this does not give a complete solution, however the performance delta minimise the time during which a climb over the obstacle cannot be achieved.

(D4) *Solution with relation to e.;* as in D1 to D3 above.

AC to Appendix 1 to OPS 3.005(h) sub-paragraph (a)(1) Improvement Programme for Public Interest Sites

(See Appendix 1 to OPS 3.005(h) sub-paragraph (a)(1)

(a) General

Although it is accepted that there will be a number of public interest sites that will remain for some time, it is in the interest of safety that the numbers are reduced and eventually, as a goal, all sites eliminated. A reduction of sites can be achieved in two ways:

(1) By an improvement in the performance of helicopters such that HOGE OEI is possible at weights where the mission can be performed.

(2) By the use of a site improvement program: to take out of service those sites where the exposure is greatest; or by improving sites such that the performance requirement can be met.

(b) Improvement in Performance

The advent of more powerful modern twin-engine helicopters has put into reach the ability to achieve the aim stated in 1.a. above. A number of these helicopters are, in 2003, almost at the point where HOGE OEI with mission payload is possible. However, although technically feasible, it is not economically justifiable to require an immediate and complete re-equipping of all HEMS fleets.

(c) Improvement of Sites

Where a site could be improved by redevelopment, for example by increasing the size of the FATO, it should be done; where the problems of a site are due to the obstacle environment, a Programme to resite the facility or remove the obstacle(s) should be an undertaken as a priority.

(d) Summary

As was stated in paragraph 1. above, it is in the interest of States to reduce the risk of an accident due to an engine failure on take-off or landing. This could be achieved with a combination of policies: the use more appropriate helicopters; or, improvement by redevelopment of a site; or, the re-siting of facilities to alternative locations.

Some States have already undertaken to remove or improve public interest sites by using one, or more of the above methods. For those States where a compliance Programme is under way, the choice of reduction by elimination or redevelopment should not be put on hold whilst waiting for new generation helicopters. The improvement policy should be achieved in a reasonable time horizon – and this should be an element of the compliance program.

The approval to operate to public interest sites could be conditional upon such improvement programs being put into place. Unless such a policy is instituted, there will be no incentive for public interest sites to be eliminated in a reasonable time horizon.

AC to Appendix 1 to OPS 3.005(h) sub-paragraph (d)(2) Helicopter Mass Limitation for Operations at a Public Interest Site

(See Appendix 1 to OPS 3.005(h) sub-paragraph (d)(2))

The helicopter mass limitation at take-off or landing specified in Appendix 1 to OPS 3.005(i) subparagraph (d)(2) should be determined using the climb performance data from 35 ft to 200 ft at Vtoss (First segment of the take-off flight path) contained in the Category A supplement of the Helicopter Flight Manual (or equivalent manufacturer data acceptable to the Authority according to AMC OPS 3.480(a)(1) and (a)(2)).

The first segment climb data to be considered is established for a climb at the take-off safety speed Vtoss, with the landing gear extended (when the landing gear is retractable), with the critical power unit inoperative and the remaining power units operating at an appropriate power rating (the 2 min 30 sec or 2 min One Engine Inoperative power rating, depending on the helicopter type certification). The appropriate Vtoss, is the value specified in the Category A performance section of the Helicopter Flight Manual for vertical take-off and landing procedures (VTOL or Helipad or equivalent). The ambient conditions at the heliport (pressure-altitude and temperature) should be taken into account.

The data is usually provided in charts one of the following ways:

(a) Height gain in ft over a horizontal distance of 100 ft in the first segment configuration (35 ft to 200 ft, Vtoss, 2 min 30 sec / 2 min OEI power rating). This chart should be entered with a height gain of 8 ft per 100 ft horizontally travelled, resulting in a mass value for every pressure altitude/temperature combination considered.

(b) Horizontal distance to climb from 35 ft to 200 ft in the first segment configuration (Vtoss, 2 min 30 sec / 2 min OEI power rating). This chart should be entered with a horizontally distance of 628 m (2 062 ft), resulting in a mass value for every pressure-altitude/temperature combination considered.

(c) Rate of climb in the first segment configuration (35 ft to 200 ft, Vtoss, 2 min 30 sec / 2 min OEI power rating). This chart can be entered with a rate of climb equal to the climb speed (Vtoss) value in knots (converted to True Airspeed) multiplied by 8·1, resulting in a mass value for every pressure-altitude/temperature combination considered.

AC to Appendix 1 to CAR OPS-3.005(i) Helicopter Operations with Night Vision Imaging Systems
(Refers to Appendix 1 to CAR OPS-3.005(i) Helicopter Operations with Night Vision Imaging Systems)

A. Equipment requirements for NVIS operations

RADIO ALTIMETER

(a) The radio altimeter should:
   (1) be of an analogue type display presentation that requires minimal interpretation for both an instantaneous impression of absolute height and rate of change of height;
   (2) be positioned to be instantly visible and discernable from each cockpit crew station;
   (3) have an integral audio and visual low height warning that operates at a height selectable by the pilot; and
   (4) provide unambiguous warning to the crew of radio altimeter failure.

(b) The visual warning should provide:
   (1) clear visual warning at each cockpit crew station of height below the pilot-selectable height; and
   (2) adequate attention-getting-capability for typical NVIS operations.

(c) The audio warning should:
   (1) be unambiguous and readily cancellable;
   (2) not extinguish any visual low height warnings when cancelled; and
   (3) operate at the same pilot-selectable height as the visual warning.

B. Equipment requirements for NVIS operations

RADIO ALTIMETER

An analogue type display presentation may be, for example, a representation of a dial, ribbon or bar, but not a display that provides numbers only. An analogue type display may be embedded into an electronic flight instrumentation system (EFIS).

C. Equipment requirements for NVIS operations

DEMONSTRATION OF EQUIVALENT VISUAL ACUITY

(a) When demonstrating the equivalent visual acuity of the required NVG, the operator should ensure that one of the following conditions are met:
   (1) all required NVG should be of the same make and model;
   (2) the operator ensures that both:
      (i) the different NVG meet the same set of specifications (e.g. generation); and
      (ii) the lowest figure of merit of the different models is no less than 85 % of the higher figure of merit;
   (3) the operator:
      (i) analyses the available specifications of the NVG that are considered for compatibility. If, based on the specifications that are available, the different models of NVG appear to be of different generations, they should only be used together on the same flight on a temporary basis, as part of an operator's upgrade to a better generation of NVG;
      (ii) conducts an operational demonstration to assess the differences in visual acuity of the different models of NVG that are considered for compatibility, in accordance with (b) below;
      (iii) conducts a risk assessment to determine whether the different models can be used by different crew members on the same flight and under which conditions, in accordance with (c) below.

(b) The operational demonstration referred to in (a)(3)(ii) above should include the following:
   (1) Environmental conditions. The operational demonstration should take place in all of the following

environmental conditions:

(i) Full moon and moisture < 70 % relative humidity

(ii) At least one lighting condition that is in-between

(iii) No moon (e.g. 5 mlux).

(2) Relevant terrain and lights. The operational demonstration should compare the visual acuity offered by the different NVG for a representative set of terrain and lights under all environmental conditions specified above.

(3) Operational environment.

(i) The operational demonstration may take place on dedicated non-commercial flights, or during commercial operations if the following conditions are met:

(A) On any given flight, all crew members use NVG of the same make and model.

(B) Different models of NVG are used on different flights within the same mission.

(C) The lighting conditions remain the same within the same mission.

(ii) An FSTD should not be used for the operational demonstration.

(4) The operator should define the operational demonstration methodology in the operations manual, and should provide to crew members in charge of the assessment an 'operational demonstration sheet', which includes all defined elements to be assessed under all defined light conditions.

(5) Crew members in charge of the assessment should have logged at least 100 NVIS flights or 30 hours' flight time under NVIS as a pilot-in-command/commander.

(c) The risk assessment referred to in (a)(3)(iii) above should consider the following:

(1) The operator should consider the results of the analysis of the available specifications and the results of the operational demonstration in its risk assessment. The conclusion may be one of the following:

(i) The different models of NVG should not be used together on the same flight;

(ii) The different models of NVG may be used on the same flight with no restrictions;

(iii) The different models of NVG may be used on the same flight with one or more of the following restrictions:

(A) The pilot flying uses the best NVG available;

(B) On dark nights, a briefing is made on the differences. Dark nights could be defined either as less than 1mLux or be defined by the operator based on the assessment results;

(C) Any additional restrictions as defined by the operator.

(2) The risk assessment should consider the interchangeability of the NVG available on board, including any NVG of different makes and models, as well as spare NVG.

(3) The risk assessment may consider the benefits of upgrading the NVG to a better standard.

(i) The duration of the transition to new NVG should be taken into account at operator level.

(ii) If the operator has more than one operating base, it may be possible to equip a given operating base with NVG of the same model, whereas another operating base will have different NVG. In such case the operator should determine the conditions under which the crew changes from one operating base to another.

(iii) If the operator defines that a crew member usually uses the same upgraded model of NVG except when one of these is in maintenance, in which case a previous model is used, the operator may need to define additional restrictions and conditions for the use of the previous model. Such conditions may include a familiarisation on ground during the night or training flight before the spare model is planned to be used in flight.

(d) SOPs. The operator should develop SOPs to comply with any restrictions established in its risk assessment.

DEMONSTRATION THAT DIFFERENT NVG ARE OF THE SAME FILTER CLASS

The operator should demonstrate that NVG of different models have the same filter class, in order to ensure that they will not filter out different external lights. This might be possible despite both NVG models being compatible with the helicopter as determined in the flight manual.

D. Equipment requirements for NVIS operations

DEMONSTRATION OF EQUIVALENT VISUAL ACUITY — SET OF SPECIFICATIONS AND GENERATIONS

(a) When assessing whether different NVG meet the same set of specifications for the purpose of demonstrating equivalent visual acuity, as described in point (a)(2)(ii) of EASA AMC1 SPA.NVIS.110(e), generations may be defined as per US military specifications or using the following criteria:
   (1) Generation 0 typically uses an S-1 photocathode with peak response in the blue-green region (with a photosensitivity of 60 micro A /lm), electrostatic inversion, and electron acceleration to achieve gain. Consequently generation 0 tubes are characterised by the presence of geometric distortion and the need for active infrared illumination.
   (2) Generation 1 typically uses an S-20 photocathode (with a photosensitivity of 180-200 micro A /lm), electrostatic inversion, and electron acceleration to achieve gain. Because of higher photo-sensitivity, generation 1 was the first truly passive image intensifier. Generation 1 is characterised by the presence of geometric distortion, low performance at low light level and blooming.
   (3) Generation 2 typically uses an S-25 photocathode (extended red, with a photosensitivity of 240 micro A /lm or more), and a microchannel to achieve gain. Generation 2 tubes provide satisfactory performance at low light levels and low distortion.
   (4) Generation 3 uses gallium-arsenide for the photocathode (photosensitivity of 800+ micro A /lm in the near infrared) and a micro-channel plate for gain. The microchannel is coated with an ion barrier film to increase tube life. Generation 3 has very good to excellent performance at low light level. Recent models have no perceptible distortion.

(b) NVG of ‘generation 3 autogated’ or ‘generation 3+’ as defined by the US military are sometimes called ‘generation 4’ commercially. The differences with generation 3 are limited to the following and are therefore considered not to be significant. Generations 3 to 4 as mentioned above may be considered to be the same generation.
   (1) they are autogated, therefore more robust to high illumination and abrupt changes of the illumination level.
   (2) they are unfilmed, which gives less image noise.

(c) A non-civilian set of specifications — other than generations — that ensures sufficient equivalent visual acuity may also be used. For example, OMNI specifications from the US military may be used.

(d) The figure of merit is resolution * signal to noise ratio.

E. Equipment requirements for NVIS operations

MODIFICATION OR MAINTENANCE TO THE HELICOPTER

It is important that the operator reviews and considers all modifications or maintenance to the helicopter with regard to the NVIS airworthiness approval. Special emphasis needs to be paid to modification and maintenance of equipment such as light emitting or reflecting devices, transparencies and avionics equipment, as the function of this equipment may interfere with the NVGs.

F. NVIS operating minima

NVIS OPERATIONS UNDER IFR

(a) Any limitation in the rotorcraft flight manual should be complied with.

(b) Night-vision goggles may be used in a flipped-down position during a flight under IFR:
   (1) under VMC;

(2) under IMC:
   (i) in preparation of the visual segment of an instrument approach or a visual approach;
   (ii) during the visual segment of an instrument approach or departure;
   (iii) during a visual approach;
   (iv) in preparation of a transition to VFR.

(c) The pilot-in-command/commander should not proceed on a visual segment of an IFR flight unless the visual cues required for the visual segment are visible using unaided vision.

(d) The pilot-in-command/commander should not proceed VFR unless the VFR weather minima are assessed without using unaided vision.

G. NVIS operating minima

NVIS OPERATIONS UNDER IFR

The use of night-vision goggles in a flipped-down position does not prevent the use of unaided vision, by looking out below the goggles or to the sides.

H. Crew requirements for NVIS operations

UNDERLYING ACTIVITY

Examples of an underlying activity are:

(a) commercial air transport (CAT);
(b) helicopter emergency medical service (HEMS); and
(c) helicopter hoist operation (HHO).

O. Crew requirements for NVIS operations

OPERATIONAL APPROVAL

(a) When determining the composition of the minimum crew, the competent authority should take account of the type of operation that is to be conducted. The minimum crew should be part of the operational approval.

(b) If the operational use of NVIS is limited to the en-route phase of a CAT flight, a single-pilot operation may be approved.

(c) Where operations to/from a HEMS operating site are to be conducted, a crew of at least one pilot and one NVIS technical crew member would be necessary (this may be the suitably qualified HEMS technical crew member).

(d) A similar assessment may be made for night HHO, when operating to unprepared sites.

P. Crew requirements for NVIS operations

TRAINING AND CHECKING SYLLABUS

(a) The flight crew training syllabus should include the following items:
   (1) NVIS working principles, eye physiology, vision at night, limitations and techniques to overcome these limitations;
   (2) preparation and testing of NVIS equipment;
   (3) preparation of the helicopter for NVIS operations;
   (4) normal and emergency procedures including all NVIS failure modes;
   (5) maintenance of unaided night flying;
   (6) crew coordination concept specific to NVIS operations;
   (7) practice of the transition to and from NVG procedures;
   (8) awareness of specific dangers relating to the operating environment; and
   (9) risk analysis, mitigation and management.

(b) The flight crew checking syllabus should include:
   (1) night proficiency checks, including emergency procedures to be used on NVIS operations; and
   (2) line checks with special emphasis on the following:

(i) local area meteorology;
(ii) NVIS flight planning;
(iii) NVIS in-flight procedures;
(iv) transitions to and from night vision goggles (NVG);
(v) normal NVIS procedures; and
(vi) crew coordination specific to NVIS operations.

(c) Whenever the crew is required to also consist of an NVIS technical crew member, he/she should be trained and checked in the following items:
(1) NVIS working principles, eye physiology, vision at night, limitations, and techniques to overcome these limitations;
(2) duties in the NVIS role, with and without NVGs;
(3) the NVIS installation;
(4) operation and use of the NVIS equipment;
(5) preparing the helicopter and specialist equipment for NVIS operations;
(6) normal and emergency procedures;
(7) crew coordination concepts specific to NVIS operations;
(8) awareness of specific dangers relating to the operating environment; and
(9) risk analysis, mitigation and management.

Q. Crew requirements for NVIS operations

CHECKING OF NVIS CREW MEMBERS

(a) The operator proficiency check and line check required in EASA SPA.NVIS.130(f) should have a validity of 12 calendar months. The validity period should be counted from the end of the month when the training was taken. When the check is undertaken within the last 3 months of the validity period, the new validity period should be counted from the previous expiry date.
(b) These checks may be combined with those checks required for the underlying activity.

R. Crew requirements for NVIS operations

CREW TRAINING AND CHECKING — NVIS OPERATIONS UNDER IFR

(a) The minimum crew should be two pilots, or one pilot and one NVIS technical crew member.
(b) The crew training and experience should ensure:
(1) efficient scanning of the instruments with the night-vision goggles (NVGs) flipped up or down as defined in the standard operating procedures (SOPs);
(2) proficiency during the transition phase;
(3) proficient use of the NVGs on the visual segments of the flight during which they are expected to be used;
(4) the continuity of a crew concept.
(c) A crew member that is involved in NVIS operations under IFR should undergo initial and recurrent training using a suitable FSTD as part of the normal crew complement. The training should cover at least the following items under a variety of weather conditions and cultural lighting:
(1) transition from instrument to visual flight during the final approach;
(2) transition from visual to instrument flight on departure.
(d) In addition to (b) and (c), a technical crew member that is involved in NVIS operations under IFR should be trained to perform navigation and monitoring functions under IFR, as described under EASA AMC3 SPA.NVIS.130(f). The training should include all of the following on the given helicopter type:
(1) initial and recurrent general training;
(2) initial and recurrent monitoring training;
(3) initial and recurrent navigation training;
(4) initial and recurrent aircraft/FSTD training focusing on crew cooperation with the pilot;

(5) LIFUS.

(e) An FSTD suitable for the NVIS training described in (c) should meet all of the following criteria:

(1) be a helicopter FSTD;

(2) have a NVIS-compatible cockpit;

(3) have a night visual system that can be representative of different moon phases and allows external visual cues to be adjusted to the point where they are no longer visible without NVGs and remain visible with NVGs, when simulating night conditions;

(4) The night visual system should be able to support atmospheric conditions such as:

(i) more than one cloud layer or one cloud layer with a geographically variable cloud base;

(ii) variable visibility; and

(iii) snow, light rain and heavy rain with and without NVGs;

(5) be of a helicopter type on which the crew member is current unless the crew member receives additional training for the use of the FSTD.

(f) The person conducting the training defined in (c) above should be a NVIS instructor and should hold an instrument rating in accordance with CAR FCL.

(g) The training should have a validity of 12 calendar months. The validity period should be counted from the end of the month when the training was taken. When the training is undertaken within the last 3 months of the validity period, the new validity period should be counted from the previous expiry date.

(h) The flight crew operator proficiency check should include one transition from instrument to visual flight during the final approach, using NVIS. This manoeuvre may be combined with a 2D or 3D approach to minima.

(i) NVIS operations under IFR on more than one type or variant with different levels of automation

(1) The crew member should be provided with differences training or familiarisation.

(2) The flight crew member should perform the manoeuvre defined in (h) each time on a different type or variant.

S. Crew requirements for NVIS operations

CREW TRAINING AND CHECKING — TECHNICAL CREW MEMBER TRAINING FOR OPERATIONS UNDER IFR — INITIAL AND RECURRENT GENERAL TRAINING AND CHECKING

(a) The technical crew member initial and recurrent training and checking syllabus should include the following items:

(1) duties in the technical crew member role;

(2) map reading, including:

(i) ability to keep track with helicopter position on map;

(ii) ability to detect conflicting terrain/obstacles on a given route, and at a given altitude;

(iii) use of moving maps, as required;

(3) basic understanding of the helicopter type in terms of location and design of normal and emergency systems and equipment, including all helicopter lights and operation of doors, and including knowledge of helicopter systems and understanding of the terminology used in checklists;

(4) the dangers of rotor-running helicopters;

(5) outside lookout during the flight;

(6) crew coordination with in-flight call-outs, with emphasis on crew coordination regarding the tasks of the technical crew member, including checklist initiation, interruptions and termination;

(7) warnings, and use of normal, abnormal and emergency checklists assisting the pilot as required;

(8) the use of the helicopter intercommunications system;

(9) basic helicopter performance principles, including the definitions of Category A certification, performance class 1 and performance class 2;

(10) operational control and supervision;

(11) meteorology;
(12) applicable parts of CAR 180, including instrument flight rules (IFR), as relevant to the tasks of the technical crew member;
(13) mission planning;
(14) early identification of pilot incapacitation;
(15) debriefing; and
(16) PBN, as necessary.

INITIAL AND RECURRENT NAVIGATION TRAINING AND CHECKING

(b) The initial and recurrent navigation training and checking syllabus should include the following items:
(1) aeronautical map reading (additional training to (a)(4) above), navigation principles;
(2) navigation aid principles and use;
(3) crew coordination with in-flight call-outs, with emphasis on navigation issues;
(4) applicable parts of SERA; and
(5) airspace, restricted areas, and noise-abatement procedures.

INITIAL AND RECURRENT MONITORING TRAINING AND CHECKING

(c) The initial and recurrent monitoring training and checking syllabus should include the following items:
(1) basic understanding of the helicopter type, including knowledge of any limitations to the parameters the crew member is tasked to monitor, and knowledge of the basic principles of flight;
(2) instrument reading;
(3) inside monitoring during the flight;
(i) aircraft state/cockpit cross-check;
(ii) automation philosophy and autopilot status monitoring, as relevant;
(iii) FMS, as relevant;
(4) crew coordination with in-flight call-outs, with emphasis on call-outs and actions resulting from the monitoring process; and
(5) flight path monitoring.

INITIAL AIRCRAFT/FSTD TRAINING

(d) The technical crew member training syllabus should include aircraft/FSTD training focusing on crew cooperation with the pilot.
(1) The initial training should include at least 4 hours instruction dedicated to crew cooperation unless:
(i) the technical crew member has undergone this training under another operator; or
(ii) the technical crew member has performed at least 50 missions in assisting the pilot from the front seat as a technical crew member.
(2) The training described in (1) should be organised with a crew composition of one pilot and one technical crew member.
(3) The training described in (1) should be supervised by a pilot with a minimum experience of 500 hours in either multi-pilot operations or single-pilot operations with a technical crew member assisting from the front seat, or a combination of these.
(4) The training may be combined with the LIFUS.

LINE FLYING UNDER SUPERVISION (LIFUS)

(e) LIFUS
(1) LIFUS should take place during the operator’s conversion course.
(2) Line flights under supervision provide the opportunity for a technical crew member to practise the procedures and techniques he or she should be familiar with, regarding ground and flight operations, including any elements that are specific to a particular helicopter type. Upon completion of the LIFUS, the technical crew member should be able to safely conduct the flight operational duties assigned to him or her according to the procedures laid down in the operator’s operations manual.

(3) LIFUS should be conducted by a suitably qualified technical crew member or commander nominated by the operator.

(4) LIFUS should include a minimum of five sectors under IFR.

RECURRENT AIRCRAFT/FSTD TRAINING

(f) Recurrent helicopter/FSTD training

(1) The recurrent training should focus on crew cooperation and contain a minimum of 2 hours of flight.

(2) The training described in (1) should take place in the same conditions as the initial training in (d) above.

T. Crew requirements for NVIS operations

TRAINING GUIDELINES AND CONSIDERATIONS

(a) Purpose

The purpose of this GM is to recommend the minimum training guidelines and any associated considerations necessary for the safe operation of a helicopter while operating with night vision imaging systems (NVISs). To provide an appropriate level of safety, training procedures should accommodate the capabilities and limitations of the NVIS and associated systems as well as the restraints of the operational environment.

(b) Assumptions

The following assumptions were used in the creation of this material:

(1) Most civilian operators may not have the benefit of formal NVIS training, similar to that offered by the military. Therefore, the stated considerations are predicated on that individual who has no prior knowledge of NVIS or how to use them in flight. The degree to which other applicants who have had previous formal training should be exempted from this training will be dependent on their prior NVIS experience.

(2) While NVIS are principally an aid to flying under VFR at night, the two- dimensional nature of the NVG image necessitates frequent reference to the flight instruments for spatial and situational awareness information. The reduction of peripheral vision and increased reliance on focal vision exacerbates this requirement to monitor flight instruments. Therefore, any basic NVIS training syllabus should include some instruction on basic instrument flight.

(c) Two-tiered approach: basic and advance training

To be effective, the NVIS training philosophy would be based on a two-tiered approach: basic and advanced NVIS training. The basic NVIS training would serve as the baseline standard for all individuals seeking an NVIS endorsement. The content of this initial training would not be dependent on any operational requirements. The training required for any individual pilot should take into account the previous NVIS flight experience. The advanced training would build on the basic training by focusing on developing specialised skills required to operate a helicopter during NVIS operations in a particular operational environment. Furthermore, while there is a need to stipulate minimum flight hour requirements for an NVIS endorsement, the training should also be event-based. This necessitates that operators be exposed to all of the relevant aspects, or events, of NVIS flight in addition to acquiring a minimum number of flight hours. NVIS training should include flight in a variety of actual ambient light and weather conditions.

(d) Training requirements

(1) Flight crew ground training

The ground training necessary to initially qualify a pilot to act as the pilot of a helicopter using NVGs should include at least the following subjects:

(i) applicable aviation regulations that relate to NVIS limitations and flight operations;

(ii) aero-medical factors relating to the use of NVGs to include how to protect night vision, how the eyes adapt to operate at night, self-imposed stresses that affect night vision, effects of lighting (internal and external) on night vision, cues utilized to estimate distance and depth perception at night, and visual illusions;

(iii) NVG performance and scene interpretation;

(iv) normal, abnormal, and emergency operations of NVGs; and

(v) NVIS operations flight planning to include night terrain interpretation and factors affecting terrain interpretation.

The ground training should be the same for flight crew and crew members other than flight crew. An example of a ground training syllabus is presented in Table 1 of Para U. Crew Requirements for NVIS Ops.

(2) Flight crew flight training

The flight training necessary to initially qualify a pilot to act as the pilot of a helicopter using NVGs may be performed in a helicopter or FSTD approved for the purpose, and should include at least the following subjects:

(i) preparation and use of internal and external helicopter lighting systems for NVIS operations;

(ii) pre-flight preparation of NVGs for NVIS operations;

(iii) proper piloting techniques (during normal, abnormal, and emergency helicopter operations) when using NVGs during the take-off, climb, en-route, descent, and landing phases of flight that includes unaided flight and aided flight; and

(iv) normal, abnormal, and emergency operations of the NVIS during flight.

Crew members other than flight crew should be involved in relevant parts of the flight training. An example of a flight training syllabus is presented in Table 1 of EASA GM3 SPA.NVIS.130(f).

(3) Training crew members other than flight crew

Crew members other than flight crew (including the technical crew member) should be trained to operate around helicopters employing NVIS. These individuals should complete all phases of NVIS ground training that is given to flight crew. Due to the importance of crew coordination, it is imperative that all crew members are familiar with all aspects of NVIS flight. Furthermore, these crew members may have task qualifications specific to their position in the helicopter or areas of responsibility. To this end, they should demonstrate competency in those areas, both on the ground and in flight.

(4) Ground personnel training

Non-flying personnel who support NVIS operations should also receive adequate training in their areas of expertise. The purpose is to ensure, for example, that correct light discipline is used when helicopters are landing in a remote area.

(5) Instructor qualifications

An NVIS flight instructor should at least have the following licences and qualifications:

(i) at least flight instructor (FI(H)) or type rating instructor (TRI(H)) with the applicable type rating on which NVIS training will be given; and

(ii) logged at least 100 NVIS flights or 30 hours' flight time under NVIS as pilot-in-command/commander.

(6) NVIS equipment minimum requirements (training)

While minimum equipment lists and standard NVIS equipment requirements may be stipulated elsewhere, the following procedures and minimum equipment requirements should also be considered:

(i) NVIS: the following is recommended for minimum NVIS equipment and procedural requirements:

(A) back-up power supply;

(B) NVIS adjustment kit or eye lane;

(C) use of helmet with the appropriate NVG attachment; and
(D) both the instructor and student should wear the same NVG type, generation and model.

(ii) (ii) Helicopter NVIS compatible lighting, flight instruments and equipment: given the limited peripheral vision cues and the need to enhance situational awareness, the following is recommended for minimum compatible lighting requirements:

(A) NVIS compatible instrument panel flood lighting that can illuminate all essential flight instruments;
(B) NVIS compatible hand-held utility lights;
(C) portable NVIS compatible flashlight;
(D) a means for removing or extinguishing internal NVIS non-compatible lights;
(E) NVIS pre-flight briefing/checklist (an example of an NVIS pre-flight briefing/checklist is in Table 1, para, W. Crew requirements for NVIS operations;
(F) training references:
a number of training references are available, some of which are listed below:
— DO 295 US CONOPS civil operator training guidelines for integrated NVIS equipment
— United States Marine Corp MAWTS-1 Night Vision Device (NVD) Manual;
— U.S. Army Night Flight (TC 1-204);
— U.S. Army NVIS Operations, Exportable Training Package;
— U.S. Army TM 11-5855-263-10;
— Air Force TO 12S10-2AVS6-1;
— Navy NAVAIR 16-35AVS-7; and
— U.S. Border Patrol, Helicopter NVIS Ground and Flight Training Syllabus.
There may also be further documents available from European/ GCC civil or military sources.

U. Crew requirements for NVIS operations

INSTRUCTION – GROUND TRAINING AREAS OF INSTRUCTION

A detailed example of possible subjects to be instructed in an NVIS ground instruction is included below. (The exact details may not always be applicable, e.g. due to goggle configuration differences.)

Table 1 Ground training areas of instruction

Item	Subject Area	Subject Details	Recommended Time
1	General anatomy and characteristics of the eye	Anatomy: — Overall structure of the eye — Cones — Rods Visual deficiencies: — myopia — hyperopia — astigmatism — presbyopia Effects of light on night vision & NV protection physiology: — Light levels — illumination — luminance	1 hour

		— reflectance — contrast Types of vision: — photopic — mesopic — scotopic — Day versus night vision Dark adaptation process: — dark adaptation — pre-adaptive state — Purkinje shift — Ocular chromatic aberration — Photochromatic interval	
2	Night vision human factors	Night blind spot (as compared to day blind spot) Field of view and peripheral vision Distance estimation and depth perception: — monocular cues — motion parallax — geometric perspective — size constancy — overlapping contours or interposition of objects Aerial perspective: — variations in colour or shade — loss of detail or texture — position of light source — direction of shadows — Binocular cues Night vision techniques: — off-centre vision — scanning shapes and silhouettes — Vestibular illusions Somatogyral illusions: — leans — graveyard spin — coriolis illusion Somatogravic illusions: — oculographic illusions — elevator illusion — oculoagravic illusions Proprioceptive illusions Dealing with spatial disorientation Visual illusions: — auto kinetic illusion — confusion with ground lights — relative motion — reversible perspective illusion	1 hour

		— false vertical and horizontal cues — altered planes of reference — height /depth perception illusion — flicker vertigo — fascination (fixation) — structural illusions — size-distance illusion Helicopter design limitations: — windscreen condition — helicopter instrument design — helicopter structural obstruction — interior lights — exterior lights Self-imposed stresses: — drugs — exhaustion — alcohol — tobacco — hypoglycaemia — injuries — physical fitness Stress & fatigue: — acute vs. chronic — prevention Hypoxia issues and night vision Weather/environmental conditions: — snow (white-out) — dust (brown-out) — haze — fog — rain — light level Astronomical lights (moon, star, northern lights) Effects of cloud cover	
3	NVIS general characteristics	Definitions and types of NVIS: — light spectrum — types of NVIS Thermal-imaging devices Image-intensifier devices Image-intensifier operational theory Types of image intensifier systems: — generation 1 — generation 2 — generation 3 — generation 4 — type I / II	1 hour

		— class A & B minus blue filter NVIS equipment: — shipping and storage case — carrying case — binocular assembly — lens caps — lens paper — operators manual — power pack (dual battery) — batteries Characteristics of NVIS: — light amplification — light intensification — frequency sensitivity — visual range acuity — unaided peripheral vision — weight — flip-up device — break-away feature — neck cord — maintenance issues — human factor issues Description and functions of NVIS components: — helmet visor cover and extension strap — helmet NVIS mount and attachment points — different mount options for various helmets — lock release button — vertical adjustment knob — low battery indicator — binocular assembly — monocular tubes — fore and aft adjustment knob — eye span knob — tilt adjustment lever — objective focus rings — eyepiece focus rings — battery pack	
4	NVIS care & cleaning	Handling procedures NVIS operating instructions: — pre-mounting inspection — mounting procedures — focusing procedures — faults Post-flight procedures; Deficiencies: type and recognition of faults: — acceptable faults	1 hour

		— black spots — chicken wire — fixed pattern noise (honeycomb effect) — output brightness variation — bright spots — image disparity — image distortion — emission points — unacceptable faults: — shading — edge glow — fashing, flickering or intermittent operation Cleaning procedures Care of batteries Hazardous material considerations;	
5	Pre- & post-flight procedures	Inspect NVIS Carrying case condition Nitrogen purge due date Collimation test due date Screens diagram(s) of any faults NVIS kit: complete NVIS binocular assembly condition Battery pack and quick disconnect condition Batteries life expended so far Mount battery pack onto helmet: — verify no LED showing (good battery) — fail battery by opening cap and LED illuminates (both compartments) Mount NVIS onto helmet Adjust and focus NVIS Eye-span to known inter-pupillary distance Eye piece focus ring to zero Adjustments: — vertical — fore and aft — tilt — eye-span (fine-tuning) Focus (one eye at a time at 20 ft, then at 30 ft from an eye chart) — objective focus ring — eye piece focus ring — verify both images are harmonised — read eye-chart 20/40 line from 20 ft NVIS mission planning NVIS light level planning NVIS risk assessment	1 hour

6	NVIS terrain interpretation and environmental factors	Night terrain interpretation Light sources: — natural — lunar — solar — starlight — northern lights — artificial — cultural — infra-red Meteorological conditions: — clouds/fog — indications of restriction to visibility: — loss of celestial lights — loss of ground lights — reduced ambient light levels — reduced visual acuity — increase in video noise — increase in halo effect Cues for visual recognition: — object size — object shape — contrast — ambient light — colour — texture — background — reflectivity Factors affecting terrain interpretation: — ambient light — flight altitudes — terrain type Seasons Night navigation cues: — terrain relief — vegetation — hydrographical features — cultural features	1 hour
7	NVIS training & equipment requirements	Cover the relevant regulations and guidelines that pertain to night and NVIS flight to include as a minimum: — Crew experience requirements; — Crew training requirements; — Airspace requirements; — Night / NVIS MEL; — NVIS / night weather limits;	1 hour

		— NVIS equipment minimum standard requirements.	
8	NVIS emergency procedures	Cover relevant emergency procedures: — Inadvertent IMC procedures — NVIS goggle failure — Helicopter emergencies: — with goggles — transition from goggles	1 hour
9	NVIS flight techniques	Respective flight techniques for each phase of flight for the type and class of helicopter used for NVIS training	1 hour
10	Basic instrument techniques	Present and confirm understanding of basic instrument flight techniques: — Instrument scan — Role of instruments in NVIS flight — Unusual attitude recovery procedures	1 hour
11	Blind cockpit drills	Perform blind cockpit drills: — Switches — Circuit breakers — Exit mechanisms — External / internal lighting — Avionics	1 hour

V. Crew requirements for NVIS operations

FLIGHT TRAINING – AREAS OF INSTRUCTION

A detailed example of possible subjects to be instructed in a NVIS flight instruction is included below.

Table 1

Item	Subject Area	Subject Details	Recommended Time
1	Ground operations	— NVIS equipment assembly — Pre-flight inspection of NVISs — Helicopter pre-flight — NVIS flight planning: — light level planning — meteorology — obstacles and known hazards — risk analysis matrix — CRM concerns — NVIS emergency procedures review — Start-up/shut down — Goggling and degoggling	1 hour
2	General handling	— Level turns, climbs, and descents — For helicopters, confined areas and sloped landings — Operation specific flight tasks — Transition from aided to unaided flight	1 hour

		— Demonstration of NVIS related ambient and — cultural effects	
3	Take-offs & landings	— At both improved illuminated areas such as airports/airfields and unimproved unlit areas such as open fields — Traffic pattern — Low speed manoeuvres for helicopters	1 hour
4	Navigation	— Navigation over variety of terrain and under different cultural lighting conditions	1 hour
5	Emergency procedures	— Goggle failure — Helicopter emergencies — Inadvertent IMC — Unusual attitude recovery	1 hour

W. Crew requirements for NVIS operations

NVIS PRE-FLIGHT BRIEFING/CHECKLIST

A detailed example of a pre-flight briefing/checklist is included below.

Table 1

NVIS pre-flight briefing/checklist

Item	Subject Area
1	Weather: — METAR/forecast — Cloud cover/dew point spread/precipitation
2	OPS items: — NOTAMs — IFR publications backup/maps — Goggles adjusted using test set (RTCA Document DO-275 [NVIS MOPS], Appendices G & H give suggested NVG pre-flight and adjustment procedures and a ground test checklist)
3	Ambient light: — Moon rise/set/phase/position/elevation — % illumination and millilux (MLX) for duration of flight — Recommended minimum MLX: 1.5
4	Mission: — Mission outline — Terrain appreciation — Detailed manoeuvres — Flight timings — Start/airborne/debrief — Airspace coordination for NVIS — Obstacles/minimum safe altitude — NVIS goggle up/degoggle location/procedure

	— Instrument IFR checks
5	Crew: — Crew day/experience — Crew position — Equipment: NVIS, case, video, flashlights — Lookout duties: left hand seat (LHS) – from 90° left to 45° right, RHS – from 90° right to 45° left; — Calling of hazards/movements landing light — Transfer of control terminology — Below 100 ft AGL – pilot monitoring (PM) ready to assume control
6	Helicopter: — Helicopter configuration — Fuel and CG
7	Emergencies: — NVIS failure: cruise and low level flight — Inadvertent IMC/IFR recovery — Helicopter emergency: critical & non-critical

X. Crew requirements for NVIS operations

CREW TRAINING AND CHECKING — SUITABLE FSTD — NVIS OPERATIONS UNDER IFR

The FSTD may be a generic FSTD and may have no motion system.

Y. Information and documentation

OPERATIONS MANUAL

The operations manual should include:

- (a) equipment to be carried and its limitations;
- (b) the minimum equipment list (MEL) entry covering the equipment specified;
- (c) risk analysis, mitigation and management;
- (d) pre- and post-flight procedures and documentation;
- (e) selection and composition of crew;
- (f) crew coordination procedures, including:
  - (1) flight briefing;
  - (2) procedures when one crew member is wearing NVG and/or procedures when two or more crew members are wearing NVGs;
  - (3) procedures for the transition to and from NVIS flight;
  - (4) use of the radio altimeter on an NVIS flight; and
  - (5) inadvertent instrument meteorological conditions (IMC) and helicopter recovery procedures, including unusual attitude recovery procedures;
- (g) the NVIS training syllabus;
- (h) in-flight procedures for assessing visibility, to ensure that operations are not conducted below the minima stipulated for non-assisted night VFR operations;
- (i) weather minima, taking the underlying activity into account; and
- (j) the minimum transition heights to/from an NVIS flight.

Z. Information and documentation

1. CONCEPT OF OPERATIONS

Night Vision Imaging System for Civil Operators

The hours of darkness add to a pilot's workload by decreasing those visual cues commonly used during daylight operations. The decreased ability of a pilot to see and avoid obstructions at night has been a subject of discussion since aviators first attempted to operate at night. Technology advancements in the late 1960s and early 1970s provided military aviators some limited ability to see at night and therein changed the scope of military night operations. Continuing technological improvements have advanced the capability and reliability of night vision imaging systems to the point that they are receiving increasing scrutiny are generally accepted by the public and are viewed by many as a tool for night flight.

Simply stated, night vision imaging systems are an aid to night VFR flight. Currently, such systems consist of a set of night vision goggles and normally a complementary array of cockpit lighting modifications. The specifications of these two sub-system elements are interdependent and, as technology advances, the characteristics associated with each element are expected to evolve. The complete description and performance standards of the night vision goggles and cockpit lighting modifications appropriate to civil aviation are contained in the Minimum Operational Performance Standards for Integrated Night Vision Imaging System Equipment.

An increasing interest on the part of civil operators to conduct night operations has brought a corresponding increased level of interest in employing night vision imaging systems. However, the night vision imaging systems do have performance limitations. Therefore, it is incumbent on the operator to employ proper training methods and operating procedures to minimise these limitations to ensure safe operations. In turn, operators employing night vision imaging systems must have the guidance and support of their regulatory agency in order to safely train and operate with these systems.

Concept of operations — NVIS operations under IFR

The NVIS can be useful to assess the environment when not in a cloud layer if procedures are established for its use. It may also be useful for decision-making before cancelling IFR and during the transition from instrument flight to visual flight under IFR.

During departure, the NVIS provides extra safety if used correctly. This is especially true for a departure where the instruction is to proceed VFR from the FATO to the initial departure fix (IDF) because VFR departures provide no obstacle protection. It could also be useful for other instrument departures.

During the transition to visual flight, the NVIS provides additional safety because the visibility may be very different with or without the NVIS, and it may help to assess the situation.

The scanning of instruments and of external cues will be modified. Multi-crew operations with SOPs and the relevant training should be in place.

Operator SOPs may define that when one of the crew members uses the NVGs in a flipped-down position, the other should have the NVGs flipped up and should monitor the flight instruments and navigation instruments used for the flight. In this case, the continuity of the crew concept will rely on efficient crew communication.

In other situations and operations, the operator SOPs may also define that both crew members have NVGs in the flipped-down position, using the capability to look below the NVGs to monitor both the instruments and the VMC situation.

2. TERMINOLOGY

2.1. Night vision goggles

An NVG is a binocular appliance that amplifies ambient light and is worn by a pilot. The NVG enhances the wearer's ability to maintain visual surface reference at night.

2.1.1. Type

Type refers to the design of the NVG with regards to the manner in which the image is relayed to the pilot. A Type 1 NVG is one in which the image is viewed directly in-line with the image intensification process. A Type 1 NVG is also referred to as "direct view" goggle. A Type 2 NVG is one in which the image intensifier is not in-line with the image viewed by the pilot. In this design, the image may be reflected several times before being projected onto a combiner in front of the pilot's eyes. A Type 2 NVG is also referred to as an "indirect view" goggle.

2.1.2. Class

Class is a terminology used to describe the filter present on the NVG objective lens. The filter restricts the transmission of light below a determined frequency. This allows the cockpit lighting to be designed and installed in a manner that does not adversely affect NVG performance.

2.1.2.1. Class A

Class A or "minus blue" NVGs incorporate a filter, which generally imposes a 625 nanometer cutoff. Thus, the use of colours in the cockpit (e.g., colour displays, colour warning lights, etc.) may be limited. The blue green region of the light spectrum is allowed through the filter.

2.1.2.2. Class B

Class B NVGs incorporate a filter that generally imposes a 665 nanometer cutoff. Thus, the cockpit lighting design may incorporate more colours since the filter eliminates some yellows and oranges from entering the intensification process.

2.1.2.3. Modified Class B

Modified Class B NVGs incorporate a variation of a Class B filter but also incorporates a notch filter in the green spectrum that allows a small percentage of light into the image intensification process. Therefore, a Modified Class B NVG allows pilots to view fixed head-up display (HUD) symbology through the NVG without the HUD energy adversely affecting NVG performance.

2.1.3. Generation

Generation refers to the technological design of an image intensifier. Systems incorporating these light-amplifying image intensifiers were first used during WWII and were operationally fielded by the US military during the Vietnam era. These systems were large, heavy and poorly performing devices that were unsuitable for aviation use, and were termed Generation I (Gen I). Gen II devices represented a significant technological advancement and provided a system that could be head-mounted for use in ground vehicles. Gen III devices represented another significant technological advancement in image intensification, and provided a system that was designed for aviation use. Although not yet fielded, there are prototype NVGs that include technological advances that may necessitate a Gen IV designation if placed into production. Because of the variations in interpretations as to generation, NVGs will not be referred to by the generation designation.

2.1.4. OMNIBUS

The term OMNIBUS refers to a US Army contract vehicle that has been used over the years to procure NVGs. Each successive OMNIBUS contract included NVGs that demonstrated improved performance. There have been five contracts since the mid 1980s, the most current being OMNIBUS V. There may be several variations of NVGs within a single OMNIBUS purchase, and some NVGs from previous OMNIBUS contracts have been upgraded in performance to match the performance of goggles from later contracts. Because of these variations, NVGs will not be referred to by the OMNIBUS designation.

2.1.5. Resolution and visual acuity

Resolution refers to the capability of the NVG to present an image that makes clear and distinguishable the separate components of a scene or object.

Visual acuity is the relative ability of the human eye to resolve detail and interpret an image.

2.2. Aviation night vision imaging system (NVIS)

The Night Vision Imaging System is the integration of all elements required to successfully and safely operate an aircraft with night vision goggles. The system includes at a minimum NVGs, NVIS lighting, other aircraft components, training, and continuing airworthiness.

2.2.1. Look under (under view)

Look under is the ability of pilots to look under or around the NVG to view inside and outside the aircraft.

2.3. NVIS lighting

An aircraft lighting system that has been modified or designed for use with NVGs and which does not degrade the performance of the NVG beyond acceptable standards, is designated as NVIS lighting. This can apply to both interior and exterior lighting.

2.3.1. Design considerations

As the choice of NVG filter drives the cockpit lighting design, it is important to know which goggle will be used in which cockpit. Since the filter in a Class A NVG allows wavelengths above 625 nanometers into the intensification process, it should not be used in a cockpit designed for Class B or Modified Class B NVGs. However, since the filter in a Class B and Modified Class B NVGs is more restrictive than that in a Class ANVG, the Class B or Modified Class B NVG can be used with either Class A or Class B cockpit lighting designs.

2.3.2. Compatible

Compatibility, with respect to an NVIS system, includes a number of different factors: compatibility of internal and external lighting with the NVG, compatibility of the NVG with the crew station design (e.g., proximity of the canopy or windows, proximity of overhead panels, operability of controls, etc.), compatibility of crew equipment with the NVG and compatibility with respect to colour discrimination and identification (e.g., caution and warning lights still maintain amber and red colours). The purpose of this paragraph is to discuss compatibility with respect to aircraft lighting. An NVIS lighting system, internal and external, is considered compatible if it adheres to the following requirements:

(1) the internal and external lighting does not adversely affect the operation of the NVG during any phase of the NVIS operation;

(2) the internal lighting provides adequate illumination of aircraft cockpit instruments, displays and controls for unaided operations and for “look-under” viewing during aided operations; and

(3) The external lighting aids in the detection and separation by other aircraft.

NVIS lighting compatibility can be achieved in a variety of ways that can include, but is not limited to, modification of light sources, light filters or by virtue of location. Once aircraft lighting is modified for using NVGs, it is important to keep in mind that changes in the crew station (e.g., addition of new display) must be assessed relative to the effect on NVIS compatibility.

2.4. NVIS operation

A night flight wherein the pilot maintains visual surface reference using NVGs in an aircraft that is NVIS approved

2.4.1. Aided

Aided flight is flight with NVGs in an operational position.

2.4.2. Unaided

Unaided flight is a flight without NVGs or a flight with NVGs in a non-operational position.

3. SYSTEM DESCRIPTION

3.1. NVIS capabilities

NVIS generally provides the pilot an image of the outside scene that is enhanced compared to that provided by the unaided, dark-adapted eye. However, NVIS may not provide the user an image equal to that observed during daylight. Since the user has an enhanced visual capability, situational awareness is generally improved.

3.1.1. Critical element

The following critical elements are the underlying assumptions in the system description for NVIS:

(1) aircraft internal lighting has been modified or initially designed to be compatible;

(2) environmental conditions are adequate for the use of NVIS (e.g. enough illumination is present, weather conditions are favourable, etc.);

(3) the NVIS has been properly maintained in accordance with the minimum operational performance standards;

(4) a proper pre-flight has been performed on the NVIS confirming operation in accordance with the continued airworthiness standards and training guidelines; and

(5) the pilot(s) has been properly trained and meets recency of experience requirements.

Even when insuring that these conditions are met, there still are many variables that can adversely affect the safe and effective use of NVIS (e.g., flying towards a low angle moon, flying in a shadowed area, flying near extensive cultural lighting, flying over low contrast terrain, etc.). It is important to understand these assumptions and limitations when discussing the capabilities provided by the use of NVIS.

3.1.2. Situation awareness

Situation awareness, being defined as the degree of perceptual accuracy achieved in the comprehension of all factors affecting an aircraft and crew at a given time, is improved at night when using NVG during NVIS operations. This is achieved by providing the pilot with more visual cues than is normally available under most conditions when operating an aircraft unaided at night. However, it is but one source of the factors necessary for maintaining an acceptable level of situational awareness.

3.1.2.1. Environment detection and identification

An advantage of using NVIS is the enhanced ability to detect, identify, and avoid terrain and/or obstacles that present a hazard to night operations. Correspondingly, NVIS aid in night navigation by allowing the aircrew to view waypoints and features.

Being able to visually locate and then (in some cases) identify objects or areas critical to operational success will also enhance operational effectiveness. Finally, use of NVIS may allow pilots to detect other aircraft more easily.

3.1.3. Emergency situations

NVIS generally improve situational awareness, facilitating the pilot's workload during emergencies. Should an emergency arise that requires an immediate landing, NVIS may provide the pilot with a means of locating a suitable landing area and conducting a landing. The pilot must determine if the use of NVIS during emergencies is appropriate. In certain instances, it may be more advantageous for the pilot to remove the NVG during the performance of an emergency procedure.

3.2.1. NVG design characteristics

There are limitations inherent in the current NVG design.

3.2.1.1. Visual acuity

The pilot's visual acuity with NVGs is less than normal daytime visual acuity.

3.2.1.2. Field of view

Unaided field of view (FOV) covers an elliptical area that is approximately 120° lateral by 80° vertical, whereas the field of view of current Type I NVG systems is nominally 40° and is circular. Both the reduced field of view of the image and the resultant decrease in peripheral vision can increase the pilot's susceptibility to misperceptions and illusions. Proper scanning techniques must be employed to reduce the susceptibility to misperception and illusions.

3.2.1.3. Field of regard

The NVG has a limited FOV but, because it is head-mounted, that FOV can be scanned when viewing the outside scene. The total area that the FOV can be scanned is called the field of regard

(FOR). The FOR will vary depending on several factors: physiological limit of head movement, NVG design (e.g., protrusion of the binocular assembly, etc.) and cockpit design issues (e.g., proximity of canopy or window, seat location, canopy bow, etc.).

3.2.1.4. NVG weight & centre of gravity

The increased weight and forward CG projection of head supported devices may have detrimental effects on pilot performance due to neck muscle strain and fatigue. There also maybe an increased risk of neck injury in crashes.

3.2.1.5. Monochromatic image

The NVG image currently appears in shades of green. Since there is only one colour, the image is said to be "monochromatic". This colour was chosen mostly because the human eye can see more detail at lower brightness levels when viewing shades of green. Colour differences between components in a scene helps one discriminate between objects and aids in object recognition, depth perception and distance estimation. The lack of colour variation in the NVG image will degrade these capabilities to varying degrees.

3.2.1.6. Ambient or artificial light

The NVG requires some degree of light (energy) in order to function. Low light levels, non-compatible aircraft lighting and poor windshield/window light transmissibility, diminish the performance capability of the NVG. It is the pilot's responsibility to determine when to transition from aided to unaided due to unacceptable NVG performance.

3.2.1.7. LED lights

Some red obstacle lights and other artificial lights that are clearly visible to the naked eye are not visible to NVGs. These obstacle lights may employ LED instead of traditional incandescent sources. The use of LED lights is becoming more common for almost all lighting applications because of their extensive lifetime and low energy consumption.

Aviation red light ranges from about 610 to 700 nanometres (nm), and NVGs approved for civil aviation (having a Class B Minus Blue Filter) are only sensitive to energy ranging from 665 to about 930 nm. LED and other artificial lights may have a relatively narrow emission band (around 630 nm ± 20 nm) and that band is below the range in which NVGs are sensitive and LEDs do not emit infrared energy like incandescent lights for obstacle red lights.

In general terms, NVG users should be aware that obstacle lighting systems and other artificial lights that fall outside the combined visible and near-infrared spectrum of NVGs (approximately 665 to 930 nm) will not be visible to their goggles. Other obstacle lights may use a wavelength very close to the approximate cut-off wavelength of 665 nm and will remain visible to the goggles, but they will be dimmed and will be better seen with the naked eye.

Full awareness of obstacle lights can only be achieved with an unaided scan.

3.2.2. Physiological and other conditions

3.2.2.1. Cockpit resource management

Due to the inherent limitations of NVIS operations, there is a requirement to place emphasis on NVIS related cockpit resource management (CRM). This applies to both single and multi-pilot cockpit environments. Consequently, NVIS flight requires effective CRM between the pilot(s), controlling agencies and other supporting personnel. An appropriate venue for addressing this issue is the pre-flight NVIS mission brief.

3.2.2.2. Fatigue

Physiological limitations that are prevalent during the hours of darkness along with the limitations associated with NVGs, may have a significant impact on NVIS operations. Some of these limitations are the effects of fatigue (both acute and chronic), stress, eyestrain, working outside the pilot's normal circadian rhythm envelope, increased helmet weight, aggressive scanning techniques associated with NVIS, and various human factors engineering concerns that may have a direct influence on how the pilot works in the aircraft while wearing NVGs. These limitations may be mitigated through proper training and recognition, experience, adaptation, rest, risk management, and proper crew rest/duty cycles.

3.2.2.3. Over-confidence

Compared to other types of flight operations, there may be an increased tendency by the pilot to over-estimate the capabilities of the NVIS.

3.2.2.4. Spatial orientation

There are two types of vision used in maintaining spatial orientation: central (focal) vision and peripheral (ambient) vision. Focal vision requires conscious processing and is slow, whereas peripheral information is processed subconsciously at a very fast rate. During daytime, spatial orientation is maintained by inputs from both focal vision and peripheral vision, with peripheral vision providing the great majority of the information. When using NVGs, peripheral vision can be significantly degraded if not completely absent. In this case, the pilot must rely on focal vision to interpret the NVG image as well as the information from flight instruments in order to maintain spatial orientation and situation awareness. Even though maintaining spatial orientation requires more effort when using NVGs than during daytime, it is much improved over night unaided operations where the only information is obtained through flight instruments. However, anything that degrades the NVG image to a point where the horizon is not visualised and/or ground reference is lost or significantly degraded will necessitate a reversion to flight on instruments until adequate external visual references can be established. Making this transition quickly and effectively is vital in order to avoid spatial disorientation. Additionally, added focal task loading during the operation (e.g., communications, looking at displays, processing navigational information, etc.) will compete with the focal requirement for interpreting the NVG image and flight instruments. Spatial disorientation can result when the task loading increases to a point where the outside scene and/or the flight instruments are not properly scanned. This potential can be mitigated to some extent through effective training and experience.

3.2.2.5. Depth perception & distance estimation

When flying, it is important for pilots to be able to accurately employ depth perception and distance estimation techniques. To accomplish this, pilots use both binocular and monocular vision. Binocular vision requires the use of both eyes working together, and, practically speaking, is useful only out to approximately 100 ft.

Binocular vision is particularly useful when flying close to the ground and/or near objects (e.g. landing a helicopter in a small landing zone). Monocular vision can be accomplished with either eye alone, and is the type of vision used for depth perception and distance estimation when viewing beyond approximately 100 ft. Monocular vision is the predominant type of vision used when flying fixed wing aircraft, and also when flying helicopters and using cues beyond 100 ft. When viewing an NVG image, the two eyes can no longer provide accurate binocular information, even though the NVG used when flying is a binocular system. This has to do with the way the eyes function physiologically (e.g. accommodation, stereopsis, etc.) and the design of the NVG (i.e. a binocular system with a fixed channel for each eye). Therefore, binocular depth perception and distance estimation tasking when viewing terrain or objects with an NVG within 100 ft is significantly degraded. Since monocular vision does not require both eyes working together, the adverse impact on depth perception and distance estimation is much less, and is mostly dependent on the quality of the NVG image. If the image is very good and there are objects in the scene to use for monocular cueing (especially objects with which the pilot is familiar), then distance estimation and depth perception tasking will remain accurate. However, if the image is degraded (e.g., low illumination, airborne obscurants, etc.) and/or there are few or unfamiliar objects in the scene, depth perception and distance estimation will be degraded to some extent. In summary, pilots using NVG will maintain the ability to accurately perceive depth and estimate distances, but it will depend on the distances used and the quality of the NVG image.

Pilots maintain some ability to perceive depth and distance when using NVGs by employing monocular cues. However, these capabilities may be degraded to varying degrees.

3.2.2.6. Instrument lighting brightness considerations

When viewing the NVG image, the brightness of the image will affect the amount of time it takes to adapt to the brightness level of the instrument lighting, thereby affecting the time it takes to interpret information provided by the instruments. The higher the quality (figure of merit (FOM), resolution, filters, contrast, etc.) of the 'tubes', the less critical this effect becomes.

For example, if the instrument lighting is fairly bright, the time it takes to interpret information provided by the instruments may be instantaneous. However, if the brightness of the lighting is set to a very low level, it may take several seconds to interpret the information, thus increasing the heads-down time and increasing the risk of spatial disorientation. It is important to ensure that instrument lighting is kept at a brightness level that makes it easy to rapidly interpret the information. This will likely be brighter than the one that is used during unaided operations. If the NVGs are used in the transition phase from IFR to VFR, the brightness level of the instrument lighting should be set in advance.

3.2.2.7. Dark adaptation time from NVG to unaided operations

When viewing an NVG image, both rods and cones are being stimulated (i.e., mesopic vision), but the brightness of the image is reducing the effectiveness of rod cells. If the outside scene is bright enough (e.g., urban area, bright landing pad, etc.), both rods and cones will continue to be stimulated. In this case there will be no improvement in acuity over time and the best acuity is essentially instantaneous. In some cases (e.g., rural area with scattered cultural lights), the outside scene will not be bright enough to stimulate the cones and some amount of time will be required for the rods to fully adapt. In this case it may take the rods one to two minutes to fully adapt for the best acuity to be realised. If the outside scene is very dark (e.g., no cultural lights and no moon), it may take up to five minutes to fully adapt to the outside scene after removing the NVGs. The preceding are general guidelines and the time required to fully adapt to the outside scene once removing the NVG depends on many variables: the length of time the NVG has been used, whether or not the pilot was dark adapted prior to flight, the brightness of the outside scene, the brightness of cockpit lighting, and variability in visual function among the population. It is important to understand the concept and to note the time requirements for the given operation.

3.2.2.8. Complacency

Pilots must understand the importance of avoiding complacency during NVG flights. Similar to other specialised flight operations, complacency may lead to an acceptance of situations that would normally not be permitted. Attention span and vigilance are reduced, important elements in a task series are overlooked, and scanning patterns, which are essential for situational awareness, break down (usually due to fixation on a single instrument, object or task). Critical but routine tasks are often skipped.

3.2.2.9. Experience

High levels of NVIS proficiency, along with a well-balanced NVIS experience base, will help to offset many of the visual performance degradations associated with night operations. NVIS experience is a result of proper training coupled with numerous NVIS operations. An experienced

NVIS pilot is acutely aware of the NVIS operational envelope and its correlation to various operational effects, visual illusions and performance limitations. This experience base is gained (and maintained) over time through a continual, holistic NVIS training programme that exposes the pilot to NVIS operations conducted under various moon angles, percentage of available illumination, contrast levels, visibility levels, and varying degrees of cloud coverage. A pilot should be exposed to as many of these variations as practicable during the initial NVIS qualification programme. Continued exposure during the NVIS recurrent training will help strengthen and solidify this experience base.

4. OPERATIONS

Operations procedures should accommodate the capabilities and limitations of the systems described in Section 3 of this GM as well as the restraints of the operational environment.

4.1. Pilot eligibility

About 54% of the civil pilot population wears some sort of ophthalmic device to correct vision necessary to safely operate an aircraft. The use of inappropriate ophthalmic devices with NVGs may result in vision performance decrement, fatigue, and other human factor problems, which could result in increased risk for aviation accidents and incidents.

4.2. Operating environment considerations

4.2.1. Weather and atmospheric obscurants

Any atmospheric condition, which absorbs, scatters, or refracts illumination, either before or after it strikes terrain, may reduce the usable energy available to the NVG.

4.2.1.1. Weather

During NVIS operations, pilots can see areas of moisture that are dense (e.g., clouds, thick fog, etc.) but may not see areas that are less dense (e.g., thin fog, light rain showers, etc.). The inability to see some areas of moisture may lead to hazardous flight conditions during NVIS operations and will be discussed separately in the next section.

The different types of moisture will have varying effects and it is important to understand these effects and how they apply to NVIS operations. For example:

(1) It is important to know when and where fog may form in the flying area. Typically, coastal, low-lying river, and mountainous areas are most susceptible.

(2) Light rain or mist may not be observed with NVIS but will affect contrast, distance estimation, and depth perception. Heavy rain is more easily perceived due to large droplet size and energy attenuation.

(3) Snow occurs in a wide range of particle sizes, shapes, and densities. As with clouds, rain, and fog, the denser the airborne snow, the greater the effect on NVG performance. On the ground, snow has mixed effect depending on terrain type and the illumination level. In mountainous terrain, snow may add contrast, especially if trees and rocks protrude through the snow. In flatter terrain, snow may cover high contrast areas, reducing them to areas of low contrast. On low illumination nights, snow may reflect the available energy better than the terrain it covers and thus increase the level of illumination.

(4) All atmospheric conditions reduce the illumination level to some degree and recognition of this reduction with NVGs can be difficult. Thus, a good weather briefing, familiarity with the local weather patterns and understanding the effects on NVG performance are important for a successful NVIS flight.

4.2.1.2. Deteriorating weather

It is important to remain cognizant of changes in the weather when using NVGs. It is possible to “see through” areas of light moisture when using NVGs, thus increasing the risk of inadvertently entering IMC. Some ways to help reduce this possibility include the following:

(1) Be attentive to changes in the NVG image. Halos may become larger and more diffuse due to diffraction of light in moisture. Scintillation in the image may increase due to a lowering of the illumination level caused by the increased atmospheric moisture. Loss of scene detail may be secondary to the lowering illumination caused by the changing moisture conditions.

(2) Obtain a thorough weather brief with emphasis on NVG effects prior to flight.

(3) Be familiar with weather patterns in the flying area.

(4) Occasionally scan the outside scene. The unaided eye may detect weather conditions that are not detectable to the NVG.

Despite the many methods of inadvertent instrument meteorological conditions (IMC) prevention, one should have established IMC recovery procedures and be familiar with them.

4.2.1.3. Airborne obscurants

In addition to weather, there may be other obscurants in the atmosphere that could block energy from reaching the NVG, such as haze, dust, sand, or smoke. As with moisture, the size and concentration of the particles will determine the degree of impact. Examples of these effects include the following:

(1) high winds during the day can place a lot of dust in the air that will still be present at night when the wind may have reduced in intensity;

(2) forest fires produce heavy volumes of smoke that may cover areas well away from the fire itself;

(3) the effects of rotor wash may be more pronounced when using NVGs depending on the material (e.g. sand, snow, dust, etc.); and

(4) pollution in and around major cultural areas may have an adverse effect on NVG performance.

4.2.1.4. Winter operations

Using NVGs during winter conditions provide unique issues and challenges to pilots.

4.2.1.4.1. Snow

Due to the reflective nature of snow, it presents pilots with significant visual challenges both en-route and in the terminal area. During the en-route phase of a flight the snow may cause distractions to the flying pilot if any aircraft external lights (e.g., anti-collision beacons/strobes, position lights, landing lights, etc.) are not compatible with NVGs. In the terminal area, whiteout landings can create the greatest hazard to unaided night operations. With NVGs the hazard is not lessened, and can be more disorienting due to lights reflecting from the snow that is swirling around the aircraft during the landing phase. Any emergency vehicle lighting or other airport lighting in the terminal area may exaggerate the effects.

4.2.1.4.2. Ice fog

Ice fog presents the pilot with hazards normally associated with IMC in addition to problems associated with snow operations. The highly reflective nature of ice fog will further aggravate any lighting problems. Ice fog conditions can be generated by aircraft operations under extremely cold temperatures and the right environmental conditions.

4.2.1.4.3. Icing

Airframe ice is difficult to detect while looking through NVGs. The pilot will need to develop a proper crosscheck to ensure airframe icing does not exceed operating limits for that aircraft. Pilots should already be aware of icing indicator points on their aircraft. These areas require consistent oversight to properly determine environmental conditions.

4.2.1.4.4. Low ambient temperatures

Depending on the cockpit heating system, fogging of the NVGs can be a problem and this will significantly reduce the goggle effectiveness. Another issue with cockpit temperatures is the reduced battery duration. Operations in a cold environment may require additional battery resources.

4.2.2. Illumination

NVGs require illumination, either natural or artificial, to produce an image. Although current NVG technology has significantly improved low light level performance, some illumination, whether natural or artificial, is still required to provide the best possible image.

4.2.2.1. Natural illumination

The main sources of natural illumination include the moon and stars. Other sources can include sky glow, the aurora borealis, and ionisation processes that take place in the upper atmosphere.

4.2.2.1.1. Moon phase

The moon provides the greatest source of natural illumination during night time. Moon phase and elevation determines how much moonlight will be available, while moonrise and moonset times determine when it will be available. Lunar illumination is reported in terms of percent illumination, 100% illumination being full moon. It should be noted that this is different from the moon phase (e.g., 25% illumination does not mean the same thing as a quarter moon). Currently, percent lunar illumination can only be obtained from sources on the Internet, military weather facilities and some publications (e.g. Farmers Almanac).

4.2.2.1.2. Lunar azimuth and elevation

The moon can have a detrimental effect on night operations depending on its relationship to the flight path. When the moon is on the same azimuth as the flight path, and low enough to be within or near the NVG field of view, the effect on NVG performance will be similar to that caused by the sun on the unaided eye during daytime. The brightness of the moon drives the NVG gain down, thus reducing image detail. This can also occur with the moon at relatively high elevations. For example, it is possible to bring the moon near the NVG field of view when climbing to cross a ridgeline or other obstacle, even when the moon is at a relatively high elevation. It is important to consider lunar azimuth and elevation during pre-flight planning. Shadowing, another effect of lunar azimuth and elevation, will be discussed separately.

4.2.2.1.3. Shadowing

Moonlight creates shadows during night time just as sunlight creates shadows during daytime. However, night time shadows contain very little energy for the NVG to use in forming an image. Consequently, image quality within a shadow will be degraded relative to that obtained outside the shadowed area. Shadows can be beneficial or can be a disadvantage to operations depending on the situation.

4.2.2.1.3.1. Benefits of shadows

Shadows alert aircrew to subtle terrain features that may not otherwise be noted due to the reduced resolution in the NVG image. This may be particularly important in areas where there is little contrast differentiation; such as flat featureless deserts, where large dry washes and high sand dunes may go unnoticed if there is no contrast to note their presence. The contrast provided by shadows helps make the NVG scene appear more natural.

4.2.2.1.3.2. Disadvantages due to shadows

When within a shadow, terrain detail can be significantly degraded, and objects can be regarding flight in or around shadowed areas is the pilot's response to loss of terrain detail. During flight under good illumination conditions, a pilot expects to see a certain level of detail. If flight into a shadow occurs while the pilot is preoccupied with other matters (e.g., communication, radar, etc.), it is possible that the loss in terrain detail may not have been immediately noted. Once looking outside again, the pilot may think the reduced detail is due to an increase in flight altitude and thus begin a descent - even though already at a low altitude. Consideration should be given during mission planning to such factors as lunar azimuth and elevation, terrain type (e.g., mountainous, flat, etc.), and the location of items significant to operation success (e.g., ridgelines, pylons, targets, waypoints, etc.). Consideration of these factors will help predict the location of shadows and the potential adverse effects.

4.2.2.1.4. Sky glow

Sky glow is an effect caused by solar light and continues until the sun is approximately 18 degrees below the horizon. When viewing in the direction of sky glow there may be enough energy present to adversely affect the NVG image (i.e., reduce image quality). For the middle latitudes the effect on NVG performance may last up to an hour after official sunset. For more northern and southern latitudes the effect may last for extended periods of times (e.g., days to weeks) during seasons when the sun does not travel far below the horizon. This is an important point to remember if planning NVG operations in those areas. Unlike sky glow after sunset, the sky glow associated with sunrise does not have an obvious effect on NVG performance until fairly close to official sunrise. The difference has to do with the length of time the atmosphere is exposed to the sun's irradiation, which causes ionisation processes that release near-IR energy. It is important to know the difference in these effects for planning purposes.

4.2.2.2. Artificial illumination

Since NVGs are sensitive to any source of energy in the visible and near-infrared spectrums, there are also many types of artificial illumination sources (e.g. flares, IR searchlights, cultural lighting, etc.). As with any illumination source, these can have both positive and detrimental effects on NVG utilisation. For example, viewing a scene indirectly illuminated by a searchlight can enable the pilot to more clearly view the scene; conversely, viewing the same scene with the searchlight near or within the NVG field of view will reduce the available visual cues. It is important to be familiar with the effects of cultural lighting in the flying area in order to be able to avoid the associated problems and to be able to use the advantages provided. Also, it is important to know how to properly use artificial light sources (e.g. aircraft IR spotlight). It should be noted that artificial light sources may not always be available or dependable, and this should be taken into consideration during flight planning.

When using NVGs in an area with high-intensity cultural lighting, the lights beyond this area may not be visible. The visibility assessed with the NVGs might be judged to be worse than the unaided visibility.

4.2.3. Terrain contrast

Contrast is one of the more important influences on the ability to correctly interpret the NVG image, particularly in areas where there are few cultural features. Any terrain that contains varying albedos (e.g., forests, cultivated fields, etc.) will likely increase the level of contrast in a NVG image, thus enhancing detail. The more detail in the image, the more visual information aircrews have for manoeuvring and navigating. Low contrast terrain (e.g., flat featureless desert, snow-covered fields, water, etc.) contains few albedo variations, thus the NVG image will contain fewer levels of contrast and less detail.

4.3. Aircraft considerations

4.3.1. Lighting

Factors such as aircraft internal and external lighting have the potential to adversely impact NVG gain and thus image quality. How well the windshield, canopy, or window panels transmit near infrared energy can also affect the image. Cleanliness of the windshield directly impacts this issue.

4.3.2. Cockpit ergonomics

While wearing NVGs, the pilot may have limited range of head movement in the aircraft. For example, switches on the overhead console may be difficult to read while wearing NVGs. Instruments, controls, and switches that are ordinarily accessible, may now be more difficult to access due to the extended mass (fore/aft) associated with NVGs.

In addition, scanning may require a more concentrated effort due to limited field of view. Lateral viewing motion can be hindered by cockpit obstructions (i.e. door post or seat back design).

4.3.3. Windshield reflectivity

Consideration within the cockpit and cabin should be given to the reflectivity of materials and equipment upon the windshield. Light that is reflected may interfere with a clear and unobstructed view. Items such as flight suits, helmets, and charts, if of a light colour such as white, yellow, and orange, can produce significant reflections. Colours that impart the least reflection are black, purple, and blue. This phenomenon is not limited to windshields but may include side windows, chin bubbles, canopies, etc.

4.4. Generic operating considerations

This section lists operating topics and procedures, which should be considered when employing NVIS. The list and associated comments are not to be considered all inclusive. NVIS operations vary in scope widely and this section is not intended to instruct a prospective operator on how to implement an NVIS programme.

4.4.1. Normal procedures

4.4.1.1. Scanning

When using NVGs there are three different scan patterns to consider and each is used for different reasons: instrument scan, aided scan outside, and unaided scan outside. Normally, all three are integrated and there is a continuous transition from one to the other depending on the mission, environmental conditions, immediate tasking, flight altitude and many other variables. For example, scanning with the NVG will allow early detection of external lights. However, the bloom caused by the lights will mask the aircraft until fairly close or until the lighting scheme is changed. Once close to the aircraft (e.g., approximately one-half mile for smaller aircraft), visual acquisition can possibly be made unaided or with the NVG. Whether to use the NVG or unaided vision depends on many variables (e.g., external lighting configuration, distance to aircraft, size of aircraft, environmental conditions, etc.). The points to be made are that a proper scan depends on the situation and variables present, and that scanning outside is critical when close to another aircraft. Additionally, for a multi-crew environment, coordination of scan responsibilities is vital.

4.4.1.1.1. Instrument crosscheck scan

In order to affect a proper and effective instrument scan, it is important to predict when it will be important. A start can be made during pre-flight planning when critical phases of flight can be identified and prepared for. For example, it may be possible when flying over water or featureless terrain to employ a good instrument crosscheck. However, the most important task is to make the appropriate decision during flight as conditions and events change. In this case, experience, training and constant attention to the situation are vital contributors to the pilot's assessment of the situation.

4.4.1.1.2. NVG scan

To counteract the limited field of view, pilots should continually scan throughout the field of regard. This allows aircrew to build a mental image of the surrounding environment. How quickly the outside scene is scanned to update the mental image is determined by many variables. For example, when flying over flat terrain where the highest obstacle is below the flight path, the scan may be fairly slow. However, if flying low altitude in mountainous terrain, the scan will be more aggressive and rapid due to the presence of more information and the increased risk. How much of the field of regard to scan is also determined by many variables. For example, if a pilot is anticipating a turn, more attention may be placed in the area around the turn point, or in the direction of the new heading. In this situation, the scan will be limited briefly to only a portion of the field of regard.

As with the instrument scan, it is very important to plan ahead. It may, for example, be possible to determine when the scan may be interrupted due to other tasks, when it may be possible to become fixated on a specific task, or when it is important to maximise the outside scan. An important lesson to learn regarding the NVG scan is when not to rely on visual information. It is easy to overestimate how well one can see with NVGs, especially on high illumination nights, and it is vital to maintain a constant awareness regarding their limitations. This should be pointed out often during training and, as a reminder, should be included as a briefing item for NVG flights.

4.4.1.1.3. Unaided scan

Under certain conditions, this scan can be as important as the others can. For example, it may be possible to detect distance and/or closure to another aircraft more easily using unaided vision, especially if the halo caused by the external lights masks aircraft details on the NVG image. Additionally, there are other times when unaided information can be used in lieu of or can augment NVG and instrument information.

When using the NVGs in the transition from IFR to VFR, the unaided scan is essential to assess the unaided visibility conditions. Focusing on the first light seen when looking out is an automatic response, but it is vital to continue the scan in order to assess the surrounding weather conditions.

Some examples where unaided scan can enhance safety is where LED-lit obstacles can be encountered (e.g. during low-altitude flying and when performing a reconnaissance of landing areas) or when unmanned aircraft systems (UASs) fly at night with LED navigation lights.

Air operators should incorporate procedures into their manuals and/or SOPs that require periodic unaided scanning when operating at low altitudes, when looking for potential landing areas, and when performing a reconnaissance of a landing area. This may be accomplished by looking under the NVGs, or by briefly placing the NVGs in the stowed (flipped-up) position. Manuals/SOPs should include procedures and call-outs for LED-lit obstacles.

Air operators and pilots are encouraged to report encounters with obstacles equipped with LED lighting systems not visible by NVGs, with pertinent information, to their competent authority.

4.4.1.1.4. Scan patterns

Environmental factors will influence scan by limiting what may be seen in specific directions or by degrading the overall image. If the image is degraded, aircrew may scan more aggressively in a subconscious attempt to obtain more information, or to avoid the chance of missing information that suddenly appears and/or disappears. The operation itself may influence the scan pattern. For example, looking for another aircraft, landing zone, or airport may require focusing the scan in a particular direction. In some cases, the operation may require aircrew in a multi place aircraft to assign particular pilots responsibility for scanning specific sectors.

The restrictions to scan and the variables affecting the scan patter are not specific to night operations or the use of NVGs, but, due to the NVG's limited field of view, the degree of impact is magnified.

4.4.1.2. Pre-flight planning

4.4.1.2.1. Illumination criteria

The pilot should provide a means for forecasting the illumination levels in the operational area. The pilot should make the effort to request at least the following information in addition to that normally requested for night VFR: cloud cover and visibility during all phases of flight, sunset, civil and nautical twilight, moon phase, moonrise and moonset, and moon and/or lux illumination levels, and unlit tower NOTAMS.

4.4.1.2.2. NVIS operations

An inspection of the power pack, visor, mount, power cable and the binocular assembly should be performed in accordance with the operations manual.

To ensure maximum performance of the NVGs, proper alignment and focus must be accomplished following the equipment inspection. Improper alignment and focus may degrade NVIS performance.

4.4.1.2.3. Aircraft pre-flight

A normal pre-flight inspection should be conducted prior to an NVIS flight with emphasis on proper operation of the NVIS lighting. The aircraft windshield must also be clean and free of major defects, which might degrade NVIS performance.

4.4.1.2.4 Equipment

The basic equipment required for NVIS operations should be those instruments and equipment specified within the current applicable regulations for VFR night operations. Additional equipment required for NVIS operations, e.g. NVIS lighting system and a radio altimeter must be installed and operational. All NVIS equipment, including any subsequent modifications, shall be approved.

4.4.1.2.4. Risk assessment

A risk assessment is suggested prior to any NVIS operation. The risk assessment should include as a minimum:

(1) illumination level
(2) weather
(3) pilot recency of experience
(4) pilot experience with NVG operations
(5) pilot vision
(6) pilot rest condition and health
(7) windshield/window condition
(8) NVG tube performance
(9) NVG battery condition
(10) types of operations allowed
(11) external lighting environment.

4.4.1.3. Flight operations

4.4.1.3.1. Elevated terrain

Safety may be enhanced by NVGs during operations near elevated terrain at night. The obscuration of elevated terrain is more easily detected with NVGs thereby allowing the pilot to make alternate flight path decisions.

4.4.1.3.2. Over-water

Flying over large bodies of water with NVGs is difficult because of the lack of contrast in terrain features. Reflections of the moon or starlight may cause disorientation with the natural horizon. The radio altimeter must be used as a reference to maintain altitude.

4.4.1.4. Remote area considerations

A remote area is a site that does not qualify as an aerodrome as defined by the applicable regulations. Remote area landing sites do not have the same features as an aerodrome, so extra care must be given to locating any obstacles that may be in the approach/departure path.

A reconnaissance must be made prior to descending at an unlighted remote site. Some features or objects may be easy to detect and interpret with the unaided eye. Other objects will be invisible to the unaided eye, yet easily detected and evaluated with NVGs.

4.4.1.5. Reconnaissance

The reconnaissance phase should involve the coordinated use of NVGs and white lights. The aircraft's external white lights such as landing lights, searchlights, and floodlights, should be used during this phase of flight. The pilot should select and evaluate approach and departure paths to the site considering wind speed and direction, and obstacles or signs of obstacles.

4.4.1.6. Sources of high illumination

Sources of direct high illumination may have the potential to reduce the effectiveness of the NVGs. In addition, certain colour lights, such as red, will appear brighter, closer and may display large halos.

4.4.2. Emergency procedures

No modification for NVG operations is necessary to the aircraft emergency procedures as approved in the operations manual or approved checklist. Special training may be required to accomplish the appropriate procedures.

4.4.3. Inadvertent IMC

Some ways to help reduce the potential for inadvertent flight into IMC conditions are:

(1) obtaining a thorough weather brief (including pilot reports);
(2) being familiar with weather patterns in the local flying area; and
(3) by looking beneath the NVG at the outside scene.
(4) However, even with thorough planning a risk still exists. To help mitigate this risk it is important to know how to recognise subtle changes to the NVG image that occur during entry into IMC conditions. Some of these include the onset of scintillation, loss of scene detail, and changes in the appearance of halos.

5. TRAINING

To provide an appropriate level of safety, training procedures must accommodate the capabilities and limitations of the systems described in Section 3 of this GM as well as the restraints of the operational environment.

To be effective, the NVIS training philosophy would be based on a two-tiered approach: basic and advanced NVIS training. The basic NVIS training would serve as the baseline standard for all individuals seeking an NVIS endorsement. The content of this initial training would not be dependent on any operational requirements. The advanced training would build on the basic training by focusing on developing specialised skills required to operate an aircraft during NVIS operations in a particular operational environment. Furthermore, while there is a need to stipulate minimum flight hour requirements for an NVIS endorsement, the training must also be event based. This necessitates that pilots be exposed to all of the relevant aspects, or events, of NVIS flight in addition to acquiring a minimum number of flight hours.

6. CONTINUING AIRWORTHINESS

The reliability of the NVIS and safety of operations are dependent on the pilots adhering to the instructions for continuing airworthiness. Personnel who conduct the maintenance and inspection on the NVIS must be qualified and possess the appropriate tools and facilities to perform the maintenance.

Acronyms used in this GM

AC	Advisory Circular
AGL	above ground level
ATC	air traffic control
CON OPS	concept of operations
CG	centre of gravity
CRM	cockpit resource management
DOD	Department of Defense
DOT	Department of Transportation
EFIS	electronic flight instrumentation systems
EMS	emergency medical service
FAA	Federal Aviation Administration
FLIR	forward looking infrared radar
FOR	field of regard
FOV	field of view
GEN	generation
HUD	head-up display
IFR	instrument flight rules
IMC	instrument meteorological conditions
IR	infrared
JAA	Joint Aviation Authorities
MOPS	Minimum Operational Performance Standard
NAS	national airspace system
NOTAMS	Notices to Airmen
NVD	night vision device
NVED	night vision enhancement device
NVG	night vision goggles
NVIS	night vision imaging system
SC	special committee
TFR	temporary flight restrictions
VA	visual acuity
VFR	visual flight rules
VMC	visual meteorological conditions

Glossary of terms used in this GM

(1) ‘Absorptance’: the ratio of the radiant energy absorbed by a body to that incident upon it.

(2) ‘Albedo’: the ratio of the amount of light reflected from a surface to the amount of incident light.

(3) ‘Automatic brightness control (ABC)’: one of the automatic gain control circuits found in second and third generation NVG devices. It attempts to provide consistent image output brightness by automatic control of the micro channel plate voltage.

(4) ‘Automatic gain control (AGC)’: comprised of the automatic brightness control and bright source protection circuits. Is designed to maintain image brightness and protect the user and the image tube from excessive light levels. This is accomplished by controlling the gain of the intensifier tube.

(5) ‘Blackbody’: an ideal body of surface that completely absorbs all radiant energy falling upon with no reflection.

(6) ‘Blooming’: common term used to denote the “washing out” of all or part of the NVG image due to de-gaining of the image intensifier tube when a bright light source is in or near the NVG field of view.

(7) ‘Bright source protection (BSP)’: protective feature associated with second and third generation NVGs that protects the intensifier tube and the user by controlling the voltage at the photo cathode.

(8) ‘Brownout’: condition created by blowing sand, dust, etc., which can cause the pilots to lose sight of the ground. This is most commonly associated with landings in the desert or in dusty LZs.

(9) ‘Civil nautical twilight’: the time when the true altitude of the centre of the sun is six degrees below the horizon. Illuminance level is approximately 3.40 lux and is above the usable level for NVG operations.

(10) ‘Diopter’: a measure of the refractive (light bending) power of a lens.

(11) ‘Electro-optics (EO)’: the term used to describe the interaction between optics and electronics, leading to transformation of electrical energy into light or vice versa.

(12) ‘Electroluminescent (EL)’: referring to light emission that occurs from application of an alternating current to a layer of phosphor.

(13) ‘Foot-candle’: a measure of illuminance; specifically, the illuminance of a surface upon which one lumen is falling per square foot.

(14) ‘Foot-Lambert’: a measure of luminance; specifically the luminance of a surface that is receiving an illuminance of one foot-candle.

(15) ‘Gain’: when referring to an image intensification tube, the ratio of the brightness of the output in units of foot-lambert, compared to the illumination of the input in foot-candles. A typical value for a GEN III tube is 25,000 to 30,000 Fl/fc. A “tube gain” of 30,000 Fl/fc provides an approximate “system gain” of 3,000. This means that the intensified NVG image is 3,000 times brighter to the aided eye than that of the unaided eye.

(16) ‘Illuminance’: also referred to as illumination. The amount, ratio or density of light that strikes a surface at any given point.

(17) ‘Image intensifier’: an electro-optic device used to detect and intensify optical images in the visible and near infrared region of the electromagnetic spectrum for the purpose of providing visible images. The component that actually performs the intensification process in a NVG. This component is composed of the photo cathode, MCP, screen optic, and power supply. It does not include the objective and eyepiece lenses.

(18) ‘Incandescent’: refers to a source that emits light based on thermal excitation, i.e., heating by an electrical current, resulting in a very broad spectrum of energy that is dependent primarily on the temperature of the filament.

(19) ‘Infrared’: that portion of the electromagnetic spectrum in which wavelengths range from 0.7 microns to 1 mm. This segment is further divided into near infrared (0.7-3.0 microns), mid infrared (3.0-6.0 microns), far infrared (6.0-15 microns), and extreme infrared (15 microns-1 mm). A NVG is sensitive to near infrared wavelengths approaching 0.9 microns.

(20) ‘Irradiance’: the radiant flux density incident on a surface. For the purpose of this document the terms irradiance and illuminance shall be interchangeable.

(21) ’Lumen’: a measurement of luminous flux equal to the light emitted in a unit solid angle by a uniform point source of one candle intensity.

(22) ’Luminance’: the luminous intensity (reflected light) of a surface in a given direction per unit of projected area. This is the energy used by NVGs.

(23) ’Lux’: a unit measurement of illumination. The illuminance produced on a surface that is one-meter square, from a uniform point source of one candle intensity, or one lumen per square meter.

(24) ‘Microchannel plate’: a wafer containing between 3 and 6 million specially treated microscopic glass tubes designed to multiply electrons passing from the photo cathode to the phosphor screen in second and third generation intensifier tubes.

(25) ‘Micron’: a unit of measure commonly used to express wavelength in the infrared region; equal to one millionth of a meter.

(26) ‘Nanometer (nm)’: a unit of measure commonly used to express wavelength in the visible and near infrared region; equal to one billionth of a meter.

(27) 'Night vision device (NVD)': an electro-optical device used to provide a visible image using the electromagnetic energy available at night.
(28) 'Photon': a quantum (basic unit) of radiant energy (light).
(29) 'Photopic vision': vision produced as a result of the response of the cones in the retina as the eye achieves a light adapted state (commonly referred to as day vision).
(30) 'Radiance': the flux density of radiant energy reflected from a surface. For the purposes of this manual the terms radiance and luminance shall be interchangeable.
(31) 'Reflectivity': the fraction of energy reflected from a surface.
(32) 'Scotopic vision': that vision produced as a result of the response of the rods in the retina as the eye achieves a dark-adapted state (commonly referred to as night vision).
(33) 'Situational awareness (SA)': degree of perceptual accuracy achieved in the comprehension of all factors affecting an aircraft and crew at a given time.
(34) 'Starlight': the illuminance provided by the available (observable) stars in a subject hemisphere. The stars provide approximately 0.00022 lux ground illuminance on a clear night. This illuminance is equivalent to about one-quarter of the actual light from the night sky with no moon.
(35) 'Stereopsis': visual system binocular cues that are used for distance estimation and depth perception. Three dimensional visual perception of objects. The use of NVGs seriously degrades this aspect of near-depth perception.
(36) 'Transmittance': the fraction of radiant energy that is transmitted through a layer of absorbing material placed in its path.
(37) 'Ultraviolet': that portion of the electromagnetic spectrum in which wavelengths range between 0.1 and 0.4 microns.
(38) 'Wavelength': the distance in the line of advance of a wave from any one point to the next point of corresponding phase; is used to express electromagnetic energy including IR and visible light.
(39) 'Whiteout': a condition similar to brownout but caused by blowing snow.

AC to Appendix 1 to CAR OPS-3.005(k) Helicopter External Slung Load Operations

A. HESLO Standard operating procedures

STANDARD OPERATING PROCEDURES

(a) Before conducting any HESLO, the operator should develop its SOPs taking into account the elements below.
(b) Nature and complexity of the activity
  (1) Nature of the activity and exposure:
  Helicopter flights for the purpose of transporting external loads by different means, e.g. under slung, external pods or racks. These operations are usually performed at a low height.
  (2) Complexity of the activity:
  The complexity of the activity varies with the size and the shape of the load, the length of the rope and characteristics of the pick-up and drop-off zones, the time per load cycle, etc.

Table 1: HESLO types

HESLO 1:	short line, 20 metres (m) or less
HESLO 2:	long line, more than 20 m
HESLO 3:	specialised sling load, such as: Logging, insulators and pullers, traverse mounting, spinning of fibre cable, ice and snow removal from power lines, sawing, geophysical surveys, cable laying onto the ground or into ditches, avalanche control, landslide control
HESLO 4:	Advanced sling load such as: Tower erecting, wire stringing, disassembly of masts and towers

(3) Operational environment and geographical area:
HESLO may be performed over any geographical area. Special attention should be given to:
(i) hostile and congested;
(ii) mountains;
(iii) sea;
(iv) jungle;
(v) desert; and
(vi) polar;
(vii) lakes and river canyons; and
(viii) environmentally sensitive areas (e.g. national parks, noise sensitive areas).

(c) Equipment
(1) The helicopter may be equipped with:
(i) additional mirror(s) and/or video camera(s);
(ii) a bubble window;
(iii) supplementary hook(s) or multi-hook device(s); and
(iv) load data recorder (lifts, weights, torques, power, forces, shocks and electrical activities)
(2) When conducting single-pilot vertical reference operations with no assistance of a task specialist or other crew member, additional engine monitoring in the pilot line of vision or an audio warning system is recommended.
(3) All additional equipment used, e.g. ropes, cables, mechanical hooks, swivel hooks, nets, buckets, chainsaws, baskets, containers, should be manufactured according to applicable rules or recognised standards. The operator should be responsible for maintaining the serviceability of this equipment.
(4) Adequate radio communication equipment (e.g. VHF, UHF, FM) should be installed and serviceable in the helicopter for co-ordination with the task specialists involved in the operation.
(5) Task specialists involved in the operation should be equipped with hand-held communication equipment, protective helmets with integrated earphones and microphones, and the relevant personal protective equipment.

(d) Crew members
(1) Crew composition:
(i) The minimum flight crew as stated in the approved AFM. For operational or training purposes, an additional crew member may assist the pilot-in-command (PIC) in a single-pilot operation. In such a case:
(A) procedures are in place for a crew member to monitor the flight, especially during the departure, approach and HESLO cycle, to ensure that a safe flight path is maintained; and
(B) when a task specialist is tasked with assisting the pilot, the procedures according to which this assistance is taking place should be clearly defined.
(ii) For safety and/or operational purposes, task specialists should be instructed by the operator to fulfil specified tasks.
(2) Pilot training for HESLO
Before acting as unsupervised PIC, the pilot should demonstrate to the operator that he/she has the required skills and knowledge.
(i) Theoretical knowledge for HESLO 1:
(A) content of the operations manual (OM) including the relevant SOPs;
(B) AFM (limitations, performance, mass and balance, abnormal and emergency procedures, etc.);
(C) procedures (e.g. short line, long line, construction, wire stringing or cable laying flying techniques), as required for the operation;
(D) load and site preparation including load rigging techniques and external load procedures;
(E) special equipment used in the operation;
(F) training in human factor principles; and
(G) hazards and dangers.
(ii) Theoretical knowledge for other HESLO levels should include the elements listed in point (i) above where additional knowledge to that of HESLO 1 is needed for the adequate HESLO level.

(iii) Practical training defined in the operator's training programme:

(A) Flight instruction provided by a HESLO instructor; and

(B) Flight under the supervision of a HESLO instructor. The supervision should take place during HESLO missions, from inside the helicopter and on-site.

For the purpose of this AMC, a HESLO mission is defined as a flight or series of flights from point A to point B on a particular day and for commercial specialised operations, for a particular client.

(3) Pilot experience

(i) Prior to commencing training:

(A) 10 hours flight experience on the helicopter type;

(B) For HESLO 2: At least 100 HESLO cycles;

(C) For HESLO 3: At least 500 HESLO cycles; and

(D) For HESLO 4: At least 1 000 flight hours on helicopters and 2 000 HESLO cycles, including experience as unsupervised PIC in HESLO 2 or HESLO 3.

(ii) Before acting as PIC under the supervision of a HESLO instructor:

(A) For HESLO 1: At least 5 hours and 50 HESLO cycles flight instruction;

(B) For HESLO 2: In addition to HESLO 1 training, at least 2 hours and 20 HESLO cycles flight instruction with a long line of more than 20 metres.

(C) For HESLO 3 and 4: A number of HESLO cycles flight instruction, as relevant to the activity to be performed and the required skills.

(iii) Before acting as unsupervised PIC:

(A) For HELSO 1, 300 hours helicopter flight experience as PIC; and

(B) For HESLO 1: At least 8 hours, 80 HESLO cycles and 5 HESLO missions;

(C) For HESLO 2: At least 5 hours, 50 HESLO cycles and 5 HESLO missions with long line of more than 20 metres;

(D) For HESLO 3 and 4: A number of HESLO missions under the supervision of a HESLO instructor, as relevant to the activity to be performed and the required skills;

(E) For HESLO 3 and 4, 15 hours on the helicopter type, performing HESLO 1 and 2 operations;

(F) At least 20 hours gained in an operational environment similar to the environment of intended operation (desert, sea, jungle, mountains, etc.).

(4) Pilot proficiency: Before acting as unsupervised PIC, pilot proficiency has been assessed as sufficient for the intended operations and environment under the relevant HESLO type, by a HESLO instructor nominated by the operator.

(5) Pilot recurrent training and checking at least every two years:

(i) review of the load rigging techniques;

(ii) external load procedures;

(iii) review of the applicable flying techniques; and

(iv) review of human factor principles.

(v) A pilot who has performed 20 hours of relevant HESLO within the past 12 months may not need any further flight training other than in accordance with Part-ORO and Part-FCL.

(e) Task specialists

Before acting as task specialist, he/she should demonstrate to the operator that he/she has been trained appropriately and has the required skill and knowledge.

(1) Initial training

(i) The initial training of task specialists should include at least:

(A) behaviour in a rotor turning environment and training in ground safety and emergency procedures;

(B) procedures including load rigging, usage and conservation (replacement) of LLD;

(C) helicopter marshalling signals;

(D) radio communication;

(E) selection and preparation of pick-up and drop-off sites, dangers on working places (downwash, loose goods, third people);

(F) handling and safety of the third party;

(G) relevant training for the helicopter type;

(H) duties and responsibilities as described in the appropriate manual;

(I) perception and classification of flight obstacles (none, critical, danger), measures for safety;
(J) human factor principles; and
(K) for task specialists seated in the cockpit and whose tasks are to assist the pilot, the relevant CRM training elements must be complied with.

(ii) The individual safety equipment appropriate to the operational environment and complexity of the activity should be described in the appropriate manual.

(2) Recurrent training
(i) The annual recurrent training should include the items listed in the initial training as described in (e)(1) above.
(ii) The operator should establish a formal qualification list for each task specialist.
(iii) The operator should establish a system of record keeping that allows adequate storage and reliable traceability of:
(A) the initial and recurrent training;
(B) Qualifications (qualification list).

(3) Briefing of task specialists
Briefings on the organisation and coordination between the flight crew and task specialists involved in the operation should take place prior to each operation. These briefings should include at least the following:
(i) location and size of pick-up and drop-off site, operating altitude;
(ii) location of refuelling site and procedures to be applied;
(iii) load sequence, danger areas, performance and limitations, emergency procedures; and
(iv) for a task specialist who has not received the relevant elements of CRM training as specified in the operator’s crew coordination concept including relevant elements of CRM as approved in the Operations Manual.

(4) Responsibility of task specialists operating on the ground:
(i) Task specialists operating on the ground are responsible for the safe organisation of the ground operation, including:
(A) adequate selection and preparation of the pick-up and drop-off points and load rigging;
(B) appropriate communication and assistance to the flight crew and other task specialists; and
(C) access restriction on the pick-up and drop-off site.
(ii) If more than one task specialist is required for a task, one should be nominated as leading the activities. He/she should act as the main link between the flight crew and other task specialist(s) involved in the operation and is responsible for:
(A) task specialist coordination and activities on the ground; and
(B) the safety of the working area (loading and fuelling).

(f) HESLO instructor
The HESLO instructor should be assigned by the operator on the basis of the following:
(1) the HESLO instructor for pilots should:
(i) be suitably qualified as determined by the operator and have a minimum experience of 500 hours HESLO;
(ii) have at least 10 hours HESLO experience as unsupervised PIC in the appropriate HESLO level on which instruction, supervision and proficiency assessments are to be provided; and
(iii) have attended the ‘teaching and learning’ part of the flight instructor or type rating instructor training, or have prior experience as an aerial work instructor subject to national rules.
(2) the HESLO instructor for task specialists should be suitably qualified as determined by the operator and have at least 2 years of experience in HESLO operations.

(g) Performance
(1) Power margins for HESLO operations:
(i) HESLO 1 and 2
The mass of the helicopter should not exceed the maximum mass specified in accordance with performance operating limitations at the pick-up or drop-off site, whichever is higher, as stated in the appropriate manual.
(ii) HESLO 3 and 4
The mass of the helicopter should not exceed the maximum mass specified in accordance with

performance operating limitations at the pick-up or drop-off site, whichever is higher, as stated in the appropriate manual, and in the case of construction (montage) operations, reduced by 10% of the mass of the sling load capacity.

(h) Normal procedures
   (1) Operating procedures:
   HESLO should be performed in accordance with the appropriate manual and appropriate operating procedures. These procedures should include, for each type of operation:
      (i) crew individual safety equipment (e.g. helmet, fire-retardant suits);
      (ii) crew responsibilities;
      (iii) crew coordination and communication;
      (iv) selection and size of pick-up and drop-off sites;
      (v) selection of flight routes;
      (vi) fuel management in the air and on the ground;
      (vii) task management; and
      (viii) third party risk management.
   (2) Ground procedures:
   The operator should specify appropriate procedures, including:
      (i) use of ground equipment;
      (ii) load rigging;
      (iii) size and weight assessment of loads;
      (iv) attachment of suitably prepared loads to the helicopter;
      (v) two-way radio communication procedures;
      (vi) selection of suitable pick-up and drop-off sites;
      (vii) safety instructions for task specialists operating on the ground;
      (viii) helicopter performances information;
      (ix) fuel management on the ground;
      (x) responsibility, organisation and task management of other personnel on the ground involved in the operation;
      (xi) third party risk management; and
      (xii) environmental protection.

(i) Emergency procedures
   (1) Operating procedures for the flight crew:
   In addition to the emergency procedures published in the AFM or OM, the operator should ensure that the flight crew:
      (i) is familiar with the appropriate emergency procedures;
      (ii) has appropriate knowledge of the emergency procedures for personnel on the ground involved in the operation; and
      (iii) reports emergencies as specified in the AFM or OM.
   (2) Ground procedures:
   The operator should ensure that the task specialist on the ground involved in the operation:
      (i) is familiar with the appropriate emergency procedures;
      (ii) has appropriate knowledge of the flight crew emergency procedures;
      (iii) reports emergencies as specified in the AFM or OM; and
      (iv) prevents, as far as possible, environmental pollution.

(j) Ground equipment
   The operator should specify the use of ground equipment, such as fuel trucks, cables, strops, etc. in the AFM or OM, including at least:
   (1) minimum size of the operating site;
   (2) surface condition;
   (3) positioning of ground equipment on the operating site;
   (4) fuel handling;
   (5) environment protection plan; and
   (6) location and use of fire suppression equipment.

B. HESLO Standard operating procedures

PILOT INITIAL TRAINING

The table below summarises minimum training standards

HESLO 1	— CPL(H) or ATPL(H) — PPL(H) only for non-commercial operations — Minimum 10 hours PIC on type — Type rating completed — HESLO ground instruction completed — Task specialist syllabus reviewed — HESLO 1 flight instruction completed: Minimum 5 hours/50 HESLO cycles — HESLO 1 flights under supervision completed — Minimum experience 8 hours/80 HESLO cycles/5 HESLO missions — Minimum 300 hours PIC(H) — HESLO 1 proficiency
HESLO 2	— CPL(H) or ATPL(H) — PPL(H) only for non-commercial operations — HESLO level 1 completed — Type rating completed — Minimum 10 hours PIC on type — HESLO 2 ground instruction completed — Task specialist syllabus reviewed — Minimum 100 HESLO cycles — HESLO 2 flight instruction completed: Minimum 2 hours/20 HESLO cycles with long line — HESLO 2 flights under supervision completed — Minimum experience 5 hours/50 HESLO 2 cycles/5 HESLO 2 missions — HESLO 2 proficiency
HESLO 3	— CPL(H) or ATPL(H) — PPL(H) only for non-commercial operations — HESLO level 1 completed to 20m — Min. 500 HESLO cycles — Type rating completed — Minimum 10 hours PIC on type — HESLO 3 ground instruction completed — Task specialist syllabus reviewed — Practical Task specialist training for logging — HESLO 3 flight instruction completed — HESLO 3 flights under supervision completed — HESLO 3 proficiency
HESLO 4	— CPL(H) or ATPL(H) — PPL(H) only for non-commercial operations — Minimum 1 000 hours (H) — HESLO level 2 or 3 completed — Minimum 2 000 HESLO cycles — Type rating completed — Minimum 10 hours PIC on type — HESLO 4 ground instruction completed — Practical load preparation training — HESLO 4 flight instruction completed — HESLO 4 flights under supervision completed — HESLO 4 proficiency

HESLO ground instruction, HESLO flight training, HESLO flights under supervision and HESLO proficiency assessments may be combined with the operator’s conversion course.

C. HEC Standard operating procedures

STANDARD OPERATING PROCEDURES

(a) Before conducting any HEC operations, the operator should develop its SOPs taking into account the elements below.

(b) Nature and complexity of the activity
  (1) Nature of the activity and exposure:
  HEC operations are usually performed at a low height.
  (2) Complexity of the activity:
    (i) The complexity of the activity varies with the length of the rope and characteristics of the pick-up and drop-off zones, etc.

Table 1: HEC levels

HEC 1:	Sling or cable length is less or equal to 25 m
HEC 2:	Sling or cable length is greater than 25 m

  (3) Operational environment and geographical area:
  HEC may be performed over any geographical area. Special attention should be given to:
    (i) hostile congested and non-congested environment;
    (ii) mountains;
    (iii) sea;
    (iv) jungle;
    (v) desert;
    (vi) artic;
    (vii) lakes and river canyons; and
    (viii) environmentally sensitive areas (e.g. national parks, noise sensitive areas).

(c) Equipment
  (1) The helicopter may be equipped with:
    (i) additional mirror(s) and/or video camera(s);
    (ii) a bubble window;
    (iii) supplementary hook(s) or multi-hook device(s); and
    (iv) load data recorder (lifts, weights, torques, power, forces, shocks and electrical activities).
  (2) When conducting single-pilot vertical reference operations with no assistance of a task specialist or other crew member, additional engine monitoring in the pilot line of vision or an audio warning system is recommended.
  (3) Adequate radio communication equipment (e.g. VHF, UHF, FM) should be installed in the helicopter for co-ordination with the task specialist involved in the operation.
  (4) Task specialists involved in the operation should be equipped with hand-held communication equipment, protective helmets with integrated earphones and microphones as well as personal protective equipment.

(d) Crew members
  (1) Crew composition:
    (i) The minimum flight crew is stated in the approved AFM. For operational or training purposes, an additional qualified crew member may assist the PIC in a single-pilot operation. In such a case:
      (A) procedures are in place for a member of the flight crew to monitor the flight, especially during the departure, approach and HEC operations, to ensure that a safe flight path is maintained; and
      (B) when a task specialist is tasked with assisting the pilot, the procedures according to which this assistance is taking place should be clearly defined.
    (ii) For safety and/or operational purposes, a task specialist may be required by the operator to fulfil the task (e.g. to establish vertical reference or to operate the release safety device for the belly rope).
  (2) Pilot initial training:
  Before acting as PIC, the pilot should demonstrate to the operator that he/she has the required skills and knowledge, as follows:
    (i) Theoretical knowledge:
      (A) load rigging techniques;
      (B) external load procedures;
      (C) site organisation and safety measures;
      (D) short line, long line, construction, wire stringing or cable laying flying techniques, as required

for the operation.

(ii) Pilot experience prior to commencing the training:

(A) 10 hours flight experience on the helicopter type;

(B) type rating completed;

(C) HESLO type 1 or 2 completed;

(D) relevant experience in the field of operation;

(E) training in human factor principles; and

(F) ground instruction completed (marshaller syllabus).

(iii) Pilot experience prior to commencing unsupervised HEC flights:

(A) HEC flight instruction completed.

(B) 1 000 hours helicopter flight experience as PIC.

(C) for mountain operations, 500 hours of flight experience as PIC in mountain operations.

(D) for HEC 2, HESLO type 2 completed.

(3) Pilot proficiency prior to commencing unsupervised HEC flights:
Pilot proficiency has been assessed as sufficient for the intended operations and environment under the relevant HEC level, by a HEC instructor nominated by the operator.

(4) Pilot recurrent training and checking at least every two years:

(i) review of the sling technique;

(ii) external load procedures;

(iii) training in human factor principles; and

(iv) review of the applicable flying techniques, which should take place during a training flight if the pilot has not performed HEC or HHO operations within the past 24 months.

(5) Conditions of HEC instruction:

(i) Maximum sling length according to the level applicable:

(A) 1 task specialist (with radio) at pickup point;

(B) 1 task specialist (with radio) at drop off point/on the line;

(C) helicopter fitted with cargo mirror/bubble window;

(D) flight instruction DC/: Cycles DC/minimum 10 cycles which of 5 Human Cargo Sling; and

(E) flight instruction solo with onsite supervision/Cycles solo/minimum 10 cycles.

(ii) HEC instructor:
The HEC instructor should be assigned by the operator on the basis of the following:

(A) the HEC instructor for pilots should:

— have a minimum experience of 100 cycles in HEC operations at HEC levels equal to or greater than that on which instruction, supervision and proficiency assessment are to be provided; and

— have attended the 'teaching and learning' part of the flight instructor or type rating instructor training, or have prior experience as an aerial work instructor subject to national rules;

(B) the HEC instructor for task specialists should be suitably qualified as determined by the operator and have at least 2 years of experience in HEC operations as a task specialist.

(e) Task specialists
Before acting as task specialists, they should demonstrate to the operator that they have been appropriately trained and have the required skills and knowledge including training on human factor principles.

(1) Task specialists should receive training relevant to their tasks including:

(i) fitting and removal of system; and

(ii) normal procedure.

For task specialists in charge of assisting the pilot, the relevant CRM training elements should be as specified in OM and be approved by CAA.

(2) Briefings
Briefings on the organisation and coordination between flight crew and task specialist involved in the operation should take place prior to each operation. These briefings should include at least the following:

(i) location and size of pick-up and drop-off site, operating altitude;

(ii) location of refuelling site and procedures to be applied; and
(iii) load sequence, danger areas, performance and limitations, emergency procedures.
(iv) for task specialists who have not received the relevant elements of CRM training as specified in OM, the operator's crew coordination concept including relevant elements of crew resource management.

(3) Recurrent training
(i) The annual recurrent training should include the items listed in the initial training as described in (e)(1) above.
(ii) The operator should establish a formal qualification list for each task specialist.
(iii) The operator should establish a system of record keeping that allows adequate storage and reliable traceability of:
(A) the initial and recurrent training;
(B) qualifications (qualification list).

(f) Performance
HEC should be performed with the following power margins: the mass of the helicopter should not exceed the maximum mass specified in accordance with performance operating limitations of the Rotorcraft Flight Manual and approved by CAA in the SOP.

(g) Normal procedures
(1) Operating procedures:
HEC should be performed in accordance with the AFM. Operating procedures should include, for each type of operation:
(i) crew individual safety equipment (e.g. helmet, fire retardant suits);
(ii) crew responsibilities;
(iii) crew coordination and communication;
(iv) selection and size of pick-up and drop-off sites;
(v) selection of flight routes;
(vi) fuel management in the air and on the ground;
(vii) task management; and
(viii) third party risk management.

(2) Ground procedures:
The operator should specify appropriate procedures, including:
(i) use of ground equipment;
(ii) load rigging;
(iii) size and weight assessment of loads;
(iv) attachment of suitably prepared loads to the helicopter;
(v) two-way radio communication procedures;
(vi) selection of suitable pick-up and drop-off sites;
(vii) safety instructions for ground task specialists or other persons required for the safe conduct of the operation;
(viii) helicopter performances information;
(ix) fuel management on the ground;
(x) responsibility and organisation of the personnel on the ground involved in the operation;
(xi) task management of personnel on the ground involved in the operation;
(xii) third party risk management; and
(xiii) environmental protection.

(h) Emergency procedures
(1) Operating procedures:
In addition to the emergency procedures published in the AFM or OM, the operator should ensure that the flight crew:
(i) is familiar with the appropriate emergency procedures;
(ii) has appropriate knowledge of the emergency procedures for personnel on the ground involved in the operation; and
(iii) reports emergencies as specified in the AFM or OM.

(2) Ground procedures:

The operator should ensure that the task specialist on the ground involved in the operation:

(i) is familiar with the appropriate emergency procedures;
(ii) has appropriate knowledge of the emergency procedures for personnel on the ground involved in the operation;
(iii) reports emergencies as specified in the AFM or OM; and
(iv) prevents, as far as possible, environmental pollution.

D. Specific HEC equipment

AIRWORTHINESS APPROVAL FOR HEC EQUIPMENT

(a) Hoist or cargo hook installations that have been certificated according to any of the following standards should be considered to satisfy the airworthiness criteria for HEC operations as per CAR M:
  (1) CS 27.865 or CS 29.865;
  (2) JAR 27 Amendment 2 (27.865) or JAR 29 Amendment 2 (29.865) or later;
  (3) FAR 27 Amendment 36 (27.865) or later — including compliance with CS 27.865(c)(6); or
  (4) FAR 29 Amendment 43 (29.865) or later.
(b) Hoist or cargo hook installations that have been certified prior to the issuance of the airworthiness criteria for HEC as defined in (a) may be considered as eligible for HEC provided that following a risk assessment either:
  (1) the service history of the hoist or cargo hook installation is found satisfactory to the competent authority; or
  (2) for hoist or cargo hook installations with an unsatisfactory service history, additional substantiation to allow acceptance by the competent authority should be provided by the hoist or cargo hook installation certificate holder (type certificate (TC) or supplemental type certificate (STC)) on the basis of the following requirements:
    (i) The hoist or cargo hook installation should withstand a force equal to a limit static load factor of 3.5, or some lower load factor, not less than 2.5, demonstrated to be the maximum load factor expected during hoist operations, multiplied by the maximum authorised external load.
    (ii) The reliability of the primary and back up quick release systems at helicopter level should be established and failure mode and effect analysis at equipment level should be available. The assessment of the design of the primary and back up quick release systems should consider any failure that could be induced by a failure mode of any other electrical or mechanical rotorcraft system.
    (iii) The appropriate manual should contain one-engine-inoperative (OEI) hover performance data or single engine failures procedures for the weights, altitudes, and temperatures throughout the flight envelope for which hoist or cargo hook operations are accepted.
    (iv) Information concerning the inspection intervals and retirement life of the hoist or cargo hook cable should be provided in the instructions for continued airworthiness.

AMC OPS-3.035 Quality System

(See CAR OPS-3.035)

(a) Introduction
  (1) In order to show compliance with CAR OPS-3.035, an operator should establish his Quality System in accordance with the instructions and information contained in the following paragraphs:
(b) General
  (1) Terminology – The terms used in the context of the requirement for an operator's Quality System have the following meanings:
    (i) Accountable Manager. The person acceptable to the Authority who has corporate Authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority, and any additional requirements defined by the operator.
    (ii) Quality Assurance. All those planned and systematic actions necessary to provide adequate confidence that operational and maintenance practices satisfy given requirements.
    (iii) Quality Manager. The manager, acceptable to the Authority, responsible for the management

of the Quality System, monitoring function and requesting corrective actions.

(iv) In determining the acceptability by the Authority the following is taken into consideration:

(A) the receipt of training, acceptable to the Authority, on quality management systems.

(B) the receipt of training, acceptable to the Authority, on Quality Audit techniques.

(C) having held a position previously within the Quality Assurance department of an organisation.

(D) having a detailed knowledge of the approved organisation's procedures that describe the means, methods and practices of compliance with the Sultanate of Oman regulations and standards.

(2) Quality Policy

(i) An operator should establish a formal written Quality Policy Statement that is a commitment by the Accountable Manager as to what the Quality System is intended to achieve. The Quality Policy should reflect the achievement and continued compliance with CAR OPS-3 together with any additional standards specified by the operator.

(ii) The Accountable Manager is an essential part of the AOC holder's management organisation. With regard to the text in CAR OPS-3.175 (i) and the above terminology, the term 'Accountable Manager' is intended to mean the Chief Executive / President / Managing Director / Director General / General Manager etc. of the operator's organisation, who by virtue of his position has overall responsibility (including financial) for managing the organisation.

(iii) The Accountable Manager will have overall responsibility for the AOC holder's Quality System including the frequency, format and structure of the internal management evaluation activities as prescribed in subparagraph 4(i) below.

(3) Purpose of the Quality System

(i) The Quality System should enable the operator to monitor compliance with CAR OPS-3, the Operations Manual, the Operator's Maintenance Management Exposition, and any other standards specified by that operator, or the Authority.

(ii) The QMS focus on:

(a) compliance with regulations and requirements;

(b) consistency in the delivery of products and services;

(c) meeting the specified performance standards; and

(d) delivery of products and services that are "fit for purpose" and free of defects or errors.

(4) Quality Manager

(i) The function of the Quality Manager to monitor compliance with, and the adequacy of, procedures required to ensure safe operational practices and airworthy Helicopters, as required by CAR OPS-3.035(a), may be carried out by more than one person by means of different, but complementary, Quality Assurance Programmes.

(ii) The primary role of the Quality Manager is to verify, by monitoring activity in the fields of flight operations, maintenance, crew training and ground operations, that the standards required by the Authority, and any additional requirements defined by the operator, are being carried out under the supervision of the relevant Nominated Post- holder.

(iii) The Quality Manager should be responsible for ensuring that the Quality Assurance Programme is properly established, implemented and maintained.

(iv) The Quality Manager should:

(A) Have direct access to the Accountable Manager;

(B) Not be one of the nominated post-holders to preserve the independence of the compliance monitoring function (for exceptions see para (v) below and CAR OPS-3.175); and

(C) Have access to all parts of the operator's and, as necessary, any subcontractor's organisation.

(v) In the case of small/very small operators (see paragraph 7(c) below), the posts of the Accountable Manager and the Quality Manager may be combined. However, in this event, independent personnel shall conduct quality audits.

(c) Quality System

(1) Introduction

(i) The operator's Quality System should ensure compliance with and adequacy of operational and maintenance activities requirements, standards and operational procedures.

(ii) The operator should specify the basic structure of the Quality System applicable to the operation.

(iii) The Quality System should be structured according to the size and complexity of the operation to be monitored ('small operators' see also paragraph (7) below).

(2) Scope

(i) As a minimum, the Quality System should address the following:

(A) The provisions of CAR OPS-3;

(B) The operator's additional standards and operating procedures;

(C) The operator's Quality Policy;

(D) The operator's organisational structure;

(E) Responsibility for the development, establishment and management of the Quality System;

(F) Documentation, including manuals, reports and records;

(G) Quality Procedures;

(H) Quality Assurance Programme;

(I) The required financial, material, and human resources;

(J) Training requirements.

(ii) The quality system should include a feedback system to the Accountable Manager to ensure that corrective actions are both identified and promptly addressed. The feedback system should also specify who is required to rectify discrepancies and non-compliance in each particular case, and the procedure to be followed if corrective action is not completed within an appropriate timescale.

(3) Relevant Documentation

(i) Relevant documentation includes the relevant part of the Operations Manual and the Operator's Maintenance Management Exposition, which may be included in a separate Quality Manual.

(ii) In addition, relevant documentation should also include the following:

(A) Quality Policy;

(B) Terminology;

(C) Specified operational standards;

(D) A description of the organisation;

(E) The allocation of duties and responsibilities;

(F) Operational procedures to ensure regulatory compliance;

(G) Accident Prevention and Flight Safety Programme;

(H) The Quality Assurance Programme, reflecting;

H(1) Schedule of the monitoring process;

H(2) Audit procedures;

H(3) Reporting procedures;

H(4) Follow-up and corrective action procedures;

H(5) Recording system

(I) The training syllabus; and
(J) Document control.

(d) Quality Assurance Programme (See CAR OPS-3.035(b).)

(1) Introduction

(i) The Quality Assurance Programme should include all planned and systematic actions necessary to provide confidence that all operations and maintenance are conducted in accordance with all applicable requirements, standards and operational procedures.

(ii) When establishing a Quality Assurance Programme, consideration should, at least, be given to the paragraphs (4)(b) to (4)(i) below:

(2) Quality Inspection

(i) The primary purpose of a quality inspection is to observe a particular event/action/document etc., in order to verify whether established operational procedures and requirements are followed during the accomplishment of that event and whether the required standard is achieved.

Typical subject areas for quality inspections are:

(A) Actual flight operations;
(B) Ground De-icing/Anti-icing;
(C) Flight Support Services;
(D) Load Control;
(E) Maintenance;
(F) Technical Standards; and
(G) Training Standards.

(e) Audit

(1) An audit is a systematic, and independent comparison of the way in which an operation is being conducted against the way in which the published operational procedures say it should be conducted.

(2) Audits should include at least the following quality procedures and processes:

(i) A statement explaining the scope of the audit;
(ii) Planning and preparation;
(iii) Gathering and recording evidence; and
(iv) Analysis of the evidence.

(3) Techniques which contribute to an effective audit are:

(i) Interviews or discussions with personnel;
(ii) A review of published documents;
(iii) The examination of an adequate sample of records;
(iv) The witnessing of the activities which make up the operation; and
(v) The preservation of documents and the recording of observations.

(f) Auditors

An operator should decide, depending on the complexity of the operation, whether to make use of a dedicated audit team or a single auditor. In any event, the auditor or audit team should have relevant operational and/or maintenance experience. The responsibilities of the auditors should be clearly defined in the relevant documentation.

(g) Auditor's Independence

(1) Auditors should not have any day-to-day involvement in the area of the operation and/or maintenance activity which is to be audited. An operator may, in addition to using the services of full-time dedicated personnel belonging to a separate quality department, undertake the monitoring of specific areas or activities by the use of part-time auditors. An operator whose

structure and size does not justify the establishment of full-time auditors, may undertake the audit function by the use of part-time personnel from within his own organisation or from an external source under the terms of an agreement acceptable to the Authority. In all cases the operator should develop suitable procedures to ensure that persons directly responsible for the activities to be audited are not selected as part of the auditing team. Where external auditors are used, it is essential that any external specialist is familiar with the type of operation and/or maintenance conducted by the operator.

(2) An operator should establish a schedule of audits to be completed during a specified calendar period. All aspects of the operation should be reviewed within every period of twelve (12) months in accordance with the programme unless an extension to the audit period is accepted as explained below. An operator may increase the frequency of audits at his discretion but should not decrease the frequency without the agreement of the Authority. It is considered unlikely that an interval between audits greater than twenty-four (24) months would be acceptable for any audit topic.

(3) When an operator defines the audit schedule, significant changes to the management, organisation, operation, or technologies should be considered as well as changes to the regulatory requirements.

(h) Monitoring and Corrective Action

(1) The aim of monitoring within the Quality System is primarily to investigate and judge its effectiveness and thereby to ensure that defined policy, operational, and maintenance standards are continuously complied with. Monitoring activity is based upon quality inspections, audits, corrective action and follow- up. The operator should establish and publish a quality procedure to monitor regulatory compliance on a continuing basis. This monitoring activity should be aimed at eliminating the causes of unsatisfactory performance.

(2) Any non-compliance identified as a result of monitoring should be communicated to the manager responsible for taking corrective action or, if appropriate, the Accountable Manager. Such non-compliance should be recorded, for the purpose of further investigation, in order to determine the cause and to enable the recommendation of appropriate corrective action.

(3) The Quality Assurance Programme should include procedures to ensure that corrective actions are taken in response to findings. These quality procedures should monitor such actions to verify their effectiveness and that they have been completed. Organisational responsibility and accountability for the implementation of corrective action resides with the department cited in the report identifying the finding. The Accountable Manager will have the ultimate responsibility for resourcing the corrective action and ensuring, through the Quality Manager, that the corrective action has re-established compliance with the standard required by the Authority, and any additional requirements defined by the operator.

(4) Corrective action

(i) Subsequent to the quality inspection/audit, the operator should establish:

(A) The seriousness of any findings and any need for immediate corrective action;

(B) The origin of the finding;

(C) What corrective actions are required to ensure that the noncompliance does not recur;

(D) A schedule for corrective action;

(E) The identification of individuals or departments responsible for implementing corrective action;

(F) Allocation of resources by the Accountable Manager, where appropriate.

(5) The Quality Manager should:

(i) Verify that corrective action is taken by the manager responsible in response to any finding of non-compliance;
(ii) Verify that corrective action includes the elements outlined in sub- paragraph (h)(iv) above;
(iii) Monitor the implementation and completion of corrective action;
(iv) Provide management with an independent assessment of corrective action, implementation and completion;
(v) Evaluate the effectiveness of corrective action through the follow-up process.

(i) Management Evaluation

(1) A management evaluation is a comprehensive, systematic, documented review by the management of the quality system, operational policies and procedures, and should consider:
(i) The results of quality inspections, audits and any other indicators;
(ii) The overall effectiveness of the management organisation in achieving stated objectives.

(2) A management evaluation should identify and correct trends, and prevent, where possible, future non-conformities. Conclusions and recommendations made as a result of an evaluation should be submitted in writing to the responsible manager for action. The responsible manager should be an individual who has the Authority to resolve issues and take action.

(3) The Accountable Manager should decide upon the frequency, format, and structure of internal management evaluation activities.

(j) Recording

(1) Accurate, complete, and readily accessible records documenting the results of the Quality Assurance Programme should be maintained by the operator. Records are essential data to enable an operator to analyse and determine the root causes of non-conformity, so that areas of non-compliance can be identified and addressed.

(2) The following records should be retained for a period of five (5) years:
(i) Audit Schedules;
(ii) Quality inspection and Audit reports;
(iii) Responses to findings;
(iv) Corrective action reports;
(v) Follow-up and closure reports; and
(vi) Management Evaluation Reports

(k) Quality Assurance Responsibility for Sub-Contractors

(1) Sub-Contractors
(i) Operators may decide to sub-contract out certain activities to external agencies for the provision of services related to areas such as:
(A) Ground De-icing/Anti-icing;
(B) Maintenance;
(C) Ground handling;
(D) Flight Support (including Performance calculations, flight planning, navigation database and dispatch);
(E) Training;
(F) Manual preparation.
(ii) The ultimate responsibility for the product or service provided by the sub- contractor always remains with the operator. A written agreement should exist between the operator and the sub-contractor clearly defining the safety related services and quality to be provided. The sub-contractor's safety related activities relevant to the agreement should be included in the operator's Quality Assurance Programme.

(iii) The operator should ensure that the sub-contractor has the necessary authorisation/approval when required and commands the resources and competence to undertake the task. If the operator requires the sub-contractor to conduct activity which exceeds the sub-contractor's authorisation/approval, the operator is responsible for ensuring that the sub-contractor's quality assurance takes account of such additional requirements.

(l) Quality System Training

(1) General

(i) An operator should establish effective, well planned and resourced quality related briefing for all personnel.

(ii) Those responsible for managing the Quality System should receive training covering:

(A) An introduction to the concept of the Quality System;
(B) Quality management;
(C) The concept of Quality Assurance;
(D) Quality manuals;
(E) Audit techniques;
(F) Reporting and recording; and
(G) The way in which the Quality System will function in the company.

(iii) Time should be provided to train every individual involved in quality management and for briefing the remainder of the employees. The allocation of time and resources should be governed by the size and complexity of the operation concerned.

(2) Sources of Training

(i) Quality management courses are available from the various National or International Standards Institutions, and an operator should consider whether to offer such courses to those likely to be involved in the management of Quality Systems. Operators with sufficient appropriately qualified staff should consider whether to carry out in-house training.

(m) Organisations with twenty (20) or less full-time employees

(1) Introduction

(i) The requirement to establish and document a Quality System, and to employ a Quality Manager applies to all operators. References to large and small operators elsewhere in the requirements are governed by aircraft capacity (i.e. more or less than 20 seats) and by mass (greater or less than ten (10) tonnes Maximum Take-Off Mass). Such terminology is not relevant when considering the scale of an operation and the Quality System required. In the context of quality systems therefore, operators should be categorised according to the number of full-time staff employees.

(2) Scale of Operation

(i) Operators who employ 5 or less full-time staff are considered to be 'very small' while those employing between 6 and 20 full time employees are regarded as 'small' operators as far as quality systems are concerned. Full-time in this context means employed for not less than 35 hours per week excluding vacation periods.

(ii) Complex quality systems could be inappropriate for small or very small operators and the clerical effort required to draw up manuals and quality procedures for a complex system may stretch their resources. It is therefore accepted that such operators should tailor their quality systems to suit the size and complexity of their operation and allocate resources accordingly.

(3) Quality Systems for small/very small Operators

(i) For small and very small operators it may be appropriate to develop a Quality Assurance Programme that employs a checklist. The checklist should have a supporting schedule that requires completion of all checklist items within a specified timescale, together with a statement acknowledging completion of a periodic review by top management. An occasional independent overview of the checklist content and achievement of the Quality Assurance should be undertaken.

(ii) The 'small' operator may decide to use internal or external auditors or a combination of the two. In these circumstances it would be acceptable for external specialists and or qualified organisations to perform the quality audits on behalf of the Quality Manager.

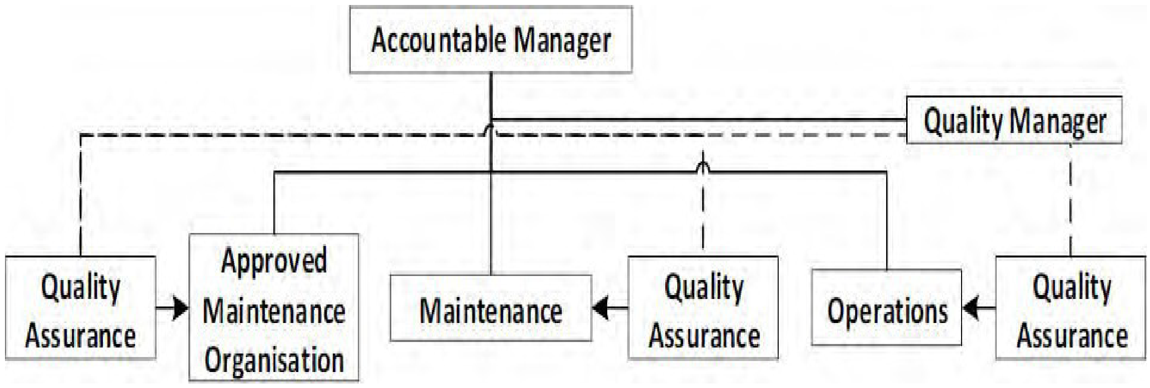
(iii) If the independent quality audit function is being conducted by external auditors, the audit schedule should be shown in the relevant documentation.

(iv) Whatever arrangements are made, the operator retains the ultimate responsibility for the quality system and especially the completion and follow- up of corrective actions.

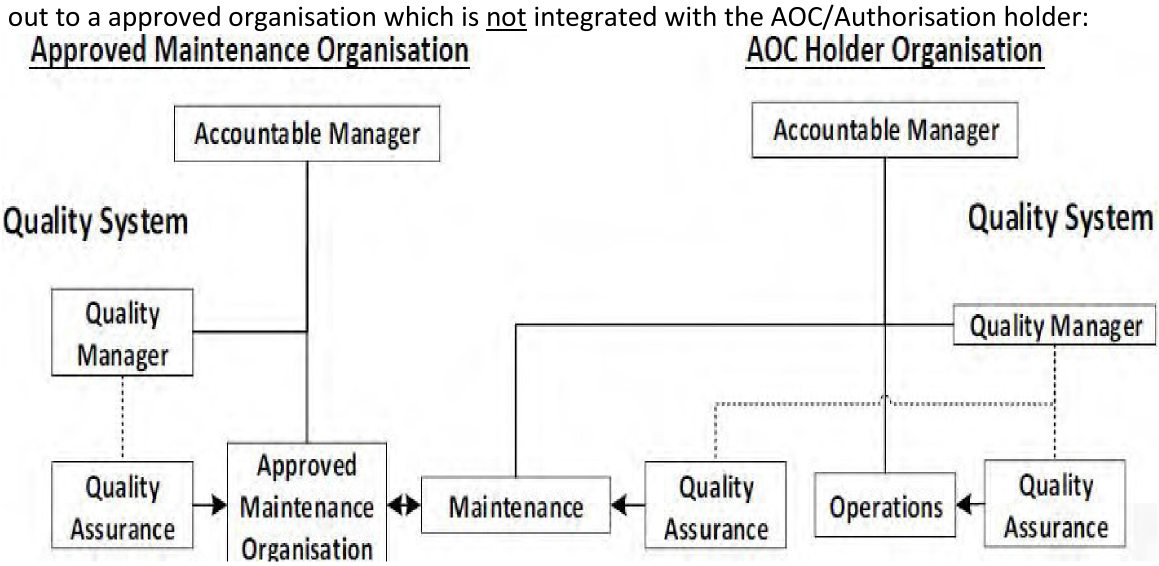
IEM OPS-3.035 Quality System – Organisation examples
(See CAR OPS-3.035)

The following diagrams illustrate two typical examples of Quality organisations.

(a) Quality System within the AOC holder's organisation when the AOC holder also holds an AMO approval.



(b) Quality Systems related to an AOC holder's organisation where aircraft maintenance is contracted out to a approved organisation which is <u>not</u> integrated with the AOC/Authorisation holder:



Note: The Quality System and Quality Audit Programme of the AOC/Authorisation holder should assure that the maintenance carried out by the approved organisation is in accordance with requirements specified by the AOC/Authorisation holder.

IEM OPS-3.037 Safety Management

(a) Guidance material for the establishment of a SMS can be found in:

(i) ICAO Safety Management System Manual (Doc 9859);

(ii) ICAO Doc 9422 (Accident Prevention Manual); and

(iii) ICAO Doc 9376 (Preparation of an Operational Manual).

(b) Where available, use may be made of analysis of flight data recorder information (See also OPS 3.160(c).)

AMC-1 OPS-3.037(c) Flight Data Monitoring Programme

(See CAR OPS-3.037(a)(4))

(a) Flight Data Monitoring (FDM) is the pro-active and non-punitive use of digital flight data from routine operations to improve aviation safety.

(b) The Accountable Manager and the SMS Manager are responsible for establishing and maintaining the FDM programme. The purpose of the FDM programme is the discovery and analysis of safety issues and the transmission of these to the relevant manager(s) responsible for the process(es) concerned. The latter are responsible for taking appropriate and practicable safety action within a reasonable period of time that reflects the severity of the issue.

Note: While an operator may contract the operation of a flight data analysis programme to another party the overall responsibility remains with the operator's safety management system.

(c) An FDM programme will allow an operator to:

(1) Identify areas of operational risk and quantify current safety margins.

(2) Identify and quantify operational risks by highlighting when non-standard, unusual or unsafe circumstances occur.

(3) Use the FDM information on the frequency of occurrence, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues.

(4) Put in place appropriate procedures for remedial action once an unacceptable risk, either actually present or predicted by trending, has been identified.

(5) Confirm the effectiveness of any remedial action by continued monitoring.

(d) Flight Data Monitoring Analysis Techniques:

(1) Exceedance Detection: This looks for deviations from flight manual limits, and standard operating procedures. A set of core events should be selected to cover the main areas of interest to the operator. A sample list is in the Appendix. The event detection limits should be continuously reviewed to reflect the operator's current operating procedures.

(2) All Flights Measurement: A system that defines what is normal practice. This may be accomplished by retaining various snapshots of information from each flight.

(3) Statistics: A series of measures collected to support the analysis process. These would be expected to include the numbers of flights flown and analysed, aircraft and sector details sufficient to generate rate and trend information.

(e) Flight Data Monitoring Analysis, Assessment and Process Control Tools: The effective assessment of information obtained from digital flight data is dependent on the provision of appropriate information technology tool sets. A programme suite may include: Annotated data trace displays, engineering unit listings, visualisation for the most significant incidents, access to interpretative material, links to other safety information, and statistical presentations.

(f) Education and Publication: Sharing safety information is a fundamental principle of aviation safety in helping to reduce accident rates. The operator should pass on the lessons learnt to all relevant personnel and, where appropriate, industry. Similar media to air safety systems may be used. These may include: Newsletters, flight safety magazines, highlighting examples in training and simulator exercises, periodic reports to industry and the regulatory Authority.

(g) Accident and incident data requirements specified in CAR OPS-3.160 take precedence over the requirements of an FDM programme. In these cases, the FDR data should be retained as part of the investigation data and may fall outside the de-identification agreements.

(h) Every crew member has a responsibility to report events described in CAR OPS-3.085(b) using the company occurrence reporting scheme detailed in CAR OPS-3.037(f). Mandatory Occurrence Reporting is a requirement under CAR OPS-3.420. Significant risk-bearing incidents detected by FDM will therefore normally be the subject of mandatory occurrence reporting by the crew. If this is not the case then they should submit a retrospective report that will be included under the safety management process without prejudice.

(i) The data recovery strategy should ensure a sufficiently representative capture of flight information to maintain an overview of operations. Data analysis should be performed sufficiently frequently to enable action to be taken on significant safety issues.

(j) The data retention strategy should aim to provide the greatest safety benefits practicable from the available data. A full data set should be retained until the action and review processes are complete; thereafter, a reduced data set relating to closed issues can be maintained for longer term trend analysis. Programme managers may wish to retain samples of de-identified full-flight data for various safety purposes (detailed analysis, training, benchmarking etc.).

(k) Data Access and Security policy should restrict information access to authorised persons. When data access is required for airworthiness and maintenance purposes, a procedure should be in place to prevent disclosure of crew identity.

(l) Procedure Document; this document is signed by all parties (airline management, flight crew member representatives nominated either by the union or the flight crew themselves) will, as a minimum, define:

   (1) The aim of the FDM programme.
   (2) A data access and security policy that should restrict access to information to specifically authorised persons identified by their position.
   (3) The method to obtain de-identified crew feedback on those occasions that require specific flight follow-up for contextual information; where such crew contact is required the authorised person(s) need not necessarily be the programme manager, or safety manager, but could be a third party (broker) mutually acceptable to unions or staff and management.
   (4) The data retention policy and accountability including the measures taken to ensure the security of the data.
   (5) The conditions under which, on rare occasions, advisory briefing or remedial training should take place; this should always be carried out in a constructive and non- punitive manner.
   (6) The conditions under which the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern.
   (7) The participation of flight crew member representative(s) in the assessment of the data, the action and review process and the consideration of recommendations.
   (8) The policy for publishing the findings resulting from FDM.

(m) Airborne systems and equipment used to obtain FDM data will range from an already installed full Quick Access Recorder, in a modern aircraft with digital systems, to a basic crash protected recorder in an older or less sophisticated aircraft. The analysis potential of the reduced data set available in the latter case may reduce the safety benefits obtainable. The operator shall ensure that FDM use does not adversely affect the serviceability of equipment required for accident investigation.

AMC-2 OPS-3.037(e) Flight Safety Documents System

(See CAR OPS-3.037(e))

(a) It should be understood that the development of a flight safety documents system is a complete process, and changes to each document comprising the system may affect the entire system.

(1) It is important for operational documents to be consistent with each other, and consistent with regulations, manufacturer requirements and Human Factors principles. It is also necessary to ensure consistency across departments as well as consistency in application. Hence there is an emphasis on the introduction of the integrated approach, based on the notion of the operational documents are a complete system.

(2) The guidelines in this AMC address the major aspects of the operator's flight safety documents system development process, with the aim of ensuring compliance with the guidelines given in Annex 6, Attachment G, which are based not only upon scientific research, but also upon current best industry practices, with an emphasis on a high degree of operational relevance.

(b) Organisational Requirements

(1) A flight safety documents system shall be organized according to criteria which ensures easy access to information required for flight and ground operations contained in the various operational documents comprising the system, which also facilitates the management of the distribution and revision of operational documents.

(2) Information contained in a flight safety documents system shall be grouped according to the importance and use of the information, as follows:

(i) time-critical information, e.g., information that can jeopardize the safety of the operation if not immediately available;

(ii) time-sensitive information, e.g., information that can affect the level of safety or delay the operation if not available in a short time period;

(iii) frequently used information;

(iv) reference information, e.g., information that is required for the operation but does not fall under ii) or iii) above; and

(v) information that can be grouped based on the phase of operation in which it is used.

(3) Time-critical information shall be placed early and prominently in the flight safety documents system.

(4) Time-critical information, time-sensitive information, and frequently used information shall be placed in cards and quick-reference guides.

(c) Validation of the Flight Safety Documents

The flight safety documents system shall be validated before deployment, under realistic conditions. Validation shall involve the critical aspects of the information use, in order to verify its effectiveness. Interactions among all groups that can occur during operations shall also be included in the validation process.

(d) Design of the Flight Safety Documents System

(1) A flight safety documents system shall maintain consistency in terminology and in the use of standard terms for common items and actions.

(2) Operational documents shall include a glossary of terms, acronyms and their standard definition, updated on a regular basis to ensure access to the most recent terminology. All significant terms, acronyms and abbreviations included in the flight documents system shall be defined.

(3) A flight safety documents system shall ensure standardization across document types, including writing style, terminology, use of graphics and symbols, and formatting across

documents. This includes a consistent location of specific types of information, consistent use of units of measurement and consistent use of codes.

(4) A flight safety documents system shall include a master index to locate, in a timely manner, information included in more than one operational document.

Note: The master index must be placed in the front of each document and consist of no more than three levels of indexing. Pages containing abnormal and emergency information must be tabbed for direct access.

(5) A flight safety documents system shall comply with the requirements of the operator's quality system, if applicable.

(e) Deployment of the Flight Safety Documents System

Operators shall monitor deployment of the flight safety documents system, to ensure appropriate and realistic use of the documents, based on the characteristics of the operational environment and in a way, which is both operationally relevant and beneficial to operational personnel. This monitoring shall include a formal feedback system for obtaining input from operational personnel.

(f) Amendment Process

(1) Operators shall develop an information gathering, review, distribution and revision control system to process information and data obtained from all sources relevant to the type of operation conducted, including, but not limited to, the State of the Operator, State of design, State of Registry, manufacturers and equipment vendors.

Note: Manufacturers provide information for the operation of specific aircraft that emphasizes the aircraft systems and procedures under conditions that may not fully match the requirements of operators. Operators shall ensure that such information meets their specific needs and approved by the CAA.

(2) Operators shall develop an information gathering, review and distribution system to process information resulting from changes that originate within the operator, including:

(i) changes resulting from the installation of new equipment;

(ii) changes in response to operating experience;

(iii) changes in the operator's policies and procedures;

(iv) changes in the operator certificate; and

(v) changes for purposes of maintaining cross fleet standardisation

Note: Operators shall ensure that crew coordination philosophy, policies and procedures are specific to their operation.

(3) A flight safety documents system shall be reviewed:

(i) on a regular basis (at least once a year);

(ii) after major events (mergers, acquisitions, rapid growth, downsizing, etc.);

(iii) after technology changes (introduction of new equipment); and

(iv) after changes in safety regulations.

(4) Operators shall develop methods of communicating new information. The specific methods shall be responsive to the degree of communication urgency.

Note: As frequent changes diminish the importance of new or modified procedures, it is desirable to minimize changes to the flight safety documents system.

(5) New information shall be reviewed and validated considering its effects on the entire flight safety documents system.

(6) The method of communicating new information shall be complemented by a tracking system to ensure currency by operational personnel. The tracking system shall include a procedure to verify that operational personnel have the most recent updates.

AMC-3 OPS-3.037(f) Occurrence Reporting Scheme
(See CAR OPS-3.037(f))

(a) The overall objective of the scheme described in CAR OPS-3.037(f) is to use reported information to improve the level of flight safety and not to attribute blame.

(b) The detailed objectives of the scheme are:
   (1) To enable an assessment of the safety implications of each relevant incident and accident to be made, including previous similar occurrences, so that any necessary action can be initiated; and
   (2) To ensure that knowledge of relevant incidents and accidents is disseminated so that other persons and organisations may learn from them.

(c) The scheme is an essential part of the overall monitoring function; it is complementary to the normal day to day procedures and 'control' systems and is not intended to duplicate or supersede any of them. The scheme is a tool to identify those occasions where routine procedures have failed. (Occurrences that have to be reported and responsibilities for submitting reports are described in CAR OPS-3.420.)

(d) Occurrences shall remain in the database when judged reportable by the person submitting the report as the significance of such reports may only become obvious at a later date.

IEM OPS-3.065 Carriage of weapons of war and munitions of war
(See CAR OPS-3.065)

(a) There is no internationally agreed definition of weapons of war and munitions of war. Some States may have defined them for their particular purposes or for national need.

(b) It should be the responsibility of the operator to check, with the State(s) concerned, whether or not a particular weapon or munition is regarded as a weapon of war or munition of war. In this context, States which may be concerned with granting approvals for the carriage of weapons of war or munitions of war are those of origin, transit, overflight and destination of the consignment and the State of the operator.

(c) Where weapons of war or munitions of war are also dangerous goods by definition (e.g. torpedoes, bombs, etc.), Subpart R will also apply. (See also AMC OPS-3.070.)

AMC OPS 3.070 Carriage of Sporting Weapons
(See OPS 3.070)

(a) There is no internationally agreed definition of sporting weapons. In general they may be any weapon which is not a weapon of war or munitions of war (See IEM OPS 3.065). Sporting weapons include hunting knives, bows and other similar articles. An antique weapon, which at one time may have been a weapon of war or munitions of war, such as a musket, may now be regarded as a sporting weapon.

(b) A firearm is any gun, rifle or pistol which fires a projectile.

(c) In the absence of a specific definition, for the purpose of OPS and in order to provide some guidance to operators, the following firearms are generally regarded as being sporting weapons: a. Those designed for shooting game, birds and other animals;
   (1) Those used for target shooting, clay-pigeon shooting and competition shooting, providing the weapons are not those on standard issue to military forces;
   (2) Air guns, dart guns, starting pistols, etc.

(d) A firearm, which is not a weapon of war or munition of war, should be treated as a sporting weapon for the purposes of its carriage on a helicopter.

(e) Other procedures for the carriage of sporting weapons may need to be considered if the helicopter does not have a separate compartment in which the weapons can be stowed.
These procedures should take into account the nature of the flight, its origin and destination, and the

possibility of unlawful interference. As far as possible, the weapons should be stowed so they are not immediately accessible to the passengers (e.g. in locked boxes, in checked baggage which is stowed under other baggage or under fixed netting). If procedures other than those in OPS 3.070(b)(1) are applied, the commander should be notified accordingly.

GM OPS-3.085(e)(3) Crew responsibilities

(See CAR OPS-3.085(e)(3))

(a) Information on the effects of medication, drugs, other treatments and alcohol, may be found in CAR FCL-3 Medical.

(b) Further guidance can be found in CAR-99 (Drugs and Alcohol Management Plan) with the associated Drugs and Alcohol Management Plan Guidance Manual.

AMC OPS-3.110 Portable Electronic Devices

(See CAR OPS-3.110 Portable electronic devices)

(a) ***Scope.*** This AMC provides means to prevent portable electronic devices (PEDs) on board aircraft adversely affect the performance of the aircraft's systems and equipment. It addresses operation of PEDs in the different aircraft zones – passenger compartment, flight compartment, and cargo compartments. Furthermore, it addresses the specific case of PEDs qualified and under configuration control by the operator – controlled PEDs (C-PEDs) - for which the operator gives some credit.

(b) ***Restrictions on the use of PEDs in the passenger compartment.*** If an operator permits passengers to use PEDs on board its aircraft, procedures shall be in place to control their use. The operator shall ensure that all crew members and ground personnel are trained to enforce the restrictions on this equipment in line with these procedures. These procedures shall ensure the following:

(1) As the general principle all PEDs (including transmitting PEDs (T-PEDs)) are switched-off at the start of the flight when the passengers have boarded and all doors have been closed, until a passenger door has been opened at the end of the flight.

(2) The following exceptions from the above general principle may be granted under the responsibility of the operator:

(i) Medical equipment necessary to support physiological functions does not need to be switched-off.

(ii) The use of PEDs, excluding T-PEDs, may be permitted during all phases of flight.

(iii) T-PEDs may be used during non-critical phases of flight, excluding taxiing, if the aircraft is equipped with a system or otherwise certified allowing the operation of such technology during flight. The restrictions coming from the corresponding aircraft certification as documented in the aircraft flight manual (AFM), or equivalent document(s), stay in force.

(iv) Use of cellphone may be permitted after an aircraft has left active runway after landing.

(v) The use of C-PEDs during critical phases of flight, however, may only be permitted if the operator has accounted for this situation in its assessment.

(vi) The commander may permit the use of any kind of PED when the aircraft is stationary during prolonged departure delays, provided that sufficient time is available to check the passenger compartment before the flight proceeds. Similarly, after landing, the commander may authorize the use of any kind of PED in the event of a prolonged delay for a parking/gate position (even though doors are closed and the engines are running).

(3) Announcements shall be made during boarding of the aircraft to inform passengers of the restrictions applicable to PEDs (in particular to T-PEDs) before fastening their seat belts.

(4) Where in-seat electrical power supplies are available for passenger use of the following shall apply:

(i) Information cards giving safety instructions are provided to the passengers;
(ii) PEDs should be disconnected from any in-seat electrical power supply, during taxiing, take-off, approach, landing, and during abnormal or emergency conditions; and
(iii) Flight crew and cabin crew should be aware of the proper means to switch-off in-seat power supplies used for PEDs.

(5) During boarding and any phase of flight:
(i) Appropriate coordination between flight crew and cabin crew is defined to deal with interference or other safety problems associated with PEDs;
(ii) passenger use of equipment during the flight is monitored;
(iii) suspect equipment is switched off; and
(iv) particular attention is given to passenger misuse of equipment that could include a built-in transmitting function.

(6) Thermal runaways of batteries, in particular lithium batteries, and potential resulting fire can be handled properly.

(7) Appropriate coordination between flight crew and cabin crew shall be defined to deal with interference or other safety problems associated with PEDs.

(8) The commander may for any reason and during any phase of flight require deactivation and stowage of PEDs.

(9) Occurrences of suspected or confirmed interference that have potential safety implications shall be reported to the Authority. Where possible, to assist follow-up and technical investigation, reports should describe the offending device, identify the brand name and model number, its location in the aircraft at the time of the occurrence, interference symptoms and the results of actions taken by the crew. The cooperation of the device owner shall be sought by obtaining contact details.

(10) Special requests to operate a PED or T-PED during any phase of the flight for specific reasons (e.g. for security measures) shall be handled properly.

(c) ***Restrictions on the use of PEDs in the flight compartment.*** Due to the higher risk of interference and potential for distracting crew from their duties, PEDs should not be used in the flight compartment. However, the operator may allow the use of PEDs, e.g. to assist the flight crew in their duties, if procedures are in place to ensure the following:

(1) The conditions for the use of PEDs in-flight are specified in the operations manual, otherwise they shall be switched off and stowed during all phases of flight.

(2) The PEDs do not pose a loose-item risk or other hazard.

(3) During critical phases of flight only those C-PEDs are operated, for which the operator has demonstrated that the radio frequency (RF) interference levels are below those considered acceptable for specific aircraft environment. Guidance for such test is provided in (e) below.

(4) During pre-flight procedures, e.g. when loading route information into navigation systems or when monitoring fuel loading, no T-PED shall be operated. In all other cases, flight crew and other persons on board the aircraft involved in dispatching the aircraft shall observe the same restrictions as applicable to passengers.

(5) These restrictions should not preclude use of a T-PED (specifically a mobile phone) by the flight crew to deal with an emergency. However, reliance should not be predicated on a TPED for this purpose.

(d) ***PEDs not accessible during the flight.*** PEDs shall be switched off, when not accessible for deactivation during flight. This shall apply especially to PEDs contained in baggage or transported as part of the cargo. The operator may allow deviation for PEDs for which tests have demonstrated their safe operation. Other precautions, such as transporting in shielded, metal boxes, may also be used to mitigate associated risks. In case an automated function is used to deactivate a T-PED, the unit shall be qualified for safe operation on board the aircraft.

(e) ***Test methods.*** The means to demonstrate that the RF radiations (intentional or non-intentional) are tolerated by aircraft systems should be as follows:

(1) The radio frequency (RF) emissions of PEDs should meet the levels as defined by EUROCAE ED-14E/RTCA DO 160E Section 21 Category M for operation in the passenger compartment and EUROCAE ED-14E/RTCA DO 160E Section 21 Category H for operation in the cargo bay. Later revisions of those documents may be used for testing. The assessment of intentional transmissions of T-PEDs is excluded from those test standards and needs to be addressed separately.

(2) When the operator intends to allow the operation of T-PEDs, its assessment should follow the principles set out in EUROCAE ED-130.

(3) The AUTHORITY reminds operators to consider the applicable telecommunication regulations before allowing the use of transmitting functions on-board aircraft.

GM-1 to AMC OPS-3.110 Definitions of PEDs DEFINITIONS

(a) ***Definition and categories of PEDs***

PEDs are any kind of electronic device, typically but not limited to consumer electronics, brought on board the aircraft by crew members, passengers, or as part of the cargo and that are not included in the approved aircraft configuration. All equipment that is able to consume electrical energy falls under this definition. The electrical energy can be provided from internal sources as batteries (chargeable or non-rechargeable) or the devices may also be connected to specific aircraft power sources.

(1) ***PEDs fall into three categories:***

(a) ***Non-intentional transmitters*** can non-intentionally radiate RF transmissions. This category includes, but is not limited to, computing equipment, cameras, radio receivers, audio and video reproducers, electronic games and toys. In addition, portable, non-transmitting devices provided to assist crew members in their duties are included in this category. The category is identified as PED.

(b) ***Intentional transmitters*** can radiate RF transmissions on specific frequencies as part of their intended function. In addition, they may radiate non-intentional transmissions like any PED. The term 'transmitting PED' (T-PED) is used to identify the transmitting capability of the PED. Intentional transmitters are transmitting devices such as RF based remote control equipment, which may include some toys, two-way radios (sometimes referred to as private mobile radio), mobile phones of any type, satellite phones, computer with mobile phone data connection, wireless fidelity (WIFI) or Bluetooth capability. After deactivation of the transmitting capability, e.g. by activating the so called 'flight mode' or 'flight safety mode', the T-PED remains a PED having non- intentional emissions.

(c) ***A controlled PED (C-PED)*** is subject to administrative control by the operator. This will include, inter alia, tracking the location of the devices to specific aircraft or persons and ensuring that no unauthorized changes are made to the hardware, software or databases. A controlled PED will also be subject to procedures to ensure that it is maintained to the latest amendment state. C-PEDs can be assigned to the category of non-intentional transmitters (PEDs) or intentional transmitters (T-PEDs).

(b) ***Definition of the switched-off status***

Many PEDs are not completely disconnected from the internal power source when switched off. The switching function may leave some remaining functionality e.g. data storage, timer, clock, etc. These devices can be considered switched off when in the deactivated status. The same applies for devices having no transmit capability and operated by coin cells without further deactivation capability, e.g. wrist watches.

GM-2 to AMC OPS-3.110 Fire risk from PEDs FIRE CAUSED BY PEDs

A detailed discussion of fire caused by PEDs can be found in CAA UK CAP 789 edition 2, chapter 31, section 6 Fires in the cabin caused by PEDs and CAA PAPER 2003/4, Dealing with In-Flight Lithium Battery Fires in Portable Electronic Devices, M.J. Lain, D.A. Teagle, J. Cullen, V. Dass.

AC OPS 3.125 Documents to be Carried

(See OPS 3.125)

The Certificate of Registration and Certificate of Airworthiness will now be presented in digital format. The certificates, when issued by the Authority, are rendered valid as the original documents in their digital form. They satisfy the on-board carriage requirements for aircraft engaged in international air navigation in accordance with Articles 29 and 31 of the Convention on International Civil Aviation as well as the requirements of Annex 7 and 8 to the same Convention.

The procedures for the carriage of an electronic version of the documents listed in OPS 3.125(a) must be acceptable to the Authority.

AMC OPS-3.125(a)(10) Documents to be carried

The Article 83 *bis* Agreement Summary shall be accessible to safety inspectors and shall state the following information as advised in the registration of that agreement with ICAO. (See CAR OPS-3.170(b))

5.6 ARTICLE 83 *bis* AGREEMENT SUMMARY TEMPLATE

AGREEMENT SUMMARY		
Title of the Agreement:		
State of Registry:		Focal point:
State of the Operator/State of the principal location of a general aviation operator (PLG):		Focal point:
Date of signature[1]:	By State of Registry:	
	By State of the Operator/PLG:	
Duration[1]:	Start Date:	End Date:
Languages of the Agreement:		
ICAO Registration No.:		
Umbrella Agreement (if any) with ICAO Registration number:		

Chicago Convention	ICAO Annexes affected by the transfer to the State of the Operator/PLG of responsibility in respect of certain functions and duties			
Article 12: Rules of the Air	Annex 2, all chapters	Yes		
		No		
Article 30 a): Aircraft radio equipment	Radio Station Licence	Yes		
		No		
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6 and Annex 6 Part I, Radio Operator or Part III, Section II, Composition of the flight crew (radio operator) and/or Part II, Qualifications and/or Flight crew member licensing or Part III, Section III, Qualifications	Yes		Annex 6: [Specify Part and paragraph][2]
		No		
Article 31: Certificates of Airworthiness	Annex 6, Part I or Part III, Section II	Yes		[Specify Part and chapters][2]
		No		
	Annex 6, Part II or Part III, Section III	Yes		[Specify Part and chapters][2]
		No		
	Annex 8, Part II, Chapters 3 and 4	Yes		[Specify chapters][2]
		No		

Aircraft affected by the transfer of responsibilities to the State of the Operator/PLG					
Aircraft make, model, series	Nationality and registration marks	Serial No.	AOC # (Commercial Aviation)	Lease/Charter/ Interchange From date[1]	Lease/Charter/ Interchange To date[1]

[1] (dd/mm/yyyy).
[2] Square brackets indicate information that needs to be provided.

AMC OPS-3.130 Manuals to be carried

(See CAR OPS-3.130)

The carriage of an approved electronic version of the Operations Manual is acceptable.

AMC OPS-3.135 (b) Additional Information and Forms carried

The use of an Electronic Flight Bag (EFB) requires an operational approval which will be reflected in the Operations Specifications. The intent and objectives of the requirements to perform an operational evaluation of an EFB system and its commonly used functions are contained in ICAO Document 10020.

Manual on Electronic Flight Bags (EFBs). Guidance material established within ICAO Document 10020 is considered an acceptable means to comply with CAR OPS-3.135(b).

AMC OPS-3.138 Electronic Flight Bag

To enable approving the use of EFBs, the applicant shall ensure that:

(a) the EFB equipment and its associated installation hardware, including interaction with Helicopter systems if applicable, meet the appropriate airworthiness requirements;

(b) the operator has assessed the safety risks associated with the operations supported by the EFB function(s);

(c) the operator has established requirements for redundancy of the information (if appropriate) contained in and displayed by the EFB function(s);

(d) the operator has established and documented procedures for the management of the EFB function(s) including any database it may use; and

(e) the operator has established and documented the procedures for the use of, and training requirements for, the EFB and the EFB function(s).

AC OPS-3.160(a)(1) and (2) Preservation of Recordings

(See CAR OPS-3.060(a)(1) and (2))

In CAR OPS-3.160(a)(1) and (2), the phrase 'to the extent possible' means that either:

(a) There may be technical reasons why all of the data cannot be preserved; or

(b) The Helicopter may have been dispatched with unserviceable recording equipment as permitted by the CAR OPS-3.700, 3.715, or 3.720 and relevant MEL Policy.

AC OPS-3.165(c)(2) Leasing of Helicopters between an Omani operator and any entity

(See CAR OPS-3.165 (c)(2))

(a) The Authority may approve individually Omani operators provided that:

  (a) The lessor is an operator holding an AOC issued by a State which is a signatory to the Convention on International Civil Aviation; and

  (b) Unless otherwise agreed by the Authority of the lessee, the lessee audits the operation of the lessor to confirm compliance with operating and aircrew training standards equivalent to CAR OPS-3, maintenance standards equivalent to CAR-145, and aircraft certification standards as prescribed; and

  (c) The routes intended to be flown are contained within the authorised areas of operations specified in the AOC of the lessor; and

  (d) For the duration of the lease, the flight and duty time limitations and rest requirements used by the lessor are not more permissive than apply in CAR OPS-3.

(b) Lessors, when first approved by the Authority, and any revalidations, remain valid for a period not exceeding twelve (12) months.

Note 1: The lessee is responsible for providing information to the Authority to support the initial application and any revalidations.

AMC OPS-3.165(e) Transfer Agreement as State of Registry under Article 83bis

Transfer of functions and duties as State of Registry under Article 83bis of the Chicago Convention (see CAR OPS-3.165 (e)). The Authority shall carry out the following evaluation before entering into agreement to transfer its responsibilities:

(a) Ensure that the foreign State is a party to Article 83bis;

(b) Carry out an assessment of the capability of the foreign State accepting the transfer, including the recognition of duties and functions under Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention issued/renewed by the foreign State;

(c) Ensure that the commercial agreement (for example, the lease) includes terms that give rise to the transfer agreement. The aircraft concerned shall be clearly identified in the agreement by including reference to the aircraft type, registration and serial number.

Note 1: The duration of the transfer agreement shall not exceed the period covered by the corresponding commercial agreement. Accordingly, the period of validity of the transfer should be mentioned in the transfer agreement taking into consideration that the registration of the aircraft concerned will not be changed.

Note 2: The duties and functions to be transferred must be specifically mentioned in the transfer agreement as, in absence of such mention, they are deemed to remain with the Authority.

AMC OPS-3.165(f) Transfer Agreement as State of Operator under Article 83bis

Acceptance of transfer of functions and duties as State of Operator under article 83bis of the Chicago Convention (see CAR OPS-3.165 (f)), Oman, as a State of the operator, shall carry out the following evaluation before accepting the transfer of responsibilities from the State of Registry:

(a) ensure that the foreign State(s) is/are a party to the Article 83bis agreement;

(b) ensure that the commercial agreement (for example, the lease) includes terms that give rise to the transfer agreement including the recognition, by the Authority, of issuing/renewing licenses/certificates under Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention which were issued/renewed by the State of Registry. The aircraft concerned shall be clearly identified in the agreement by including reference to the aircraft type, registration and serial number;

Note: The duration of the transfer agreement shall not exceed the period covered by the corresponding commercial agreement. Accordingly, the period of validity of the transfer should be mentioned in the transfer agreement taking into consideration that the registration of the aircraft concerned will not be changed.

(c) ensure that the Omani operator continuously carries a certified true copy of the transfer agreement and AOC under which the aircraft is operated at all times, while the transfer agreement is in force.

Note: The duties and functions to be accepted by the Authority under Article 12 (Rules of Air), Article30 (Aircraft Radio Equipment), Article31 (Certificate of Airworthiness) and Article32(a) (Licenses of Personnel) of the Chicago Convention must be mentioned specifically in the transfer agreement as, in absence of such mention, they are deemed to remain with the State of Registry.

SECTION 1 - SUB PART C – OPERATOR CERTIFICATION AND SUPERVISION

CAR OPS-3.175 General rules for Air Operator Certification/Authorisation

(See GM-1 OPS-3.175, GM-2 OPS-3.175(d)(2), & AMC-1 OPS-3.175(j), AMC- 2 OPS-3.175(k) & (l) and AMC-4 OPS-3.175(t))

Note 1: Appendix 1 to this regulation specifies the contents and conditions of the AOC.

Note 2: Appendix 2 to this regulation specifies the management and organisation requirements.

Note 3: Unless otherwise specified by the Authority, all private Helicopters shall meet these requirements for the issuance of an authorization to operate.

Note 4: The air operator certificate shall contain at least the following:

(i) *the State of the Operator and the issuing Authority;*

(ii) *the air operator certificate number and its expiration date;*

(iii) *the operator's name, trading name (if different) and address of the principal place of business;*

(iv) *the date of issue and the name, signature and title of the Authority representative; and*

(v) *in the Operational Points of Contact reference, where the contact details of operational management may be found.*

(a) An operator shall not operate a Helicopter for the purpose of commercial/private air transportation otherwise than under, and in accordance with, the terms and conditions of a valid Air Operator Certificate (AOC)/Authorization issued by the CAA of the operator.

(b) The air operators' certificate shall authorise the operator to conduct air transport operations in accordance with the operations specifications.

Note: Unless otherwise specified, reference to an Air Operator Certificate includes the operations specifications associated with the air operator certificate.

(c) An applicant for an AOC/Authorization, or variation of an AOC/Authorization, shall allow the Authority to examine all safety aspects of the proposed operation.

(d) An applicant for an AOC/Authorization must:

(1) Not hold an AOC/Authorization issued by another Authority unless specifically approved by the Authorities concerned;

(2) Have his principal place of business and, if any, his registered office located in the Oman; (See GM-2 OPS-3.175(d)(2).

(3) Have registered the Helicopters which are to be operated under the AOC/Authorization in the Sultanate of Oman; and

(4) Satisfy the Authority that he is able to conduct safe operations.

(e) Notwithstanding sub-paragraph (d)(3) above, an operator may operate, with the mutual agreement of the Authority issuing the AOC/Authorization and another Authority, Helicopters registered on the national register of the second-named Authority.

(f) An operator shall grant the Authority access to his organisation and Helicopters and shall ensure that, with respect to maintenance, access is granted to any associated CAR-145 maintenance organisation, to determine continued compliance with CAR OPS-3.

(g) An AOC/Authorization will be varied, suspended or revoked if the Authority is no longer satisfied that the operator can maintain safe operations.

(h) The operator must satisfy the Authority that;

(1) Its organisation and management are suitable and properly matched to the scale and scope of the operation; and

(2) Procedures for the supervision of operations have been defined.

(i) The operator shall have nominated an Accountable Manager acceptable to the Authority, who has corporate Authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority. (See AMC OPS-3.035).

(j) The operator shall have nominated post-holders, acceptable to the Authority, who are responsible for the management and supervision of the following areas,
  (1) Flight operations;
  (2) The maintenance system;
  (3) Crew training;
  (4) Ground operations;
  (5) Aviation Security;
  (6) Nomination of accountable managers responsible for:
    A. Quality Assurance.
    B. SMS

  Note 1: See AMC-1 OPS 3.175(j) Nominated Post-holders – Competence

  Note 2: Para (6) may be one or two persons who will have direct access to the Accountable Manage

(k) A person may hold more than one of the nominated posts if acceptable to the Authority but, for operators who employ twenty-one (21) or more full-time staff, a minimum of two persons are required to cover all the areas of responsibility with the exception to the Quality Assurance. (See AMC-3 OPS-3.175(k) & (l) Employment of staff).

(l) For operators who employ twenty (20) or less full-time staff, one or more of the nominated posts may be filled by the Accountable Manager, if acceptable to the Authority. (See AMC-1 OPS-3.175 (j))

(m) The operator shall ensure that every flight is conducted in accordance with the provisions of the Operations Manual.

(n) The operator shall arrange appropriate ground handling facilities to ensure the safe handling of its flights. Operator shall ensure that any inadequacy of facilities observed in the course of operations is reported to the Authority responsible for them without undue delay.

  Note: The operator maintains permanently its ground handling responsibility even when all or part of the functions and tasks related to ground handling services have been contracted to a service provider.

(o) The operator shall ensure that its Helicopters are equipped and its crews are qualified, as required for the area and type of operation.

(p) The operator must comply with the maintenance requirements, in accordance with CAR-M Subpart G, for all Helicopters operated under the terms of its AOC/Authorization.

(q) The operator shall provide the Authority with a copy of the Operations Manual, as specified in Subpart P and all amendments or revisions to it.

(r) The operator shall maintain operational support facilities at the main operating base, appropriate for the area and type of operation.

(s) The operator shall be subjected to a continued surveillance conducted by the Authority and shall ensure that the required standards of operations established are maintained.

(t) Operators required to employ cabin crew shall appoint a person or group of persons, as part of their operational management personnel as per the CAA approved organisational structure, to manage the overall supervision of Cabin Crew under their Authority.
  (See AMC- 4 OPS-3.175(t))

CAR OPS-3.180 Issue, variation and continued validity of an AOC/Authorisation

(a) An operator will not be granted an AOC/Authorisation, or a variation to an AOC/Authorisation, and that AOC/Authorisation will not remain valid unless:
  (1) Helicopters operated have a valid Certificate of Airworthiness;

(2) The maintenance system has been approved by the Authority in accordance with CARM, Subpart G; and

(3) He has satisfied the Authority that he has the ability to:

(i) Establish and maintain an adequate organisation;

(ii) Establish and maintain a quality system in accordance with CAR OPS-3.035

(iii) Comply with required training programmes;

(iv) Comply with maintenance requirements, consistent with the nature and extent of the operations specified, including the relevant items prescribed in CAR OPS-3.175(g) to (o); and

(v) Comply with CAR OPS-3.175.

(vi) Comply with Safety Management System requirements as prescribed in CAR OPS-3.037.

(b) Notwithstanding the provisions of CAR OPS-3.185(f), the operator shall notify the Authority as soon as practicable of any changes to the information submitted in accordance with CAR OPS-3.185 (a) below.

(c) If the Authority is not satisfied that the requirements of subparagraph (a) above have been met, the Authority may require the conducting of one or more demonstration flights, operated as if they were commercial air transport flights.

(d) The Authority has established a system for both the certification and the continued surveillance of the operator to ensure that the required standards of operations established in this Subpart are maintained.

CAR OPS-3.185 Administrative requirements

(See GM to OPS-3.185(b))

(a) An operator shall ensure that the following information is included in the initial application for an AOC/Authorisation and, when applicable, any variation or renewal applied for:

(1) The official name and business name, address and mailing address of the applicant;

(2) A description of the proposed operation;

(3) A description of the management organisation;

(4) The name of the accountable manager;

(5) The names of nominated post-holders, including those responsible for flight operations, the maintenance system, crew training, aviation security, quality assurance and ground operations together with their qualifications and experience; and

(6) The Operations Manual.

(b) In respect of the operator's maintenance system only, the following information must be included in the initial application for an AOC/authorisation and, when applicable, any variation or renewal applied for, and for each Helicopter type to be operated):

(1) The operator's CAME;

(2) The operator's Helicopter maintenance programme(s);

(3) The Helicopter technical log;

(4) Where appropriate, the technical specification(s) of the maintenance contract(s) between the operator and any approved maintenance organisation;

(5) The number of Helicopters.

(c) The application for an initial issue of an AOC/authorisation must be submitted at least ninety (90) days before the date of intended operation except that the Operations Manual may be submitted later but not less than sixty (60) days before the date of intended operation.

(d) The application for the variation of an AOC/authorisation must be submitted at least thirty (30) days, or as otherwise agreed, before the date of intended operation.

(e) The application for the renewal of an AOC must be submitted at least thirty (30) days, or as otherwise agreed, before the end of the existing period of validity.

(f) Other than in exceptional circumstances, the Authority must be given at least ten (10) days prior notice of a proposed change of a nominated post-holder.

(g) The operator shall ensure that pilots are knowledgeable with the descriptions and the authorisations that it contained in its AOC and Operations Specifications and to add AOC and Operations specifications specimen and its descriptions in the administration and control of the operations manual part A.

(h) The operator shall develop policies and procedures for third parties that perform work on its behalf.

Appendix 1 to CAR OPS-3.175 Contents and conditions of the Air Operator Certificate

(a) An AOC specifies the:
   - (1) For use of the State of the Operator.
   - (2) Name of the State of the Operator.
   - (3) Identification of the issuing Authority of the State of the Operator.
   - (4) AOC number, AC: Air Carrier, AT: Air Transport, PO: Private Operator.
   - (5) Date after which the AOC ceases to be valid (dd-mm-yyyy).
   - (6) Operator's registered name.
   - (7) Operator's trading name, if different. "dba" (for "doing business as").
   - (8) Operator's principal place of business address.
   - (9) Operator's principal place of business telephone, fax and E-mail.
   - (10) The contact details include the telephone and fax numbers, including the country code, and the e-mail address (if available) at which operational management can be contacted without undue delay for issues related to flight operations, airworthiness, flight and cabin crew competency, dangerous goods and other matters as appropriate will be in the operations specifications.
   - (11) Insert the controlled document, carried on board, in which the contact details are listed, with the appropriate paragraph or page reference, e.g.: "Contact details as listed in the operations manual, Gen/Basic, Chapter 1, 1.1 "or "... are listed in the operations specifications, page 1" or are listed in an attachment to this document ".
   - (12) Operator 's registered name.
   - (13) Insertion of reference to the appropriate civil aviation regulations.
   - (14) Issuance date of the AOC (dd-mm-yyyy).
   - (15) Title, name and signature of the Authority representative. In addition, an official stamp may be applied on the AOC.

(b) Content and format of Operations Specifications - See remarks for any item not filled or for specific approval / authorisation
   - (1) Telephone, fax and E-mail contact details of the Authority.
   - (2) Associated AOC number.
   - (3) Operator's registered name and the operator's trading name, if different. "dba" (for "doing business as").
   - (4) Issuance date of the operations specifications (dd-mm-yyyy) and signature of the Authority representative.
   - (5) Commercial Aviation Safety Team (CAST)/ICAO designation of the aircraft make, model and series, or master series, if a series has been designated (e.g. Bell-47G-3 or SIKORSKY-S55. CAST/ICAO taxonomy is available at: http://www.intlaviationstandards.org.
   - (6) Other type of transportation to be specified (e.g. emergency medical service).

(7) Geographical area(s) of authorized operation (by geographical coordinates or specific routes, flight information region or national or regional boundaries).
(8) List the applicable special limitations (e.g. VFR only, day only).
(9) List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria). e.g. Dangerous Goods, LVO
(10) Applicable Instrument Approach Operation Classified as Type B (CAT II, etc.). Only the minimum RVR in metres and decision height in feet will be displayed. One line is used per listed approach category.
(11) Minimum take-off RVR in metres or the equivalent horizontal visibility if RVR is not used. One line per approval may be used if different approvals are granted.
(12) List the airborne capabilities (i.e. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.
(13) Performance-based navigation (PBN): one line is used for each PBN AR navigation specification approval (e.g. RNP AR APCH), with appropriate limitations listed in the "Description" column.
(14) Insert the name of the person/organisation responsible for ensuring that the continuing airworthiness of the helicopter is maintained and the regulation that requires the work, i.e. within the AOC regulation or a specific approval (e.g. CAR M).
(15) List the EFB functions with any applicable limitations
(16) Other authorizations or data can be entered here, using one line (or one multi-line block) per authorization (e.g. special approach authorization, specification of which performance class(es) the aircraft can be operated in).

Note 1: An Authorisation issued to a Private Operator may contain similar content and conditions.

Note 2: Refer to ICAO Annex 6, Part III, Appendix 3. Air Operator Certifications, for detail operations specifications.

Appendix 2 to CAR OPS-3.175 Management and organisation of an AOC/Authority holder

(a) ***General:*** an operator must have a sound and effective management structure in order to ensure the safe conduct of air operations. Nominated post-holders must have managerial competency together with appropriate technical/operational qualifications in aviation.

(b) ***Nominated post-holders:***
(1) A description of the functions and the responsibilities of the nominated post- holders, including their names, must be contained in the Operations Manual and the Authority must be given notice in writing of any intended or actual change in appointments or functions.
(2) The operator must make arrangements to ensure continuity of supervision in the absence of nominated post-holders.
(3) A person nominated as a post-holder by the holder of an AOC/Authority must not be nominated as a post-holder by the holder of any AOC/Authority, unless acceptable to the Authorities concerned.
(4) Persons nominated as post-holders must be contracted to work sufficient hours to fulfil the management functions associated with the scale and scope of the operation.

(c) ***Adequacy and supervision of staff:***
(1) ***Crew members.*** The operator must employ sufficient flight and cabin crew for the planned operation, trained and checked in accordance with Subpart N and Subpart O as appropriate.
(2) ***Ground Staff:***
(i) The number of ground staff is dependent upon the nature and the scale of operations.

Operations and ground handling departments, in particular, must be staffed by trained personnel who have a thorough understanding of their responsibilities within the organisation.

(ii) An operator contracting other organisations to provide certain services, retains responsibility for the maintenance of proper standards. In such circumstances, a nominated post-holder must be given the task of ensuring that any contractor employed meets the required standards.

(iii) All ground handling operations must be described in a relevant section of Operations Manual or in a separate volume (Ground Handling Manual).

(3) ***Supervision:***

(i) The number of supervisors to be appointed is dependent upon the structure of the operator and the number of staff employed.

(ii) The duties and responsibilities of these supervisors must be defined, and any other commitments arranged so that they can discharge their supervisory responsibilities.

(iii) The supervision of crew members and ground staff must be exercised by individuals possessing experience and personal qualities sufficient to ensure the attainment of the standards specified in the operations manual.

(d) ***Accommodation facilities:***

(1) An operator must ensure that working space available at each operating base is sufficient for personnel pertaining to the safety of flight operations. Consideration must be given to the needs of ground staff, those concerned with operational control, the storage and display of essential records, and flight planning by crews.

(2) Office services must be capable, without delay, of distributing operational instructions and other information to all concerned.

(e) ***Documentation:***

(1) The operator must make arrangement for the production of manuals, amendments and other documentation.

GM-1 OPS-3.175 The management organisation of an AOC/Authorisation holder
(See CAR OPS-3.175(h) to (l) and (t))

(a) Function and Purpose
   (1) The safe conduct of air operations is achieved by an operator and an Authority working in harmony towards a common aim. The functions of the two bodies are different, well defined, but complementary. In essence, the operator complies with the standards set through putting in place a sound and competent management structure. The Authority working within a framework of law (statutes), sets and monitors the standards expected from operators.

(b) Responsibilities of Management
   (1) The responsibilities of management related to CAR OPS-3 should include at least the following five main functions:
      (i) Determination of the operator's flight safety policy;
      (ii) Allocation of responsibilities and duties and issuing instructions to individuals, sufficient for implementation of company policy and the maintenance of safety standards;
      (iii) Monitoring of flight safety standards;
      (iv) Recording and analysis of any deviations from company standards and ensuring corrective action;
      (v) Evaluating the safety record of the company in order to avoid the development of undesirable trends.

GM-2 OPS-3.175(d)(2) Principal place of business
(See CAR OPS-3.175(d)(2))

(a) CAR OPS-3.175(d)(2) requires an operator to have his principal place of business located in Oman.
(b) In order to ensure proper jurisdiction over the operator, the term 'principal place of business' is interpreted as meaning the State in which the administrative headquarters and the operator's financial, operational and maintenance management are based.
(c) If maintenance, continuing airworthiness functions or operational control is outsourced, the registered office in Sultanate of Oman must demonstrate, to the Authority, the ability to ensure regulatory compliance.

AMC OPS-3.175(i) Nominated Persons

(a) The person may hold more than one of the nominated posts if such an arrangement is considered suitable and properly matched to the scale and scope of the operation.
(b) A description of the functions and the responsibilities of the nominated persons, including their names, should be contained in the operations manual.
(c) The holder of an AOC should make arrangements to ensure continuity of supervision in the absence of nominated persons and these arrangements must be in the Operations Manual.
(d) The person nominated by the holder of an AOC should not be nominated by another holder of an AOC, unless agreed with the competent authorities concerned.
(e) Persons nominated should be contracted to work sufficient hours to fulfil the management functions associated with the scale and scope of the operation.

AMC OPS-3.175(j) Accountable Manager
(See CAR OPS-3.175)

(a) The Accountable Manager is the person acceptable to the Authority who has corporate authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority, and any additional requirements defined by the operator.

(b) The Accountable Manager's responsibilities include:

(c) Being the single, identifiable person having responsibility for the effective and efficient performance of the organisation including the Safety Management System (SMS).

(d) Having direct responsibility for the conduct of the organisation's affairs.

(e) Ensuring that all necessary resources are available to accomplish the standards defined in the CAA requirements and the organisation's approved manuals.

(f) having ultimate responsibility for operational standards and compliance with the relevant regulations

(g) having full authority for financial matters.

(h) having full authority for human resources.

(i) having final responsibility for all safety and quality functions and standards.

(j) establishing and promote the safety and quality policy specified in the applicable regulations.

(k) demonstrating a basic understanding of the regulations applicable to the CAA approval granted.

AMC-1 OPS-3.175(j) Nominated Post-holders – Competence
(See CAR OPS-3.175(j))

(a) ***General.*** Nominated Post-holders are expected to satisfy the Authority that they possess the appropriate experience and licensing requirements which are listed in paragraphs (2) to (6) below. In particular cases, and exceptionally, the Authority may accept a nomination which does not meet the requirements in full but, in this circumstance, the nominee should be able to demonstrate experience which the Authority will accept as being comparable and also the ability to perform effectively the functions associated with the post and with the scale of the operation.

(b) ***Nominated post-holders*** should have:

 (1) Practical experience and expertise in the application of aviation safety standards and safe operating practices;

 (2) Comprehensive knowledge of:

  (i) OPS and any associated requirements and procedures;

  (ii) The AOC holder's Operations Specifications;

  (iii) The need for, and content of, the relevant parts of the AOC holder's Operations Manual;

 (3) Familiarity with Quality and Safety Management Systems;

 (4) Appropriate management experience in a comparable organisation; and

 (5) Five years relevant work experience of which at least two years should be from the aviation industry in an appropriate position.

(c) ***Flight Operations.*** The nominated post-holder or his deputy should hold a valid Flight Crew License appropriate to the type of operation conducted under the AOC in accordance with the following:

 (1) If the AOC/Authorisation includes Helicopters certificated for a minimum crew of 2 pilots - An Airline Transport Pilot's License (ATPL) issued or validated by the Authority:

 (2) If the AOC/Authorisation is limited to Helicopters certificated for a minimum crew of 1 pilot - A Commercial Pilot's License (CPL), and if appropriate to the operation, an Instrument Rating issued or validated by the Authority.

(d) ***Maintenance System.*** The nominated post-holder should possess the following:

 (1) Relevant engineering degree, or aircraft maintenance technician with additional education acceptable to the Authority. 'Relevant engineering degree' means an engineering degree from Aeronautical, Mechanical, Electrical, Electronic, Avionic or other studies relevant to the maintenance of aircraft/aircraft components.

 (2) Thorough familiarity with the organisation's Maintenance Management Exposition.

 (3) Knowledge of the relevant type(s) of aircraft.

(4) Knowledge of maintenance methods.

(e) ***Crew Training.*** The nominated post-holder or his deputy should be a current Type Rating Instructor on a type/class operated under the AOC/Authorisation.

(1) The nominated post-holder should have a thorough knowledge of the AOC/Authorisation holder's crew training concept for Flight Crew and for Cabin Crew when relevant.

(f) ***Ground Operations.*** The nominated post-holder should have a thorough knowledge of the AOC/Authorisation holder's ground operations concept.

(g) ***Security.*** The nominated post-holder should have a thorough knowledge of the National Civil Aviation Security Programme, the operator's security programme, security training requirements and threat assessment.

AMC-2 OPS-3.175(k) & (l) Combination of nominated post-holder's responsibilities

(See CAR OPS 3.175(k) & (l))

(a) The acceptability of a single person holding several posts, possibly in combination with being the accountable manager as well, will depend upon the nature and scale of the operation. The two main areas of concern are competence and an individual's capacity to meet his responsibilities.

(1) In accordance with CAR OPS-3.175 (k), the Accountable Manager can hold one or more nominated posts only in operators who employ 20 or less full-time staff. If the Accountable Manager is accepted also as QA Post Holder, the quality audits should be conducted by independent personnel.

(2) The Authority may accept, depending on the complexity and size of operations, the QA Post Holder to hold the SMS position as well subject to compliance audits of the SMS being performed by independent personnel.

(3) The area of responsibility of a Post Holder that is also accepted as SMS Post Holder should be subject to SMS audits performed by independent personnel.

(b) As regards competence in the different areas of responsibility, there should not be any difference from the requirements applicable to persons holding only one post.

(c) The capacity of an individual to meet his responsibilities will primarily be dependent upon the scale of the operation. However, the complexity of the organisation or of the operation may prevent, or limit, combinations of posts which may be acceptable in other circumstances.

(d) In most circumstances, the responsibilities of a nominated post-holder will rest with a single individual. However, in the area of ground operations, it may be acceptable for these responsibilities to be split, provided that the responsibilities of each individual concerned are clearly defined and accepted by the CAA.

(e) The intent of CAR OPS-3.175 is neither to prescribe any specific organisational hierarchy within the operator's organisation nor to prevent an Authority from requiring a certain hierarchy before it is satisfied that the management organisation is suitable.

AMC-3 OPS-3.175(k) & (l) Employment of staff

(See CAR OPS-3.175(k) & (l))

In the context of CAR OPS-3.175(k) & (l), the expression "full-time staff" means members of staff who are employed for not less than 35 hours per week excluding vacation periods. For the purpose of establishing the scale of operation, administrative staff, not directly involved in operations or maintenance, should be excluded.

AMC-4 OPS-3.175(t) Responsibilities of appointed person or group of persons

(a) Ensure a current and approved Cabin Safety Procedures Manual is in place;
(b) Ensure current and approved Cabin Crew training programs are in place;
(c) Plan, schedule, and facilitate Cabin Crew training in accordance with the approved training programs;
(d) Assist in the development and facilitation of joint flight operations-cabin safety training programs (i.e., security, crew resource management, interference with crew members, etc.);
(e) Maintain Cabin Crew training records;
(f) Analyse the operator's cabin safety standards, make the necessary recommendations and advise the Authority if necessary;
(g) Write, distribute, and track acknowledgement of Operational Memos and Safety & Procedures Bulletins to the Cabin Crew;
(h) Participate in the Company's Safety Management System through the reporting, investigation and distribution of cabin safety related occurrence reports; and following up on implementing the recommendations;
(i) Receive, process, and respond to Cabin Crew trip reports relative to operational issues in a timely manner;
(j) Develop, maintain and approve operator's Safety Briefing Cards for all company aircraft;
(k) Develop, maintain and approve operator's pre-departure safety briefing either (personally or through a video);
(l) Develop, document, and maintain cabin safety policies, processes, and procedures;
(m) Ensure the allocation of a pre-flight briefing area with privacy;
(n) Ensure the Cabin Crew rosters are:
  (1) designed in a manner to reduce hazards caused by Human Factor and Human Performance; or
  (2) in compliance with CAR OPS-3 Subpart Q as applicable;
(o) Prepare a Pre-flight briefing checklist that contains all documents required by the CAA;

AMC to Appendix 2(b)(4) to OPS-3.175 Nominated Post Holders/Managers – Flight & Duty Time requirements

(a) Occupying a managerial post induces fatigue, consequently Flight & Duty Time requirements (subpart Q) also apply to those staff combining office work and flying duty.
(b) It is responsibility of the operator and post-holder/ concerned manager to evaluate the risk and ensure that an acceptable level of safety is ensured considering that Subpart Q applies to them in totality.
(c) The Operator may decide and implement a mechanism (acceptable to the CAA and endorsed in the OM-A) that would allow a balanced combination of both type of duties with due consideration to office working patterns, flexible allocation of flight duties, and time off.
(d) The proposed mechanism should be based on block time off from managerial and flight duties, quantified as per the amount of time off entitled by office staff (weekends and holidays), considering disrupted flight patterns (24 hour per 7 days week) and overtime.

GM OPS-3.185(b) Maintenance Management Exposition details

(See CAR OPS-3.185(b))

(a) The organisation's Maintenance Management Exposition should reflect the details of any sub-contract(s).
(b) A change of Helicopter type or of the approved maintenance organisation may require the submission of an acceptable amendment to the Maintenance Management Exposition.

Note: Refer to CAR M for additional information.

SECTION 1 - SUB PART D – OPERATIONAL PROCEDURES

CAR OPS-3.195 Operational Control

(See AMC OPS-3.195 Operational Control)

(a) An operator shall:
   (1) Establish and maintain a method of exercising operational control approved by the Authority; and
   (2) Exercise operational control over any flight operated under the terms of his AOC/Authorization.
   (3) Employ a Flight Operations Officer/ Flight Dispatcher, in accordance with the approved method of flight supervision requiring the services of qualified flight operations officer/flight dispatcher who shall be certified.
   (4) Establish and maintain a recognised and approved training programme for the certification process of Flight Operations Officer/ Flight Dispatcher, staffed by qualified and approved training personnel to deliver such training requirements.

(b) Responsibility for operational control shall be delegated only to the pilot-in-command and to a flight dispatcher if the operator's approved method of control and supervision of flight operations requires the use of flight dispatcher personnel.

(c) If an emergency situation which endangers the safety of the helicopter or persons becomes known first to the flight dispatcher, action by that person shall include, where necessary, notification to the appropriate authorities of the nature of the situation without delay, and requests for assistance if required. In the event of an emergency, a flight dispatcher shall:
   (1) Initiate such procedures as outlined in the operations manual while avoiding taking any action that would conflict with ATC procedures; and
   (2) Convey safety-related information to the pilot-in-command that may be necessary for the safe conduct of the flight, including information related to any amendments to the flight plan that become necessary in the course of the flight.

   Note: It is equally important that the pilot-in-command also convey similar information to the flight dispatcher during the course of the flight, particularly in the context of emergency situations.

(d) If an emergency situation which endangers the safety of the helicopter or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-incommand shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the Authority. Such reports shall be submitted as soon as possible and normally within ten days.

CAR OPS-3.200 Operations manual

An operator shall provide an Operations Manual in accordance with CAR OPS-3, Subpart P for the use and guidance of operations personnel, and it shall be reviewed, amended or revised as necessary to ensure that the information contained therein is kept up to date. The reviews shall be documented and the maximum interval between the reviews, amendments or revisions shall be conducted on a yearly basis or as required due to compliance changes, whichever comes first.

CAR OPS-3.205 Competence of operations personnel

(See AC OPS-3.205 Competence of Operations personnel)

An operator shall ensure that all personnel assigned to, or directly involved in, ground and flight operations are properly instructed, have demonstrated their abilities in their particular duties and are aware of their responsibilities and the relationship of such duties to the operation as a whole.

CAR OPS-3.207 Flight Dispatcher

(a) When the Authority requires that a flight dispatcher, employed in conjunction with an approved method of control and supervision of flight operations, flight dispatcher shall hold certified in accordance with the relevant provisions of CAN 4-14 and relevant regulation.

(b) In accepting proof of qualifications other than the option of holding of a flight dispatcher certification, the Authority, in accordance with the approved method of control and supervision of flight operations, shall require that, as a minimum, such persons meet the requirements specified in CAN 4-14 for the flight dispatcher certification.

(c) A flight dispatcher in conjunction with a method of control and supervision of flight operations shall:

(1) assist the pilot-in-command in flight preparation and provide the relevant information;

(2) assist the pilot-in-command in preparing the operational and ATS flight plans, sign when applicable and file the ATS flight plan with the appropriate ATS unit; and

(3) furnish the pilot-in-command while in flight, by appropriate means, with information which may be necessary for the safe conduct of the flight.

(d) A flight dispatcher shall not be assigned to duty unless that person has:

(1) satisfactorily completed the operator-specific training course that addresses all the specific components of its approved method of control and supervision of flight operations;

(2) made, within the preceding 12 months, at least a one way qualification flight in the flight crew compartment of helicopter over any area for which that individual is authorised to exercise flight supervision. The flight should include landings at as many heliports as practicable;

Note: For the purpose of the qualification flight, the flight dispatcher must be able to monitor the flight crew intercommunication system and radio communications, and be able to observe the actions of the flight crew.

(3) demonstrated to the operator a knowledge of:

(i) the contents of the operations manual;

(ii) the radio equipment in the helicopters used; and

(iii) the navigation equipment in the helicopters used;

(4) demonstrated to the operator a knowledge of the following details concerning operations for which the officer is responsible and areas in which that individual is authorised to exercise flight supervision:

(i) the seasonal meteorological conditions and the sources of meteorological information;

(ii) the effects of meteorological conditions on radio reception in the helicopters used;

(iii) the peculiarities and limitations of each navigation system which is used by the operation; and

(iv) the helicopter loading instructions;

(5) demonstrated to the operator knowledge and skills related to human performance relevant to dispatch duties; and

(6) demonstrated to the operator the ability to perform the duties specified in CAR OPS-3.195.

(7) maintained complete familiarization with all features of the operation which are pertinent to such duties, including knowledge and skills related to human performance.

(e) A flight dispatcher should not be assigned to duty after 12 consecutive months of absence from such duty, unless the provisions of paragraph (d) above are met.

CAR OPS-3.210 Establishment of procedures
(See AMC OPS-3.210 (a), & IEM OPS-3.210. (b))

(a) An operator shall establish procedures and instructions, for each Helicopter type, containing ground staff and crew members' duties for all types of operation on the ground and in flight. (See AMC OPS-3.210(a) Establishment of procedures).
(b) An operator shall establish checklists to be provided to be used by flight crews for all phases of flight of helicopter, prior to, during and after all phases of operations, and in emergency, to ensure compliance with the operating procedures contained in the operations manual and the Helicopter flight manual or other documents associated with the certificate of airworthiness. (See IEM OPS-3.210(b) Establishment of procedures). The design and utilisation of checklists shall observe Human Factors and CRM principles.
(c) An operator shall establish a check-list system in accordance with CAR OPS-3.1045 to be used by crew members for all phases of operation of the Helicopter under normal, abnormal and emergency conditions as applicable, to ensure that the operating procedures in the Operations Manual are followed.
(d) An operator shall not require a crew member to perform any activities during critical phases of the flight other than those required for the safe operation of the Helicopter.
(e) The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing:
    (1) the normal, abnormal and emergency procedures relating to the operation of the aircraft;
    (2) details of the aircraft systems and of the checklists to be used.
(f) The manual shall be easily accessible to the flight crew during all flight operations.
(g) The operator shall not permit a helicopter rotor to be turned under power for the purpose of flight without a qualified pilot at the controls.
(h) The operator shall provide appropriately specific training and procedures to be followed for all personnel, other than qualified pilots, who are likely to carry out the turning of a rotor under power for purposes other than flight. (see AC OPS 3.210(d)).

CAR OPS-3.215 Use of Air Traffic Services
An operator shall ensure that Air Traffic Services are used for all flights whenever available.

CAR OPS-3.216 In-flight Operational Instructions
(See AC OPS-3.216)
An operator shall ensure that his in-flight operational instructions involving a change to the air traffic flight plan shall, when practicable, be coordinated with the appropriate Air Traffic Service unit before transmission to a Helicopter.

CAR OPS-3.220 Authorisation of Heliports by the Operator
(See AMC1 and AMC 2 CAR OPS 3.220 Authorisation of heliports)
An operator shall only authorise use of heliports that are adequate for the type(s) of Helicopter and operation(s) concerned.

CAR OPS-3.225 Heliport or landing Location Operating Minima
(a) An operator shall specify heliport operating minima, established in accordance with CAR OPS-3.430 for each departure, destination or alternate heliport authorised to be used in accordance with CAR OPS-3.220.

(b) Any increment imposed by the Authority must be added to the minima specified in accordance with sub-paragraph (a) above. These minima shall not be lower that any that may be established for such heliports or landing locations by the State of the Heliport, except when specifically approved by the State.

(c) The operator shall, in establishing the heliport operating minima which will apply to any particular operation, take full account of:

(1) the type, performance and handling characteristics of the helicopter;
(2) the composition of the flight crew, their competence and experience;
(3) the dimensions and characteristics of the heliport, and direction of approach;
(4) the adequacy and performance of the available visual and non-visual ground aids;
(5) the equipment available on the helicopter for the purpose of navigation and/or control of the flight path during the approach to landing and the missed approach;
(6) the obstacles in the approach and missed approach areas and the obstacle clearance altitude/height for the instrument approach procedures;
(7) the means used to determine and report meteorological conditions; and
(8) the obstacles in the climb-out areas and necessary clearance margins.

(d) The minima for a specific type of approach and landing procedure are considered applicable if:

(1) The ground equipment shown on the respective chart required for the intended procedure is operative;
(2) The Helicopter systems required for the type of approach are operative;
(3) The required Helicopter performance criteria are met; and
(4) The crew is qualified accordingly.

(e) The CAA may approve operational variations to alternate heliport selection criteria based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approved operational variations to alternate heliport selection criteria. The specific safety risk assessment shall include at least the:

(1) capabilities of the operator;
(2) overall capability of the Helicopter and its systems;
(3) available heliport technologies, capabilities and infrastructure;
(4) quality and reliability of meteorological information;
(5) identified hazards and safety risks associated with each alternate heliport variation; and
(6) specific mitigation measures.

Note: Guidance on performing a safety risk assessment and on determining variations, including examples of variations, is contained in the Flight Planning and Fuel Management Manual (Doc 9976) and the Safety Management Manual (SMM) (Doc 9859).

(f) To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate heliport, the operator shall specify appropriate incremental values for height of cloud base and visibility, acceptable to the CAA, to be added to the operator's established heliport operating minima.

(g) The margin of time established by the operator for the estimated time of use of a heliport shall be approved by the CAA.

Note: Guidance on establishing an appropriate margin of time for the estimated time of use of a heliport is contained in the Flight Planning and Fuel Management Manual (Doc 9976).

CAR OPS-3.230 Departure and approach procedures

(a) The operator shall use departure and approach procedures if specified by the State in which the heliport is located.

(b) All Helicopters operated in accordance with instrument flight rules shall comply with the instrument flight procedures approved by the State in which the heliport is located. An operator shall ensure that instrument departure and approach procedures established by the State in which the heliport is located are used.

(c) Notwithstanding sub-paragraphs (a) and (b) above, a commander may accept an ATC clearance to deviate from a published departure or arrival route, provided obstacle clearance criteria are observed and full account is taken of the operating conditions. The final approach must be flown visually or in accordance with the established instrument approach procedure.

(d) Different procedures to those required to be used in accordance with sub-paragraph (a) above may only be implemented by the operator provided they have been approved by the State in which the heliport is located, if required, and accepted by the Authority.

CAR OPS 3.233 Instrument flight procedures

(a) One or more instrument approach procedures to serve each final approach and take-off area or heliport located in Sultanate of Oman utilised for instrument flight operations shall be approved and promulgated by the Authority, or when located outside the territory of Sultanate of Oman, by the State which is responsible for the heliport.

(b) All helicopters operated in accordance with IFR shall comply with the instrument approach procedures approved by the Authority for a heliport located Sultanate of Oman, or by the State which is responsible for the heliport when located outside the territory of any State.

CAR OPS-3.235 Noise abatement procedures

(a) An operator shall establish operating procedures for noise abatement during instrument flight operations in compliance with ICAO PANS OPS Volume 1 (Doc 8168).

(b) The operator shall ensure that take-off and landing procedures take into account the need to minimise the effect of helicopter noise.

(c) In no case shall the mass at the start of take-off, or at the expected time of landing at the destination and at any alternate, exceed the relevant maximum mass at which compliance has been demonstrated with the applicable noise certification Standards in Annex 16, Volume I and related CAR 21, Subpart I, unless otherwise authorised in exceptional circumstances for a certain operating site where there is no noise disturbance problem, by the competent authority of the State in which the operating site is situated.

CAR OPS-3.240 Routes and areas of operation

(a) An operator shall ensure that operations are only conducted along such routes or within such areas, for which:

   (1) Ground facilities and services, including meteorological services, are provided which are adequate for the planned operation;

   (2) The performance of the Helicopter intended to be used is adequate to comply with minimum flight altitude requirements;

   (3) The equipment of the Helicopter intended to be used meets the minimum requirements for the planned operation;

   (4) Appropriate maps and charts are available (CAR OPS-3.135(a)(9) refers);

(5) For helicopters operated in Performance Class 3, surfaces are available which permit a safe forced landing to be executed, except when the helicopter has an approval to operate in accordance with Appendix 1 to OPS 3.005(e).

(6) For helicopters operated in Performance Class 3 and conducting Coastal Transit operations, Part C of the Operations Manual contains procedures to ensure that the width of the Coastal Corridor, and the equipment carried, is consistent with the conditions prevailing at the time (See AMC OPS 3.240(a)(6)).

(b) An operator shall ensure that operations are conducted in accordance with any restriction on the routes or the areas of operation, imposed by the Authority.

(c) The operator shall ensure that any inadequacy of facilities observed in the course of operations is reported to the authority responsible for them, without undue delay.

CAR OPS-3.243 Operations in areas with specified navigation performance requirements

(See AMC OPS-3.243)

The operator shall not operate a helicopter in defined areas, or a defined portion of specified airspace, based on Regional Air Navigation Agreements where a navigation specification for performance-based navigation has been prescribed unless approved to do so by the Authority (RNP/RNAV Approval). (See also CAR OPS-3.865(c)(2).)

CAR OPS-3.250 Establishment of minimum flight altitudes

(See IEM OPS-3.250 - Establishment of Minimum Flight Altitudes)

(a) An operator shall establish minimum flight altitudes and the methods to determine those altitudes for all route segments to be flown which provide the required terrain clearance considering the requirements of CAR OPS-3, Subparts F to I.

(b) Every method for establishing minimum flight altitudes must be approved by the Authority.

(c) The operator shall specify the method by which it is intended to determine minimum flight altitudes for operations conducted over routes for which minimum flight altitudes have not been established by the State flown over, or the responsible State, and shall include this method in the operations manual.

(d) Except when necessary for take-off or landing, or except when specifically authorised by the appropriate authority, an IFR flight shall be flown at a level which is not below the minimum flight altitude established by the State whose territory is overflow, or where no such minimum flight altitude has been established:

(1) over high terrain or in mountainous areas, at a level which is at least 2,000 ft (600 m) above the highest obstacle located within 9 km of the estimated position of the aircraft;

(2) elsewhere than as specified in (a), at a level which is at least 1,000 ft (300 m) above the highest obstacle located within 9 km of the estimated position of the aircraft.

Note: The estimated position of the aircraft will take account of the navigational accuracy which can be achieved on the relevant route segment, having regard to the navigational facilities available on the ground and in the aircraft.

(e) Where minimum flight altitudes established by States over-flown are higher than those established by the operator, the higher values shall apply.

(f) An operator shall consider the following factors when establishing minimum flight altitudes:

(1) The accuracy with which the position of the Helicopter can be determined;

(2) The probable inaccuracies in the indications of the altimeters used;

(3) The characteristics of the terrain (e.g. sudden changes in the elevation) along the routes or in the areas where operations are to be conducted.

(4) The probability of encountering unfavorable meteorological conditions (e.g. severe turbulence and descending air currents); and
(5) Possible inaccuracies in aeronautical charts.
(6) Airspace restriction / Special use airspace

(g) In fulfilling the requirements prescribed in sub-paragraph (d) above due consideration shall be given to:
(1) Corrections for temperature and pressure variations from standard values;
(2) The ATC requirements; and
(3) Any foreseeable contingencies along the planned route.

CAR OPS-3.255 Fuel policy

(See AMC OPS-3.255 Fuel)

(a) An operator must establish a fuel policy for the purpose of flight planning and in-flight replanning to ensure that every flight carries sufficient fuel for the planned operation and reserves to cover deviations from the planned operation.

(b) A flight shall not be commenced unless, taking into account both the meteorological conditions and any delays that are expected in flight, the helicopter carries sufficient fuel and oil to ensure that it can safely complete the flight. In addition, a reserve shall be carried to provide for contingencies, such as loss of pressurisation, engine failure and any other condition that may delay the landing of the helicopter or increase fuel and/or oil consumption.

(c) VFR Operations
The fuel and oil carried in order to comply with (a) shall, in the case of VFR operations, be at least the amount to allow the helicopter to:
(1) fly to the landing site to which the flight is planned;
(2) have final reserve fuel to fly thereafter for a period of 20 minutes at best-range speed; and
(3) have an additional amount of fuel, to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of the Authority. (See AMC OPS 3.255)

(d) IFR Operations
The fuel and oil carried in order to comply with (a) shall, in the case of IFR operations, be at least the amount to allow the helicopter:
(1) When an alternate is not required, to fly to and execute an approach at the heliport or landing location to which the flight is planned, and thereafter to have:
(i) final reserve fuel to fly 30 minutes at holding speed at 450 m (1,500 ft) above the destination heliport or landing location under standard temperature conditions and approach and land; and
(ii) an additional amount of fuel, to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the satisfaction of the Authority. (See AMC OPS 3.255)
(2) When an alternate is required, to fly to and execute an approach, and a missed approach, at the heliport or landing location to which the flight is planned, and thereafter:
(i) to fly to and execute an approach at the alternate specified in the flight plan; and then
(ii) have final reserve fuel to fly for 30 minutes at holding speed at 450 m (1,500 ft) above the alternate under standard temperature conditions, and approach and land; and
(iii) to have an additional amount of fuel, to provide for the increased consumption on the occurrence of any of the potential contingencies specified by the operator to the

satisfaction of the Authority. (See AMC OPS 3.255)

(3) When no alternate heliport or landing location is available (e.g. the destination is isolated), sufficient fuel shall be carried to enable the helicopter to fly to the destination to which the flight is planned and thereafter for a period acceptable to the Authority that will, based on geographic and environmental considerations, enable a safe landing to be made.

(e) The operator shall ensure that pre-flight calculation of usable fuel required for a flight includes:

(1) Taxi fuel;

(2) Trip fuel;

(3) Reserve fuel consisting of:

(i) Contingency fuel (see AMC OPS 3.255)

(ii) Alternate fuel, if a destination alternate is required (This does not preclude selection of the departure heliport as the destination alternate);

(iii) Final reserve fuel; and

(iv) Additional fuel, if required by the type of operation (e.g. isolated heliports); and

(4) Extra fuel if required by the commander.

(f) The operator shall ensure that the planning of flights is only based upon:

(1) Procedures and data contained in or derived from the Operations Manual or current helicopter specific data; and

(2) The operating conditions under which the flight is to be conducted including:

(i) Realistic helicopter fuel consumption data;

(ii) Anticipated masses;

(iii) Expected meteorological conditions; and

(iv) Air Traffic Services procedures and restrictions.

(g) The use of fuel after flight commencement for purposes other than originally intended during preflight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

(h) The operator shall ensure that in-flight re-planning procedures for calculating usable fuel required when a flight has to proceed along a route or to a destination other than originally planned include:

(1) Trip fuel for the remainder of the flight;

(2) Reserve fuel consisting of:

(i) Contingency fuel;

(ii) Alternate fuel, if a destination alternate is required. (This does not preclude selection of the departure heliport as the destination alternate.);

(iii) Final reserve fuel; and

(iv) Additional fuel, if required by the type of operation (e.g. isolated heliports); and

(3) Extra fuel if required by the commander.

(i) The operator shall maintain fuel and oil records to enable the Authority to ascertain that, for each flight, the above requirements have been complied with.

CAR OPS-3.260 Carriage of Persons with Reduced Mobility

(See IEM OPS-3.260 - Carriage of persons with Reduced Mobility)

(a) An operator shall establish procedures for the carriage of Persons with Reduced Mobility (PRMs).

(b) An operator shall ensure that PRMs are not allocated, nor occupy, seats where their presence could:

(1) Impede the crew in their duties;

(2) Obstruct access to emergency equipment; or

(3) Impede the emergency evacuation of the Helicopter.

(c) The commander must be notified when PRMs are to be carried on board.

CAR OPS-3.265 Carriage of inadmissible passengers, deportees or persons in custody

An operator shall establish procedures for the transportation of inadmissible passengers, deportees or persons in custody to ensure the safety of the Helicopter and its occupants. The commander must be notified when the above-mentioned persons are to be carried on board.

CAR OPS-3.270 Stowage of baggage and cargo

(See AMC OPS-3.270 & CAR OPS-3.1310 – Loading Restrictions)

(a) The operator shall ensure that all baggage carried onto a Helicopter and taken into the passenger cabin is adequately and securely stowed.

(b) An operator shall establish procedures to ensure that all baggage and cargo on board, which might cause injury or damage, or obstruct aisles and exits if displaced, is placed in stowage areas designed to prevent movement.

CAR OPS-3.280 Passenger Seating

(See AC OPS-3.280 Passenger Seating)

An operator shall establish procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the Helicopter.

CAR OPS-3.285 Passenger briefing

An operator shall ensure that:

(a) *General.*

(1) Passengers are given a verbal briefing about safety matters. Parts or all of the briefing may be provided by an audio-visual presentation.

(2) Passengers are provided with a safety briefing card on which picture type instructions indicate the operation of emergency equipment and location of exits likely to be used by passengers.

(b) Before take-off:

(1) Passengers are briefed on the following items if applicable:

(i) Smoking regulations;

(ii) Back of the seat to be in the upright position and tray table stowed;

(iii) Location of emergency exits;

(iv) Location and use of floor proximity escape path markings;

(v) Stowage of hand baggage;

(vi) Restrictions on the use of portable electronic devices; and

(vii) The location and the contents of the safety briefing card, and,

(2) Passengers receive a demonstration of the following:

(i) The use of safety belts and/or safety harnesses, including how to fasten and unfasten the safety belts and/or safety harnesses;

(ii) The location and use of oxygen equipment if required (CAR OPS-3.770 and CAR OPS-3.775 refer). Passengers must also be briefed to extinguish all smoking materials when oxygen is being used; and

(iii) The location and use of life jackets or equivalent individual flotation devices where their carriage is required (CAR OPS-3.825, 3.827 and 3.830 refers).

(c) After take-off

(1) Passengers are reminded of the following if applicable:

(i) Smoking regulations; and

(ii) Use of safety belts and/or safety harnesses including the safety benefits of having safety belts fastened when seated irrespective of seat belt sign illumination.

(d) Before landing
   (1) Passengers are reminded of the following if applicable:
      (i) Smoking regulations;
      (ii) Use of safety belts and/or safety harnesses;
      (iii) Back of the seat to be in the upright position and tray table stowed;
      (iv) Re-stowage of hand baggage; and
      (v) Restrictions on the use of portable electronic devices.

(e) After landing
   (1) Passengers are reminded of the following:
      (i) Smoking regulations; and
      (ii) Use of safety belts and/or safety harnesses.

(f) In an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

CAR OPS-3.290 Flight preparation

(a) An operator shall ensure that an operational flight plan is completed for each intended flight. The operational flight plan shall be approved and signed by the commander and, where applicable, signed by the flight dispatcher.

(b) The commander shall not commence a flight unless he is satisfied that:
   (1) The Helicopter is airworthy;
   (2) The Helicopter is not operated contrary to the provisions of the Configuration Deviation List (CDL);
   (3) The instruments and equipment required for the flight to be conducted, in accordance with CAR OPS-3, Subparts K and L, are available;
   (4) The instruments and equipment are in operable condition except as provided in the MEL;
   (5) Those parts of the operations manual which are required for the conduct of the flight are available;
   (6) The documents, additional information and forms required to be available by CAR OPS-3.125 and CAR OPS-3.135 are on board;
   (7) Current maps, charts and associated documentation or equivalent data are available to cover the intended operation of the Helicopter including any diversion which may reasonably be expected. This shall include any conversion tables necessary to support operations where metric heights, altitudes and flight levels must be used;
   (8) Ground facilities and services required for the planned flight are available and adequate;
   (9) The provisions specified in the operations manual in respect of fuel, oil and oxygen requirements, minimum safe altitudes, heliport operating minima and availability of alternate heliports, where required, can be complied with for the planned flight;
   (10) The load is properly distributed and safely secured;
   (11) The mass of the Helicopter, at the commencement of take-off roll, will be such that the flight can be conducted in compliance with CAR OPS-3, Subparts F to I as applicable; and
   (12) Any operational limitation in addition to those covered by sub-paragraphs (9) and (11) above can be complied with.

CAR OPS-3.295 Pre-flight selection of heliports

(See AMC OPS-3.295(c)(1))

(a) An operator shall establish procedures for the selection of destination and/or alternate heliports in accordance with CAR OPS-3.220 when planning a flight.

(b) The commander must select a take-off alternate within one hour flight time at normal cruise speed for a flight under instrument meteorological conditions if it would not be possible to return to the heliport of departure due to meteorological reasons.

(c) On a VFR flight a commander shall not commence take-off unless current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown under VFR will, at the appropriate time, be such as to render compliance with these regulations possible.

(d) In addition to (c) above, for a flight to be conducted in accordance with the Instrument Flight Rules or when flying VFR and navigating by means other than by reference to visual landmarks, the commander shall specify at least one alternate in the operational flight plan unless:

(1) The destination is a coastal heliport (See AMC OPS 3.295(c)(1)); or

(2) For a flight to any other land destination, the duration of the flight and the meteorological conditions prevailing are such that, at the estimated time of arrival at the heliport of intended landing, an approach and landing may be made under visual meteorological conditions; or

(3) The heliport of intended landing is isolated and no alternate is available. A Point of No Return (PNR) shall be determined.

(e) A flight to be conducted in accordance with IFR shall not be commenced unless information is available which indicates that conditions at the destination heliport or landing location or, when an alternate is required, at least one alternate heliport will, at the estimated time of arrival, be at or above the heliport operating minima.

(f) In addition to (e) above, for a flight to be conducted in accordance with the Instrument Flight Rules, the commander shall specify at least one alternate in the operational flight plan unless:

(1) The destination is a coastal heliport (See AMC OPS 3.295(c)(1) and AMC OPS 295(c)(1)); or

(2) For a flight to any other land destination, the duration of the flight and the meteorological conditions prevailing are such that, at the estimated time of arrival at the heliport of intended landing, an approach and landing may be made under visual meteorological conditions; or

(3) The heliport of intended landing is isolated and no alternate is available. A Point of No Return (PNR) shall be determined.

(g) An operator must select two destination heliport alternates when:

(1) The appropriate weather reports or forecasts for the destination heliport, or any combination thereof, indicate that during a period commencing one hour before and ending one hour after the estimated time of arrival, the weather conditions will be below the applicable planning minima; or

(2) No meteorological information is available.

(h) Off-shore alternates may be specified subject to the following (see AMC OPS 3.295(e) and AMC OPS 3.295(e)):

(1) An off-shore alternate shall be used only after a Point of No Return (PNR). Prior to PNR, on-shore alternates shall be used.

(2) Mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternate heliport(s);

(3) One engine inoperative landing capability shall be attainable at the alternate heliport.

(4) Deck availability shall be guaranteed. The dimensions, configuration and obstacle clearance of individual helidecks or other sites shall be assessed in order to establish operational

suitability for use as an alternate by each helicopter type proposed to be used.

(5) Weather minima shall be established taking accuracy and reliability of meteorological information into account (see AMC OPS 3.295(e)(4)).

(6) The Minimum Equipment List shall reflect essential requirements for this type of operation.

(7) An off-shore alternate shall not be selected unless the operator has published a procedure in the Operations Manual approved by the Authority.

(8) Unless specifically approved by the Authority, offshore alternates shall not be used when it is possible to carry enough fuel to have an onshore alternate.

(9) Offshore alternates heliports shall not be used in a hostile environment.

(i) An operator shall specify any required alternate(s) in the operational flight plan.

(j) To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate heliport or landing location, the operator shall specify appropriate incremental values for height of cloud base and visibility, acceptable to the Authority, to be added to the operator's established heliport or landing location operating minima.

CAR OPS-3.297 Planning minima for IFR flights

(See AC OPS-3.297(c)-Table 1)

(a) *Planning minima for a take-off alternates heliport.* An operator shall only select a heliport as a take-off alternate heliport when the appropriate weather reports or forecasts or any combination thereof indicate that, during a period commencing one (1) hour before and ending one (1) hour after the estimated time of arrival at the heliport, the weather conditions will be at or above the applicable landing minima specified in accordance with CAR OPS-3.225. The ceiling must be considered when the only approaches available are non-precision and/or circling approaches. Any limitation related to one engine inoperative operations must be considered.

(b) *Planning minima for a destination heliport (except isolated destination heliports).* An operator shall only select the destination heliport when:

(1) the appropriate weather reports or forecasts and heliport or landing forecast, or any combination thereof, indicate that, during a period commencing one (1) hour before and ending one (1) hour after the estimated time of arrival at the heliport, the weather conditions will be at or above the applicable planning minima as follows:

(i) RVR/visibility specified in accordance with CAR OPS-3.225; and

(ii) For a non-precision approach or a circling approach, the ceiling at or above MDH; or

(2) An operator shall not select a heliport as an en-route alternate heliport unless the appropriate weather reports or forecasts, or any combination thereof, indicate that, during a period commencing one (1) hour before and ending one (1) hour after the expected time of arrival at the heliport, the weather conditions will be at or above the planning minima in accordance with Table 1 below.

Table 1. Planning minima – En-route and destination alternates

Type of Approach	Planning Minima
Cat II and III	Cat I (*Note 1*)
Cat I	Plus 200ft/400m visibility
Non-precision	Non-precision *(Notes 1 & 2)* plus 200 ft/400 m visibility

Note1: RVR.

Note 2: The ceiling must be at or above the MDH.

CAR OPS-3.300 Submission of ATS Flight Plan

(See AMC OPS 3.300)

An operator shall ensure that a flight is not commenced unless an ATS flight plan has been submitted, or adequate information has been deposited in order to permit alerting services to be activated if required.

CAR OPS-3.305 Refuelling/ defuelling with passengers embarking, onboard, disembarking or Rotors Turning

(See Appendix 1 to CAR OPS-3.305, IEM OPS 3.305, CAR OPS-3.990& IEM OPS-3.990)

(a) An operator shall ensure that no Helicopter is refuelled/defueled, rotors stopped or turning when:
   (1) Passengers are embarking, on-board or disembarking; or
   (2) When oxgen is bein replenished
(b) When the helicopter is refuelled with passengers on board, rotors stopped or turning, necessary precautions shall be taken and the Helicopter shall be properly manned (See CAR OPS-3.990, IEM OPS-3.990) by sufficiently qualified personnel ready to initiate and direct an evacuation of the Helicopter by the most practical and expeditious means available:
   (1) the flight crew shall ensure that the passengers are briefed on what actions to take if an incident occurs during refuelling;
   (2) a constant two-way communication shall be maintained by the helicopter's intercommunication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the helicopter; and

   Note: Caution needs to be exercised when using radios for this purpose due to the potential for stray currents and radio-induced voltages.

   (3) during an emergency shutdown procedure, the flight crew shall ensure that any personnel or passengers outside the helicopter are clear of the rotor area.
(c) The operator shall establish procedures and specify conditions under which such refuelling with may be carried out.
(d) Operational procedures should ensure that the following precautions are taken:
   (1) only Jet A fuel is used;
   (2) door(s) on the refuelling side of the helicopter remain closed unless these are the only suitable exits;
   (3) door(s) on the non-refuelling side of the helicopter remain open, weather permitting unless otherwise specified in the RFM;
   (4) firefighting facilities of the appropriate scale be positioned so as to be immediately available in the event of a fire;
   (5) if the presence of fuel vapour is detected inside the helicopter, or any other hazard arises during refueling, fuelling be stopped immediately;
   (6) the ground or deck area beneath the exits intended for emergency evacuation be kept clear;
   (7) seat belts should be unfastened to facilitate rapid egress; and
   (8) with rotors turning, only ongoing passengers should remain on board.
(e) A helicopter shall not be refuelled with AVGAS (aviation gasoline) or wide-cut type fuel or a mixture of these types of fuel, when passengers are on board.

   Note: Additional precautions are required when refuelling with fuels other than aviation kerosene or when refuelling results in a mixture of aviation kerosene with other aviation turbine fuels, or when an open line is used.

CAR OPS-3.307 Refuelling/Defuelling

(See IEM OPS-3.307)

A helicopter shall not be defueled at any time when:

(a) passengers remain on board; or

(b) passengers are embarking or disembarking; or

(c) oxygen is being replenished.

CAR OPS-3.310 Crew Members at stations

(See IEM OPS-3.310(b))

(a) *Flight crew members.*

(1) During take-off and landing each flight crew member required to be on flight deck duty shall be at his station.

(2) During all other phases of flight each flight crew member required to be on duty shall remain at his station unless his absence is necessary for the performance of his duties in connection with the operation, or for physiological needs provided at least one suitably qualified pilot remains at the controls of the Helicopter at all times.

(b) *Cabin crew members*. On all decks of the Helicopter that are occupied by passengers, required cabin crew members shall be seated at their assigned emergency stations during take-off, landing, during any critical phases of flight and whenever the pilot-in-command so directs. (See IEM OPS-3.310(b)).

(c) An operator shall ensure that any person conducting duties in the passenger compartment other than those required for the intended flight is:

(1) not confused by the passengers with the cabin crew members;

(2) does not impede cabin crew members in their duties; and

(3) does not occupy cabin crew members assigned stations.

CAR OPS-3.315 Assisting means for emergency evacuation

An operator shall establish procedures to ensure that before taxiing, take-off and landing, and when safe and practicable to do so, an assisting means for emergency evacuation that deploys automatically, is armed.

CAR OPS-3.320 Seats, safety belts and harnesses

(a) Flight crew members

(1) Any flight crew member occupying a pilot's seat shall keep the safety harness fastened during the take-off and landing phases; all other flight crew members shall keep their safety harnesses fastened during the take-off and landing phases unless the shoulder straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.

(2) During other phases of the flight each flight crew member on the flight deck shall keep his safety belt fastened while at his station.

(b) Cabin Crew members

Each cabin crew member shall be seated with seat belt or, when provided, safety harness fastened during take-off and landing and whenever the pilot-in-command so directs.

(c) Passengers

(1) Before take-off and landing, and during taxiing, and whenever deemed necessary in the interest of safety, the commander shall ensure that each passenger on board occupies a seat or berth with his safety belt, or harness where provided, properly secured.

(2) An operator shall make provision for, and the In-charge Cabin crew shall ensure that multiple

occupancy of Helicopter seats may only be allowed at specified seat locations (due to the availability of additional oxygen masks) and does not occur other than by one adult and one infant who is properly secured by an infant restraint device.

CAR OPS-3.325 Securing of passenger cabin and galley(s)

(a) An operator shall establish procedures to ensure that before taxiing, take-off and landing all exits and escape paths are unobstructed.

(b) The In-charge Cabin crew shall ensure that before take-off and landing, and whenever deemed necessary in the interest of safety, all passengers, galley equipment and hand baggage is properly secured.

CAR OPS-3.327 Safeguarding of cabin crew and passengers

An operator shall make provision and establish procedures for the safeguarding of cabin crew and passengers in pressurized Helicopters in the event of loss of pressurization.

(a) Cabin crew shall be safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of depressurization and, in addition, cabin crew should have such means of protection as will enable them to administer first aid to passengers during stabilised flight.

(b) Passengers shall be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurization.

CAR OPS-3.330 Accessibility of emergency equipment

(a) The operator shall establish procedures to ensure that when operating overwater in Performance Class 3, account is taken of the duration of the flight and conditions to be encountered when deciding if the lifejackets should be worn by all occupants.

(b) The commander shall ensure that relevant emergency equipment remains easily accessible for immediate use.

CAR OPS-3.335 Smoking on board Oman registered aircraft

(a) Smoking is prohibited on all aircraft registered within the Sultanate of Oman.

(b) When fitted, all “No Smoking” signs shall be illuminated prior to the boarding of passengers and shall remain illuminated until the aircraft shuts down operations for the day.

CAR OPS-3.340 Meteorological Conditions

(a) A flight shall not be continued towards the heliport of intended landing, unless the latest available information indicates that at the expected time of arrival, a landing can be affected at that heliport, or at least one destination alternate heliport, in compliance with VFR or the operating minima established in accordance with CAR OPS-3.297.

(b) A flight to a helideck or elevated heliport shall not be operated when the mean wind speed at the helideck or elevated heliport is reported as 60 knots or more.

CAR OPS-3.345 Ice and other contaminants – ground procedures

(See AC OPS-3.345)

(a) An operator shall establish procedures to be followed when ground de-icing and anti-icing and related inspections of the Helicopter(s) are necessary.

(b) A flight to be planned or expected to operate in suspected or known ground icing conditions shall not be commenced unless the helicopter has been inspected for icing and, if necessary, has been given appropriate de-icing/anti-icing treatment. Accumulation of ice or other naturally occurring contaminants shall be removed so that the helicopter is kept in an airworthy condition prior to take-off.

(c) A commander shall not commence take-off unless the external surfaces are clear of any deposit which might adversely affect the performance and/or controllability of the Helicopter except as permitted in the Helicopter Flight Manual.

CAR OPS-3.346 Ice and other contaminants – flight procedures

(a) An operator shall establish procedures for flights in expected or actual icing conditions. *Note: See AC OPS 3.346 and CAR OPS-3.675*

(b) A commander shall not commence a flight nor intentionally fly into expected or actual icing conditions unless the Helicopter is certificated and equipped to cope with such conditions.

CAR OPS-3.350 Fuel and oil supply

A commander shall not commence a flight or continue in the event of inflight re-planning unless the usable fuel on board meets the requirements of CAR OPS-3.255 paragraph (d) as applicable.

CAR OPS-3.355 Take-off conditions

Before commencing take-off, a commander must satisfy himself that, according to the information available to him, the weather at the heliport and the condition of the runway intended to be used should not prevent a safe take-off and departure.

CAR OPS-3.360 Application of take-off minima

Before commencing take-off, a commander must satisfy himself that the RVR or visibility in the takeoff direction of the Helicopter is equal to or better than the applicable minimum.

CAR OPS-3.365 Minimum flight altitudes

(See IEM OPS-3.250)

The pilot flying shall not descend below specified minimum altitudes except when necessary for takeoff or landing, or when descending in accordance with procedures approved by the Authority.

CAR OPS-3.370 Simulated abnormal situations in flight

An operator shall establish procedures to ensure that abnormal or emergency situations requiring the application of part or all of abnormal or emergency procedures and simulation of IMC by artificial means, are not simulated during commercial air transportation flights.

CAR OPS-3.375 In-flight fuel management

(See Appendix 1 to OPS 3.375)

(a) The operator shall establish policies and procedures, approved by the Authority, to ensure that inflight fuel checks and fuel management are performed.

(b) The Commander shall monitor the amount of usable fuel remaining on board to ensure it is not less than the fuel required to proceed to a landing site where a safe landing can be made with the planned final reserve fuel remaining.

(c) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific landing site, the pilot calculates that any change to the existing clearance to that landing site, or other air traffic delays, may result in landing with less than the planned final reserve fuel.

Note 1: The declaration of MINIMUM FUEL informs ATC that all planned landing site options have been reduced to a specific landing site of intended landing that no precautionary landing site is available, and any change to the existing clearance, or air traffic delays, may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

Note 2: A precautionary landing site refers to a landing site, other than the site of intended landing, where it is expected that a safe landing can be made prior to the consumption of the planned final reserve fuel shall declare an emergency when the actual usable fuel on board is less than final reserve fuel.

(d) The Commander shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the usable fuel estimated to be available upon landing at the nearest landing site where a safe landing can be made is less than the required final reserve fuel.

Note 1: The planned final reserve fuel is the minimum amount of fuel required upon landing at any landing site. The declaration of MAYDAY MAYDAY, MAYDAY FUEL informs ATC that all available landing options have been reduced to a specific site and a portion of the final reserve fuel may be consumed prior to landing.

Note 2: The pilot estimates with reasonable certainty that the fuel remaining upon landing at the nearest safe landing site will be less than the final reserve fuel taking into consideration the latest information available to the pilot, the area to be overflown (i.e. with respect to the availability of precautionary landing areas), meteorological conditions and other reasonable contingencies.

Note 3: Guidance on declaring minimum fuel is contained in the Flight Planning and Fuel Management Manual (Doc 9976).

CAR OPS-3.385 Use of supplemental oxygen

A commander shall ensure that flight crew members engaged in performing duties essential to the safe operation of a Helicopter in flight use supplemental oxygen continuously whenever cabin altitude exceeds 10,000 ft for a period in excess of thirty (30) minutes, whenever the cabin altitude exceeds 13,000 ft or when other circumstances may dictate the use of oxygen for breathing purposes (e.g. smoke in the cockpit, pilot incapacitation).

CAR OPS-3.395 Ground proximity detection

When undue proximity to the ground is detected by any flight crew member or by a ground proximity warning system, the commander or the pilot to whom conduct of the flight has been delegated shall ensure that corrective action is initiated immediately to establish safe flight conditions.

CAR OPS-3.398 Use of Airborne Collision Avoidance System (ACAS)

(See AC OPS-3.398)

An operator shall establish procedures to ensure that:

(a) When ACAS is installed and serviceable, it shall be used in flight in a mode that enables Traffic Advisories (TA) and Resolution Advisories (RA) to be produced unless to do so would not be appropriate for conditions existing at the time.

(b) When undue proximity to another aircraft (RA) is detected by ACAS, the commander or the pilot to whom conduct of the flight has been delegated must ensure that any corrective action indicated by

RA is initiated immediately, unless doing so would jeopardize the safety of the Helicopter;

The corrective action must:

(1) Never be in a sense opposite to that indicated by the RA.

(2) Be in the correct sense indicated by the RA even if this is in conflict with the vertical element of an ATC instruction.

(3) Be the minimum possible to comply with the RA indication.

(c) Prescribed ACAS ATC communications are specified.

(d) When the conflict is resolved, the Helicopter is promptly returned to the terms of the ATC instructions or clearance.

(e) Operators of aircraft equipped with ACAS shall establish standards of training and operation before authorising crews to use ACAS.

CAR OPS-3.400 Approach and landing conditions

(See IEM OPS-3.400)

Before commencing an approach to land, the commander must ensure, the information available pertaining to the weather at the heliport and the condition of the FATO intended to be used, should not prevent a safe approach, landing or missed approach, in accordance with the performance information contained within the Operations Manual and the Aircraft Flight Manual.

CAR OPS-3.405 Commencement and continuation of approach

(a) The commander or the pilot to whom conduct of the flight has been delegated may commence an instrument approach regardless of the reported RVR/Visibility but the approach shall not be continued below 300 m (1,000 ft) above the heliport elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the heliport operating minima.

(b) Where RVR is not available, RVR values may be derived by converting the reported visibility in accordance with Appendix 1 to CAR OPS-3.430, Table 6.

(c) If, after entering the final approach segment or after descending below 300 m (1,000 ft) above the heliport elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, a Helicopter shall not continue its approach-to-land at any heliport beyond a point at which the limits of the operating minima specified for that heliport would be infringed.

Note: Controlling RVR means the reported values of one or more RVR reporting locations (touchdown, mid-point and stop-end) used to determine whether operating minima are or are not met. Where RVR is used, the controlling RVR is the touchdown RVR, unless otherwise specified by State criteria.

(d) If the MDA/H is at or above 1,000 ft above the heliport, the operator shall establish a height, for each approach procedure, below which the approach shall not be continued if the RVR/visibility is less than the applicable minima.

(e) The approach may be continued below DA/H or MDA/H and the landing may be completed provided that the required visual reference is established at the DA/H or MDA/H and is maintained.

CAR OPS-3.415 Journey log

The pilot-in-command shall be responsible for the journey log book or the general declaration containing the information listed in CAR OPS-3.1055.

CAR OPS-3.420 Occurrence reporting

Detailed reporting requirements are stipulated in CAR 13.400 and CAR-13 Appendix D.

(a) ***Terminology***

(1) *Incident:* An occurrence, other than an accident, associated with the operation of a aircraft which affects or could affect the safety of operation.

(2) *Serious Incident:* is an incident involving circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

Note 1: The difference between an accident and a serious incident lies only in the result.

Note 2: Examples of serious incidents can be found in ICAO Annex 13 Attachment C.

(3) *Accident:* An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

(i) a person is fatally or seriously injured as a result of:

(A) being in the helicopter; or

(B) direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or,

(C) direct exposure to jet blast or rotor downwash;

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew: or

(ii) the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics; and would normally require major repair or replacement of the affected component; except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or to antennas, tires, brakes, wheels, fairings, panels, doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, and those resulting from hail or bird strike (including holes in the radome); or

(iii) the aircraft is missing or is completely inaccessible.

Note 1: For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified, by ICAO, as a fatal injury.

Note 2: An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Note 3: The type of unmanned aircraft system to be investigated is addressed in 5.1 of ICAO Annex 13.

Note 4: Guidance for the determination of aircraft damage can be found in Attachment E of ICAO Annex 13.

(b) ***Incident Reporting:*** An operator shall establish procedures for reporting incidents considering responsibilities described below and circumstances described in sub-paragraph (d) below.

(1) CAR OPS-3.085(b) specifies the responsibilities of crew members for reporting incidents that

endanger, or could endanger, the safety of operation.

(2) The commander or the operator of a Helicopter shall submit a report to the Authority of any incident that endangers or could endanger the safety of operation.

(3) Reports must be dispatched within seventy-two (72) hours of the time when the incident was identified unless exceptional circumstances prevent this.

(4) A commander shall ensure that all known or suspected technical defects and all exceedances of technical limitations occurring while he was responsible for the flight are recorded in the aircraft technical log. If the deficiency or exceedance of technical limitations endangers or could endanger the safety of operation, the commander must in addition initiate the submission of a report to the Authority in accordance with paragraph (b)(2) above.

(5) In the case of incidents reported in accordance with sub- paragraphs (b)(1), (b)(2) and (b)(3) above, arising from, or relating to, any failure, malfunction or defect in the Helicopter, its equipment or any item of ground support equipment, or which cause or might cause adverse effects on the continuing airworthiness of the Helicopter, the operator must also inform the organisation responsible for the design or the supplier or, if applicable, the organisation responsible for continued airworthiness, at the same time as a report is submitted to the Authority.

(c) ***Accident and Serious Incident Reporting:*** An operator shall establish procedures for reporting accidents and serious incidents considering responsibilities described below and circumstances described in sub-paragraph (d) below.

(1) The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the Helicopter, resulting in serious injury or death of any person or substantial damage to the Helicopter or property.

(2) A commander shall notify the operator of any accident or serious incident occurring while he was responsible for the flight. In the event that the commander is incapable of providing such notification, this task shall be undertaken by any other member of the crew if they are able to do so, note being taken of the succession of command specified by the operator.

(3) An operator shall ensure that the Authority in the State of the operator, the nearest appropriate Authority (if not the Authority in the State of the operator), and any other organisation required by the State of the operator to be informed, are notified by the quickest means available of any accident or serious incident and - in the case of accidents only - at least before the Helicopter is moved unless exceptional circumstances prevent this.

(4) The commander or the operator of a Helicopter shall submit a report to the Authority in the State of the operator within seventy-two (72) hours of the time when the accident or serious incident occurred.

(5) In the event of an emergency situation which endangers the safety of the Helicopter or person necessitates the taking of action that involves a violation of local regulations or procedures, the commander shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the commander shall submit a report on any such violation to the appropriate authority of such State; in that event, the commander shall also submit a copy of it to the State of the Operator as soon as possible or within ten (10) days of the occurrence.

(d) ***Specific Reports:*** Occurrences for which specific notification and reporting methods must be used are described below;

(1) ***Air Traffic Incidents:*** A commander shall without delay notify the air traffic service unit concerned of the incident and shall inform them of his intention to submit an air traffic incident report after the flight has ended whenever an aircraft in flight has been endangered

by:

(i) A near collision with any other flying device;

(ii) Faulty air traffic procedures or lack of compliance with applicable procedures by air traffic services or by the flight crew;

(iii) Failure of air traffic services facilities.

In addition, the commander shall notify the Authority of the incident.

(2) ***Airborne Collision Avoidance System Resolution Advisory*:** A commander shall notify the air traffic service unit concerned and submit an ACAS report to the Authority whenever an aircraft in flight has manoeuvred in response to an ACAS Resolution Advisory (ACAS RA).

(3) ***Bird Hazards and Strikes:***

(i) A commander shall immediately inform the local air traffic service unit whenever a potential bird hazard is observed.

(ii) If he is aware that a bird strike has occurred, a commander shall submit a written bird strike report after landing to the Authority whenever an aircraft for which he is responsible suffers a bird strike that results in significant damage to the aircraft or the loss or malfunction of any essential service. If the bird strike is discovered when the commander is not available, the operator is responsible for submitting the report.

(4) ***Dangerous Goods Incidents and Accidents:*** An operator shall report dangerous goods incidents and accidents to the Authority and the appropriate Authority in the State where the accident or incident occurred, as provided for in Appendix 1 to CAR OPS3.1325. The first report shall be dispatched within seventy-two (72) hours of the event unless exceptional circumstances prevent this and include the details that are known at that time. If necessary, a subsequent report must be made as soon as possible giving whatever additional information has been established. (See also CAR OPS-3.1325 & CAR-92.155(1))

(5) ***Unlawful Interference:*** Following an act of unlawful interference on board an aircraft, the commander or, in his absence, the operator shall submit a report as soon as practicable to the local Authority and to the Authority in the State of the operator. (See also CAR OPS-3.1345)

(6) ***Encountering Potentially Hazardous Conditions:*** A commander shall notify the appropriate air traffic services unit as soon as practicable whenever a potentially hazardous condition such as, but not limited to, an irregularity in a ground or navigational facility, a meteorological phenomenon or a volcanic ash cloud is encountered during flight.

(7) ***Health related incidents requiring immediate action:*** the commander shall notify the appropriate air traffic services unit to relay information to destination heliport, as soon as he becomes aware or suspects that there is a traveler onboard suffering from communicable disease. The operator shall ensure that the operations manual contain information to handle health related information, particularly communicable disease. (See AMC OPS-3.420(d)(7))

Note: The procedures for making special air-reports regarding runway braking action are contained in the PANS-ATM (Doc 4444), Chapter 4 and Appendix 1.

CAR OPS-3.425 Deficiencies reported by an Inspecting Authority

(See AC OPS-3.425 & IEM OPS 3.425)

An operator shall:

(a) Notify, immediately but no later than seventy-two (72) hours from the date of inspection, to the CAA principal inspector (copying Foreign Operators Affairs), the deficiencies/findings reported by an Inspecting Authority during its inspection of the operator’s aircraft;

(b) Provide the Inspecting Authority, copying the CAA, with the corrective/preventative action plan no later than thirty (30) days from receiving date of the inspection report;

(c) Upon request from the CAA, coordinate with the respective department of the CAA (i.e. Department of Airworthiness, Department of Flight Operations and Department of Licensing) prior to response to the Inspecting Authority on the corrective/ preventive action plan.

(d) Notify the CAA when the Inspecting Authority confirms closure of deficiencies/findings; and

(e) Ensure compliance with (a), (b) (c) and (d) for aircraft under a lease agreement (See CAR OPS3.165 and CAR OPS-3.170).

CAR OPS-3.426 Flight Hours Reporting

(See AC OPS-3.426)

The operator shall make available to the Authority the hours flown for each helicopter operated during the previous calendar year.

Appendix 1 to OPS 3.270 Stowage of Baggage and Cargo

(a) Procedures established by the operator to ensure that hand baggage and cargo is adequately and securely stowed must take account of the following:

(1) Each item carried in a cabin must be stowed only in a location that is capable of restraining it;

(2) Mass limitations placarded on or adjacent to stowages must not be exceeded;

(3) Underseat stowages must not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment;

(4) Items must not be stowed in toilets or against bulkheads that are incapable of restraining articles against movement forwards, sideways or upwards and unless the bulkheads carry a placard specifying the greatest mass that may be placed there;

(5) Baggage and cargo placed in lockers must not be of such size that they prevent latched doors from being closed securely;

(6) Baggage and cargo must not be placed where it can impede access to emergency equipment; and

(7) Checks must be made before take-off, before landing, and whenever the fasten seat belts signs are illuminated or it is otherwise so ordered to ensure that baggage is stowed where it cannot impede evacuation from the aircraft or cause injury by falling (or other movement) as may be appropriate to the phase of flight.

Appendix 1 to OPS 3.375 In-flight Fuel Management

(a) *In-flight fuel checks.*

(1) A commander must ensure that fuel checks are carried out in flight at regular intervals. The remaining fuel must be recorded and evaluated to:

(i) Compare actual consumption with planned consumption;

(ii) Check that the remaining fuel is sufficient to complete the flight; and

(iii) Determine the expected fuel remaining on arrival at the destination.

(2) The relevant fuel data must be recorded.

(b) *In-flight fuel management.*

(1) If, as a result of an in-flight fuel check, the expected fuel remaining on arrival at the destination is less than the required alternate fuel plus final reserve fuel, the commander must:

(i) Divert; or

(ii) Replan the flight in accordance with OPS 3.295(d)(1) unless he considers it safer to continue to the destination provided that,

(2) At an on-shore destination, when two suitable, separate touchdown and lift-off areas are available and the weather conditions at the destination comply with those specified for planning in OPS 3.340(a)(2), the commander may permit alternate fuel to be used before landing at the destination.

(c) If, as a result of an in-flight fuel check on a flight to an isolated destination heliport, planned in accordance with AMC OPS 3.255 paragraph 3, the expected fuel remaining at the point of last possible diversion is less than the sum of:

(1) Fuel to divert to a heliport selected in accordance with OPS 3.295(b);
(2) Contingency fuel; and
(3) Final reserve fuel, a commander must:
(4) Divert; or
(5) Proceed to the destination provided that at on-shore destinations, two suitable, separate touchdown and lift-off areas are available at the destination and the expected weather conditions at the destination comply with those specified for planning in OPS 3.340(a)(2).

Appendix 1 to CAR OPS-3.270 Stowage of baggage and cargo

(a) Procedures established by an operator to ensure that hand baggage and cargo is adequately and securely stowed must take account of the following:

(1) Each item carried in a cabin must be stowed only in a location that is capable of restraining it;
(2) Mass limitations placarded on or adjacent to stowages must not be exceeded;
(3) Under seat stowages must not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment;
(4) Items must not be stowed in toilets or against bulkheads that are incapable of restraining articles against movement forwards, sideways or upwards and unless the bulkheads carry a placard specifying the greatest mass that may be placed there;
(5) Baggage and cargo placed in lockers must not be of such size that they prevent latched doors from being closed securely;
(6) Baggage and cargo must not be placed where it can impede access to emergency equipment; and
(7) Checks must be made before take-off, before landing, and whenever the fasten seat belts signs are illuminated or it is otherwise so ordered to ensure that baggage is stowed where it cannot impede evacuation from the aircraft or cause injury by falling (or other movement) as may be appropriate to the phase of flight.

Appendix 1 to CAR OPS-3.305 Refuelling/Defuelling with passengers embarking, on board or disembarking

(a) An operator must establish operational procedures for re/defuelling with passengers embarking, on board or disembarking to ensure the following precautions are taken:

(1) One qualified person must remain at a specified location during fuelling operations with passengers on board. This qualified person must be capable of handling emergency procedures concerning fire protection and fire-fighting, handling communications and initiating and directing an evacuation;
(2) A two-way communication shall be established and shall remain available by the Helicopter's inter-communication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the Helicopter;
(3) Crew, staff and passengers must be informed that re/defuelling will take place;

(4) 'Fasten Seat Belts' signs must be off;

(5) 'NO SMOKING' signs **(if available)** must be illuminated, cabin lighting to be switched "ON."

(6) Passengers must be instructed to unfasten their seat belts and smoking is not allowed;

(7) Sufficient qualified personnel must be on board and be prepared for an immediate emergency evacuation;

(8) If the presence of fuel vapour is detected inside the Helicopter, or any other hazard arises during re/defuelling, fuelling must be stopped immediately;

(9) The ground area beneath the exits intended for emergency evacuation and slide deployment areas must be kept clear; and

(10) Provision is made for a safe and rapid evacuation.

AMC-1 OPS-3.195 Operational Control

(See CAR OPS-3.195)

(a) Operational control means the exercise by the operator or a designated representative, in the interest of safety of the aircraft, the regulatory control, the efficiency of the flight, and the authority over the initiation, continuation, termination or diversion of a flight. There is a requirement for certified/ licensed flight dispatchers or a full flight watch system.

(b) The organisation and methods established to exercise operational control shall be included in the operations manual and shall cover at least a description of responsibilities concerning the initiation, continuation, termination or diversion of each flight.

(c) Responsibility for operational control shall be delegated only to the pilot-in-command or a suitably qualified flight operations officer/flight dispatcher personnel.

AMC-2 OPS-3.195 Certification Requirements for Commercial Air Transport (CAT) Flight operations officer/Flight dispatcher

(a) A person certified by the operator may operate as flight operations officer/flight dispatcher on the condition they meet these requirements:

(1) ***Age***

The applicant shall be not less than 21 years of age.

(2) ***Knowledge***

The applicant shall have demonstrated a level of knowledge appropriate to the privileges granted to an operations officer, in at least the following subjects:

(i) Air law; rules and regulations relevant to the performance of duties as a flight operations officer license; appropriate air traffic services practices and procedures;

(ii) Aircraft general knowledge

(A) principles of operation of Helicopter power-plants, systems and instruments;

(B) operating limitations of Helicopters and power-plants;

(C) minimum equipment list;

(iii) Flight performance calculation and planning procedures

(A) effects of loading and mass distribution on aircraft performance and flight characteristics; mass and balance calculations;

(B) operational flight planning; fuel consumption and endurance calculations; alternate airport selection procedures; en-route cruise control; extended range operation;

(C) preparation and filing of air traffic services flight plans;

(D) basic principles of computer-assisted planning systems;

(iv) Meteorology

(A) aeronautical meteorology; the movement of pressure systems; the structure of fronts, and the origin and characteristics of significant weather phenomena which affect take-off, en-route and landing conditions;

(B) interpretation and application of aeronautical meteorological reports, charts and forecasts; codes and abbreviations; use of, and procedures for obtaining, meteorological information;

(v) Navigation

(A) principles of air navigation with particular reference to instrument flight;

(vi) Operational procedures

(A) use of aeronautical documentation;

(B) operational procedures for the carriage of freight and dangerous goods;

(C) procedures relating to aircraft accidents and incidents; emergency flight procedures;

(D) procedures relating to unlawful interference and sabotage of aircraft;

(vii) Principles of flight

(A) principles of flight relating to the appropriate category of aircraft; and

(viii) Radio communication

(A) procedures for communicating with aircraft and relevant ground stations.

(3) ***Experience***

(i) The applicant shall have gained the following experience:

(A) a total of two years' service in any one or in any combination of the capacities specified in (i) to (iii) inclusive, provided that in any combination of experience the period of service in any capacity shall be at least one year:

(B) a flight crew member in air transportation; or

(C) a meteorologist in an organisation dispatching aircraft in air transportation; or

(D) an air traffic controller; or a technical supervisor of flight operations officers or air transportation flight operations systems; or

(ii) at least one year as an assistant in the dispatching of air transport; or iii. have satisfactorily completed a course of approved training. iv. the trainee shall have served under the supervision of a flight operations officer for at least ninety (90) working days within the six months immediately preceding the certification as a FOO/FD.

(4) ***Skills***

(i) The applicant shall have demonstrated the ability to:

(A) make an accurate and operationally acceptable weather analysis from a series of daily weather maps and weather reports; provide an operationally valid briefing on weather conditions prevailing in the general neighborhood of a specific air route; forecast weather trends pertinent to air transportation with particular reference to destination and alternates;

(B) determine the optimum flight path for a given segment, and create accurate manual and/or computer-generated flight plans; and

(C) provide operating supervision and all other assistance to a flight in actual or simulated adverse weather conditions, as appropriate to the duties of the holder of a flight operations officer certification.

(5) **Recurrent training requirements**

(i) The Flight operations Officer/Flight dispatcher shall within the preceding twelve (12) months, completed at least a one familiarization flight sector in the flight deck of a Helicopter over any area for which that individual is authorised to exercise flight supervision. This flight should include landings at as many heliports as practicable.

(ii) The Flight Operations Officer/Flight dispatcher shall complete each twenty- four (24) months a written examination as part of recurrent training which covers all aspects of the training required for certification.

(iii) In the event that a flight operations officer/flight dispatcher is absent from those assigned duties for more than twelve (12) months they shall be re- certified after completing an approved recurrent training course.

AMC-3 OPS-3.195 Flight Dispatching for aircraft below 5,700Kg MTOW

For the purpose of controlling the weight and balance of an aircraft the air operator certificate holder shall ensure the following:

Goods, passenger, and baggage weights

(a) Subject to paragraphs (b), (c), and (d), a holder of an air operator certificate shall ensure that for every air operation conducted under the authority of the certificate the weights of the following items that are carried on the aircraft are established:
  (1) the total weight of passengers:
  (2) the total weight of crew members:
  (3) the total weight of goods and baggage.

(b) The total weight of passengers (excluding their carry-on baggage (if any) shall be determined by using only one of the following:
  (1) the actual weight of every passenger:
  (2) a standard weight for every passenger that is established by the certificate holder and detailed in the certificate holder's exposition:
  (3) a weight that is declared by the passenger plus an additional four (4) kg for every passenger.

(c) The total weight of crew members (excluding their carry-on baggage (if any)) must be established by using—
  (1) the actual weight of every crew member; or
  (2) a standard weight for every crew member that is established by the certificate holder and detailed in the certificate holder's exposition.

(d) The total weight of goods and baggage must be determined by using— (1) the actual weight of the goods and baggage; or
  (2) for commercial transport operations operating from a remote heliport where it is not practicable to establish the actual weight of the goods and baggage, the certificate holder must establish procedures to enable the pilot-in-command to assess the weight of the goods and baggage.

(e) A certificate holder who intends to establish a standard weight to be detailed in the certificate holder's exposition for use under paragraphs (b)(2) or (c)(2) must establish the respective standard weight in accordance with a survey programme that is acceptable to the Authority.

(f) A certificate holder who intends to use declared weights for passengers under paragraph (b)(3), or standard weights for passengers under paragraph (b)(2) or for crew members under paragraph (c)(2) must establish procedures that are acceptable to the Authority to ensure that, if the weight of a passenger or crew member is clearly greater than the declared weight or standard weight being used, a weight that is more representative of the actual weight of the person is used.

(g) A certificate holder who uses a passenger declared weight under paragraph (b)(3) must ensure that the passenger is not encouraged to declare weight that is less than the passenger's actual weight.

AMC-4 OPS-3.195 Operational Control – Flight Operations Officer/ Flight Dispatcher Instructor

(a) The following pre-requisite qualifications are required prior to the approved authorisation being granted by the Authority to perform the duties of Flight Operations Officer/ Flight Dispatcher instructor:
  (1) Applicable Flight Operations Officer/ Flight Dispatcher operational experience:
    i. a minimum of five (5) years in the capacity of a Flight Operations Officer/ Flight Dispatcher; or
    ii. a minimum of continuous three (3) years in the capacity of a Flight Operations Officer/

Flight Dispatcher combined with a minimum of three (3) years' experience in a training role within the aviation industry.

(2) Recognized relevant qualification in Training (Train the Trainer), or preferably holds an instructor qualification in Human Factors.

(3) Have achieved and maintained a favorable record as a Flight Operations Officer/ Flight Dispatcher.

(4) Proven training background experience in course development, delivery and assessment.

(5) Proficient in computer skills and the ability to use multimedia as a training tool including experience in course design.

(6) High standard of written and spoken English and a high level of interpersonal skills.

(7) Having good knowledge and skills in line with aviation industry standards and Civil Aviation Regulations.

(b) Flight Operations Officer/ Flight Dispatcher Instructor Responsibilities:

(1) Conducts initial, aircraft type training, differences training and recurrent training.

(2) Responsible to impart effective and efficient Flight Operations Officer/ Flight Dispatcher training to Flight Operations Officer/ Flight Dispatcher staff.

(3) Responsible for the instructional design of training courses, including their delivery, development, regulatory compliances, standards, remedial, devices and training material.

(4) Conducting a training needs analysis on the effectiveness of the course material and passed to the Training Manager.

(5) Ensure completion of required documentation and maintaining accurate records of all trainees.

(c) Continuation of Flight Operations Officer/ Flight Dispatcher Instructor Authorisation

(1) This training should consist of a minimum of thirty-five (35) hours of training classes within the twenty-four (24) month period;

(2) Training personnel shall remain conversant within the latest revision of the CAR's, AMC's, and Guidance Material.

(3) They shall also be conversant with the relevant parts of the Operations Manual and associated training procedures.

(4) The operator shall ensure that personnel training records, including records of qualifications, training update and experience is retained for each Instructor.

(5) When a new aircraft type is added to the operator's AOC use of special resources for introduction may be required, such as:

(i) Flight Operations Officer/ Flight Dispatcher Instructors rated on the aircraft from the manufacturer

(ii) Flight Operations Officer/ Flight Dispatcher Instructor from another operator using the same type of aircraft;

(iii) Flight Operations Officer/ Flight Dispatcher Instructor may extend the function to the new aircraft type after having undergone training according to an established Conversion and Differences Course.

(d) A Flight Operations Officer/ Flight Dispatcher Instructor shall complete within the preceding twelve (12) months, at least a one-way qualification flight in the flight crew department of a Helicopter over any area for which that individual is authorised to exercise flight supervision. This flight should include landings at as many heliports as practicable.

(e) When a Flight Operations Officer/ Flight Dispatcher Instructor changes operator whilst maintaining Helicopter type:

(1) A Flight Operations Officer/ Flight Dispatcher Instructor who is changing operator with the same Helicopter type with the intention to continue the Flight Operations Officer/ Flight Dispatcher

Instructor activity must undergo a conversion training course designed accordingly to CAR OPS-3.945 for changing operator.

(f) Flight Operations Officer/ Flight Dispatcher Instructor changing operator and Helicopter type:

(1) A Flight Operations Officer/ Flight Dispatcher Instructor who is changing operator and aircraft type with the intention to continue the Flight Operations Officer/ Flight Dispatcher Instructor activity must undergo the regular training for changing operator and aircraft type.

AMC-1 OPS-3.196 Aircraft Tracking System – Helicopters

(See CAR OPS-3.196)

Equipment, Performance and Procedures When Aircraft Tracking Is Required

(a) ***Automatic tracking of Helicopter position***

The aircraft tracking system shall rely on equipment capable of automatically detecting and transmitting a position report to the aircraft operator, except if (d)(2) applies.

(b) ***Position reporting period***

The tracking of an individual flight shall provide a position report at time intervals which do not exceed 15 minutes.

(c) ***Content of position reports***

Each position report shall contain at least the latitude, the longitude and the time of position determination and whenever available, an indication of the Helicopter altitude, except that for each flight:

(1) One of the position reports may contain only time-stamped data indicating that the Helicopter has left the gate;

(2) One of the position reports may contain only time-stamped data indicating that the Helicopter has become airborne;

(3) One of the position reports may contain only time-stamped data indicating that the Helicopter has landed; and

(4) One of the position reports may contain only time-stamped data indicating that the Helicopter has reached the gate.

(d) ***Source of position data***

The data contained in a position report may come from:

(1) ATC surveillance systems, if the ATC surveillance data source is capable of providing this data with a delay equal to or less than 10 minutes;

(2) the flight crew, if the planned flight duration is less than two position reporting periods;

(3) Helicopter systems. In that case:

(i) the source of time, latitude and longitude data shall be the navigation system of the Helicopter or an approved GNSS receiver;

(ii) the source of altitude data should be:

- the same source as for time, latitude and longitude data, or
- an approved source of pressure altitude; and

(iii) the delivery time of position reports from the Helicopter to the operational control over the flight shall, to the extent possible, not exceed 10 minutes; or

(4) any data source when the position report is of a type designated by (c)(1), (c)(2), (c)(3) or (c)(4). In that case, the delivery time of position reports from the data source to the operational control over the flight shall, to the extent possible, not exceed 10 minutes.

(e) ***Temporary lack of aircraft tracking data***

Aircraft tracking data may be incomplete due to a temporary or unexpected issue prior to or during the flight. However, the operator should:

(1) identify any loss of aircraft tracking data which is not due to a temporary issue, and
(2) address any systematic lack of aircraft tracking data affecting a given Helicopter or a given route in a timely manner.

(f) ***Operational control over the flights***

When abnormal flight behaviour is suspected, this should be checked and acted upon without delay.

(g) ***Recording of aircraft tracking data during normal operation***

When the tracking of a flight is required, all related aircraft tracking data shall be recorded on the ground, including position data from ATC surveillance systems when they are used. The aircraft tracking data of a given flight shall be retained until confirmation that the flight is completed and no accident or serious incident occurred.

(h) ***Preserving aircraft tracking data after an accident or a serious incident***

Following an accident or a serious incident, the operator shall retain the aircraft tracking data of the involved flight for at least 30 days. In addition, the operator shall be capable of providing a copy of this data without delay and in an electronic format that is computer readable using a common text file editor.

(i) ***Procedures***

The operator shall establish procedures describing its aircraft tracking system, including the identification of abnormal flight behaviour and the notification of the competent ATS unit, when appropriate. These procedures shall be integrated with the emergency response plan of the operator.

Note1.- Oceanic area, for the purpose of aircraft tracking, is the airspace which overlies waters outside the territory of a State.

Note2.-See ICAO Annex 11, Chapter 2 for coordination between the operator and air traffic services providers regarding the territory of a State.

Note3.- Operational procedures for monitoring the aircraft tracking information are contained in PANS-OPS, Volume III Section 10

AMC-2 OPS-3.196 Aircraft tracking system — Helicopters Routes Included in Airspace Covered By ATS Surveillance

(a) Trajectory points located at a distance of less than 50 NM from the departure airfield and trajectory points located at a distance of less than 50 NM from the destination airfield may be considered as not part of the 'planned route'.
(b) Trajectory points located at a distance of less than 50 NM from any diversion airfield may be considered as not part of the 'planned diversion routes'.
(c) An ATS surveillance service may be considered 'supported by ATC surveillance systems locating the aircraft at time intervals with adequate duration' if those ATC surveillance systems are capable of locating aircraft at time intervals not exceeding 15 minutes when operated normally. Information on FIRs able to support 15-minute position reports is available on https://www4.icao.int/opsctrl.
(d) When applicable, the operator should check that the conditions required for using the exception defined by CAR OPS-3.196 (b) are fulfilled before operating into new airspace blocks.
(e) When applicable, the operator should check at time intervals not exceeding 180 calendar days that the conditions required for using the exception defined by CAR OPS-3.197 (b) are maintained.

AMC-3 OPS-3.196 Aircraft Tracking

(a) When an aircraft operator or an air traffic service (ATS) unit has reason to believe that an aircraft is in distress, coordination shall be established between the ATS unit and the aircraft operator.
(b) The CAA shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

(1) air traffic service (ATS) unit(s); and
(2) SAR rescue coordination centre(s) (RCC) and sub-centres.

Note 1: Refer to Annex 11 for emergency phase criteria.

Note 2: Refer to Annex 12 for required notifications in the event of an emergency phase. Annex 6 — Operation of Aircraft Part I 8/11/18 APP 9-2

Note 3: Operational procedures for monitoring the aircraft tracking information are contained in PANS-OPS, Volume III, Section 10

(c) When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.

(d) The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.

GM OPS-3.197 Retention of Aircraft Tracking Data

Guidance on aircraft tracking capabilities is contained in the Aircraft Tracking Implementation Guidelines is available from ICAO Circular – 347

AC OPS-3.205 Competence of Operations personnel

(See CAR OPS-3.205)

If an operator employs Flight Operations Officers in conjunction with a method of Operational Control as defined in CAR OPS-3.195, training for these personnel should be based on relevant parts of ICAO Doc 7192 D3. This training should be described in Subpart D of the Operations Manual.

AMC OPS-3.210(a) Establishment of procedures

(See CAR OPS-3.210(a))

(1) An operator should specify the contents of safety briefings for all cabin crew members prior to the commencement of a flight or series of flights.

(2) An operator should specify procedures to be followed by cabin crew with respect to:
 (a) The operation of cabin lights, including emergency lighting;
 (b) The prevention and detection of cabin, oven and toilet fires;
 (c) Action to be taken when turbulence is encountered; and
 (d) Actions to be taken in the event of an emergency and/or an evacuation.

IEM OPS-3.210(b) Establishment of procedures

(See CAR OPS-3.210(b))

When an operator establishes procedures and a checklist system for use by cabin crew with respect to the Helicopter cabin, at least the following items should be taken into account:

	ITEM	Pre-Take-Off	In-Flight	Pre-Landing	Post Landing
1.	Brief of cabin crew by the in-charge cabin crew member prior to commencement of a flight or series of flights.	X			
2.	Check of safety equipment in accordance with operator's policies and procedures.	X			
3.	Security checks as required by Subpart S (CAR OPS 3.1250).	X			X
4.	Supervision of passenger embarkation and disembarkation (CAR OPS-3.075; CAR OPS-3.105; CAR OPS-3.270; CAR OPS-3.280; CAR OPS-3.305).	X			X
5.	Securing of passenger cabin (e.g. seat belts, cabin cargo/baggage etc. (CAR OPS-3.280; CAR OPS-3.285; CAR OPS-3.310).	X	if required	X	
6.	Securing of galleys and stowage of equipment and during turbulence (CAR OPS-3.325).	X	X	X	
7.	Intentionally left blank.				
8.	Safety information to passengers (CAR OPS 3.285).	X	X	if required	X
9.	'Cabin secure' report to flight crew.	X	If required	X	
10.	Operation of cabin lights.	X	If required	X	X
11.	Cabin crew at crew stations for turbulence, take-off and landing. (CAR OPS-3.310,	X	If required	X	X
12.	Surveillance of passenger cabin.	X	X	X	X
13.	Prevention and detection of fire in the cabin (including the combi-cargo area), crew rest areas, galleys and toilets and instructions for actions to be taken.	X	X	X	X
14.	Action to be taken when turbulence is encountered or inflight incidents (pressurisation failure, medical emergency etc.) (See also CAR OPS-3.320 and CAR OPS-3.325).	X	X		
15.	Intentionally left blank.				
16.	Reporting of any deficiency and/or unserviceability of equipment and/or any incident (See also CAR OPS 3.420).	X	X	X	X

AC OPS 3.210(d) Establishment of Procedures

(See OPS 3.210)

The intent of this paragraph is to ensure that the pilot remains at the controls when the rotors are turning under power whilst not preventing ground runs being conducted by qualified personnel other than pilots. The operator should ensure that the qualification of personnel, other than pilots, who are authorised to conduct ground runs is described in the appropriate manual.

AMC No 1 to OPS 3.220 Authorisation of Heliports by the Operator See OPS 3.220

(a) When defining sites for use as heliports (including infrequent or temporary heliports) for the type(s) of helicopter(s) and operation(s) concerned, the operator should take account of the following:

(b) An adequate site is a site which the operator considers to be satisfactory, taking account of the applicable performance requirements and site characteristics (guidance on standards and criteria are contained in ICAO Annex 14 Volume 2 and in the ICAO 'Heliport Manual' (Doc 9261-AN/903)).

(c) The operator should have in place a procedure for the survey of sites by a competent person. Such a procedure should take account for possible changes to the site characteristics which may have taken place since last surveyed.

(d) Sites which are pre-surveyed should be specifically authorised in the operator's Operations Manual. The Operations Manual should contain diagrams or/and ground and aerial photographs, and depiction (pictorial) and description of:

(1) The overall dimensions of the site;
(2) Location and height of relevant obstacles to approach and take-off profiles, and in the manoeuvring area;
(3) Approach and take-off flight paths;
(4) Surface condition (blowing dust/snow/sand);
(5) Helicopter types authorised with reference to performance requirements;
(6) Provision of control of third parties on the ground (if applicable);
(7) Procedure for activating site with land owner or controlling authority;
(8) Other useful information, for example appropriate ATS agency and frequency;
(9) Lighting (if applicable);

(e) For sites which are not pre-surveyed, the Operator should have in place a procedure which enables the pilot to make, from the air, a judgment on the suitability of a site. Items (a) to (f) inclusive in (4) above should be considered.

(f) Operations to non pre-surveyed sites by night (except in accordance with Appendix 1 to 3.005(d) -(c)(2)(i)(C)) should not be permitted.

AMC No 2 to OPS 3.220 Authorisation of Heliports by the Operator - Helidecks
(See OPS 3.220 & See OPS 3.1045)

(a) The content of Part C of the Operations Manual relating to the specific authorisation of helidecks should contain both the listing of helideck limitations in a Helideck Limitations List (HLL) and a pictorial representation (template) of each helideck showing all necessary information of a permanent nature. The HLL will show, and be amended as necessary to indicate, the most recent status of each helideck concerning non-compliance with ICAO Annex 14 Volume 2, limitations, warnings, cautions or other comments of operational importance. An example of a typical template is shown in Figure 1.

(b) In order to ensure that the safety of flights is not compromised, the operator should obtain relevant information and details for compilation of the HLL, and the pictorial representation, from the owner/operator of the helideck.

(c) When listing helidecks, if more than one name of the helideck exists, the most common name should be used, other names should also be included. After renaming a helideck, the old name should be included in the HLL for the ensuing 6 months.

(d) All helideck limitations should be included in the HLL. Helidecks without limitations should also be listed. With complex installations and combinations of installations (e.g. co-locations), a separate listing in the HLL, accompanied by diagrams where necessary, may be required.

(e) Each helideck should be assessed (based on limitations, warnings, cautions or comments) to determine its acceptability with respect to the following which, as a minimum, should cover the factors listed below:

(1) The physical characteristics of the helideck.

(2) The preservation of obstacle protected surfaces is the most basic safeguard for all flights. These surfaces are:

- (i) The minimum 210° obstacle free surface (OFS);
- (ii) The 150° limited obstacle surface (LOS); and
- (iii) The minimum 180° falling "5:1" - gradient with respect to significant obstacles. If this is infringed or if an adjacent installation or vessel infringes the obstacle clearance surfaces or criteria related to a helideck, an assessment should be made to determine any possible negative effect which may lead to operating restrictions.

(3) Marking and lighting:

- (i) Adequate perimeter lighting;
- (ii) Adequate floodlighting;
- (iii) Status lights (NB for night and day operations e.g. Aldis Lamp);
- (iv) Dominant obstacle paint schemes and lighting;
- (v) Helideck markings; and
- (vi) General installation lighting levels. Any limited authorisation in this respect should be annotated "daylight only operations" on the HLL.

(4) Deck surface:

- (i) Surface friction;
- (ii) Helideck net;
- (iii) Drainage system;
- (iv) Deck edge netting;
- (v) Tie down system; and
- (vi) Cleaning of all contaminants.

(5) Environment:

- (i) Foreign Object Damage;
- (ii) Physical turbulence generators;
- (iii) Bird control,
- (iv) Air quality degradation due to exhaust emissions, hot gas vents or cold gas vents; and
- (v) Adjacent helidecks may need to be included in air quality assessment.

(6) Rescue and firefighting:

- (i) Primary and complementary media types, quantities, capacity and systems personal protective equipment and clothing, breathing apparatus; and
- (ii) Crash box;

(7) Communications & Navigation:

- (i) Aeronautical Radio(s);
- (ii) R/T callsign to match helideck name and side identification which should be simple and unique;
- (iii) NDB or equivalent (as appropriate);
- (iv) Radio log; and
- (v) Light signal (e.g. Aldis Lamp).

(8) Fuelling facilities:

- (i) In accordance with the relevant national guidance and regulations; .

(9) Additional operational and handling equipment:

- (i) Windsock;
- (ii) Wind recording;

(iii) Deck motion recording and reporting where applicable;
(iv) Passenger briefing system;
(v) Chocks;
(vi) Tie downs; and
(vii) Weighing scales.

(10) Personnel:

(i) Trained helideck staff (e.g. Helicopter Landing Officer/Helicopter Deck Assistant and fire fighters etc.).

(11) Other:

(i) as appropriate.

(f) For helidecks about which there is incomplete information, a 'limited' authorisation based on the information available may be issued by the operator prior to the first helicopter visit. During subsequent operations and before full authorisation is given, information should be gathered and the following procedures should apply:

(1) Pictorial (static) representation:

(i) Template (see figure 1) blanks should be available, to be filled out during flight preparation on the basis of the information given by the helideck owner/operator and flight crew observations.
(ii) Where possible, suitably annotated photographs may be used until the HLL and template has been completed.
(iii) Until the HLL and Template has been completed, operational restrictions (e.g. performance, routing etc.) may be applied.
(iv) Any previous inspection reports should be obtained by the operator.
(v) An inspection of the helideck should be carried out to verify the content of the completed HLL and template, following which the helideck may be fully authorised for operations.

(2) With reference to the above, the HLL should contain at least the following:

(i) HLL revision date and number;
(ii) Generic list of helideck motion limitations;
(iii) Name of Helideck;
(iv) 'D'-value of the helideck; and
(v) Limitations, warnings, cautions and comments.

(3) The template should contain at least the following (see example below):

(i) Installation/Vessel name;
(ii) R/T Callsign;
(iii) Helideck Identification Marking;
(iv) Side Panel Identification Marking;
(v) Helideck elevation;
(vi) Maximum installation/vessel height;
(vii) 'D' Value;
(viii) Type of installation/vessel;

(A) Fixed manned
(B) Fixed unmanned
(C) Ship type (e.g. diving support vessel)
(D) Semi-submersible
(E) Jack-up

(ix) Name of owner/operator;

(x) Geographical position;

(xi) Com/Nav Frequencies and Ident;

(xii) General drawing preferably looking into the helideck with annotations showing location of derrick, masts, cranes, flare stack, turbine and gas exhausts, side identification panels, windsock etc.;

(xiii) Plan view drawing, chart orientation from the general drawing, to show the above. The plan view will also show the 210 degree bisector orientation in degrees true;

(xiv) Type of fuelling:

(A) Pressure and Gravity

(B) Pressure only

(C) Gravity only

(D) None

(xv) Type and nature of firefighting equipment;

(xvi) Availability of GPU;

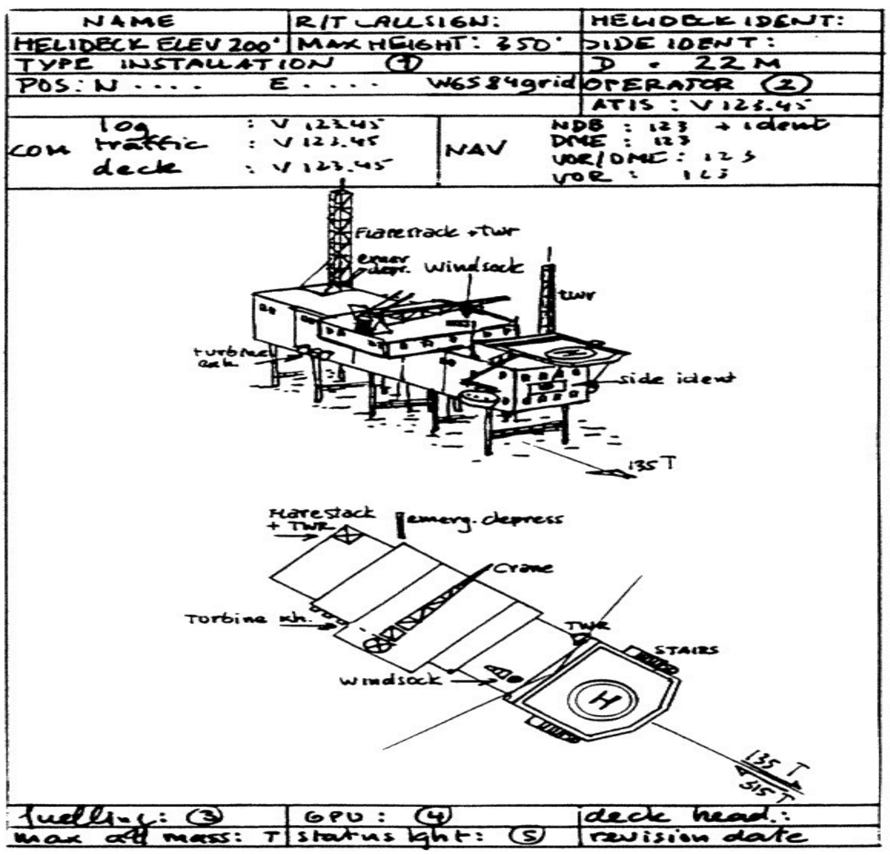
(xvii) Deck heading;

(xviii) Maximum allowable mass;

(xix) Status light (Yes/No); and

(xx) Revision date of publication.

Figure 1 – Helideck Template



1. Fixed manned; fixed unmanned; small ship; large ship; semi-submersible; jack-up.
2. NAM, AMOCO etc.
3. Pressure/gravity; pressure; gravity; no.
4. Yes; no; 28V DC.
5. Yes; no.

AC OPS-3.216 In-flight Operational Instructions

(See CAR OPS-3.216)

When co-ordination with an appropriate Air Traffic Service unit has not been possible, in-flight operational instructions do not relieve a commander of responsibility for obtaining an appropriate clearance from an Air Traffic Service unit, if applicable, before making a change in flight plan.

AMC OPS 3.240(a)(6) Coastal Transit

(See OPS 3.240(a)(6))

(a) Introduction

(1) A helicopter operating overwater in Performance Class 3, has to have certain equipment fitted. This equipment varies with the distance from land that the helicopter is expected to operate. The aim of this AMC is to discuss that distance, bring into focus what fit is required and to clarify the operator's responsibility, when a decision is made to conduct coastal transit operations.

(2) The coastal corridor facility may or may not be available in a particular state, as it is related to the State definition of open sea area as described in the definition of hostile environment and AMC 3.480(a)(12).

(3) Where the term Coastal Transit is used, it means the conduct of operations overwater within the coastal corridor in conditions where there is reasonable expectation that; the flight can be conducted safely in the conditions prevailing; and, following an engine failure, a safe forced landing and successful evacuation can be achieved; and survival of the crew and passengers can be assured until rescue is affected.

(4) Coastal corridor is a variable distance from the coastline to a maximum distance corresponding to 3 minutes flying at normal cruising speed.

(b) Establishing the width of the coastal corridor.

(1) The distance from land of Coastal Transit, is defined the boundary of a corridor that extends from the land, to a maximum distance of up to 3 minutes at normal cruising speed (approximately 5 - 6 nm). Land in this context includes sustainable ice (see a. to c. below) and, where the coastal region includes islands, the surrounding waters may be included in the corridor and aggregated with the coast and each other. Coastal transit need not be applied to inland waterways, estuary crossing or river transit.

(i) In some areas, the formation of ice is such that it can be possible to land, or force land, without hazard to the helicopter or occupants. Unless the Authority considers that operating to, or over, such ice fields is unacceptable, the operator may regard the definition of the "land" extends to these areas.

(ii) The interpretation of the following rules may be conditional on a. above:

(A) OPS 3.240(a)(6)

(B) OPS 3.825

(C) OPS 3.827

(D) OPS 3.830

(E) OPS 3.843

(iii) In view of the fact that such featureless and flat white surfaces could present a hazard and could lead to white-out conditions, the definition of land does not extend to flights over ice fields in the following rules:

(A) OPS 3.650(i)

(B) OPS 3.660

(2) The width of the corridor is variable from not safe to conduct operations in the conditions prevailing, to the maximum of 3 minutes wide. A number of factors will, on the day, indicate if it can be used - and how wide it can be. These factors will include but not be restricted to: a. The meteorological conditions prevailing in the corridor;

(i) The instrument fit of the aircraft;
(ii) The certification of the aircraft - particularly with regard to floats;
(iii) The sea state;
(iv) The temperature of the water;
(v) The time to rescue; and
(vi) The survival equipment carried.

These can be broadly divided into three functional groups:

Those which meet the requirement for safe flying - a. and b..

Those which meet the requirement for a safe forced landing and evacuation - a., b., c. and d.

Those which meet the requirement for survival following a forced landing and successful evacuation - a., d., e., f. and g.

(c) Requirement for safe flying

(1) It is generally recognised that when flying out of sight of land in certain meteorological conditions, such as occur in high pressure weather patterns (goldfish bowl - no horizon, light winds and low visibility), the absence of a basic panel (and training) can lead to disorientation. In addition, lack of depth perception in these conditions demands the use of a radio altimeter with an audio voice warning as an added safety benefit - particularly when autorotation to the surface of the water may be required.

(2) In these conditions a helicopter, without the required instruments and radio altimeter, should be confined to a corridor in which a pilot can maintain reference using the visual cues on the land.

(d) Requirement for a safe forced landing and evacuation

(1) Weather and sea state both affect the outcome of an autorotation following an engine failure. It is recognised that the measurement of sea state is problematical and when assessing such conditions, good judgement has to be exercised by the operator and the commander.

(2) Where floats have been certificated only for emergency use (and not for ditching), operations must be limited to those sea states which meet the requirement for such use - where a safe evacuation is possible.

Note: Ditching certification requires compliance with a comprehensive number of requirements relating to rotorcraft water entry, flotation and trim, occupant egress and occupant survival. Emergency flotation systems, generally fitted to smaller FAA Part 27 rotorcraft, are approved against a broad requirement that the equipment must perform its intended function and not hazard the rotorcraft or its occupants. In practice, the most significant difference between ditching and emergency flotation systems is substantiation of the water entry phase. Ditching requirements call for water entry procedures and techniques to be established and promulgated in the Flight Manual. The fuselage/flotation equipment must thereafter be shown to be able to withstand loads under defined water entry conditions which relate to these procedures. For emergency flotation equipment, there is no requirement to define the water entry technique and no specific conditions defined for the structural substantiation.

(e) Requirements for survival

(1) Survival of crew members and passengers, following a successful autorotation and evacuation, is dependent on the clothing worn, the equipment carried and worn, the temperature of the

sea and the sea state (see AMC OPS 3.827). Search and rescue response/capability consistent with the anticipated exposure should be available before the conditions in the corridor can be considered non-hostile.

(2) Coastal Transit can be conducted providing the requirements of paragraph 3 and 4 are met, and the conditions for a non-hostile coastal corridor are satisfied.

AMC OPS 3.243 Operations in Areas with Specific Navigation Performance Requirements

(See OPS 3.243)

(a) The requirements and procedures relating to areas in which minimum navigation performance specifications are prescribed, based on Regional Air Navigation Agreements, are covered (as indicated for the type of navigation performance specification) in the following documentation: a. RNP information and associated procedures - ICAO DOC 9613; and

(1) EUROCONTROL Standards on Area Navigation to comply with RNP/RNAV.

(2) JAR TGL No. 2 - Advisory material for the airworthiness approval of navigation systems for use in European Airspace designated for Basic RNAV Operations.

(3) For general guidance refer to Performance Based Navigation Manual - ICAO Doc 9613

(b) The following explanatory material has been developed to explain the subject of Required Navigation Performance (RNP) more fully:

(1) Objective of RNP - The RNP concept will replace the conventional method of ensuring required navigation performance by requiring the carriage of specific navigation equipment by worldwide, uniform standards of navigation performance for defined airspace and/or flight procedures. It is therefore up to the operator to decide which system(s) he will utilise to meet the requirements. However, the operator must ensure that the system(s) used is certificated for operations in the airspace concerned.

(2) Navigational Accuracy - RNP is defined as a statement of the navigational accuracy required for operation within a defined area of airspace. Navigational accuracy is based upon a combination of navigation sensor error, airborne sensor error, display error and flight technical error in the horizontal plane. The level of accuracy is expressed as a single parameter and it defines the distance from helicopter's intended position within which the aircraft must be maintained for at least 95% of the total flying time. As an example, RNP 4 means that all aircraft remain within 4 nm of their intended positions for at least 95% of the total flying time.

(3) PBN for En-Route Operations - In order to consider the requirements for performance-based navigation for various areas of airspace and/or routes, RNP types have been defined for worldwide, uniform application in en-route operations as follows:

(i) RNP 1 requires highly accurate position information and will be associated with highdensity continental traffic. Full exploitation of the benefits of RNP 1 (in connection with area navigation (RNAV)) will require that a high percentage of aircraft achieves this level of navigation performance.

(ii) RNP 4 will normally be applied in continental areas in which the route structure is presently based on VOR/DME.

AMC OPS-3.250 Establishment of Minimum Flight Altitudes

(See CAR OPS-3.250)

(a) The following are examples of some of the methods available for calculating minimum flight altitudes.

(b) KSS Formula

(1) Minimum obstacle clearance altitude (MOCA). MOCA is the sum of:

(i) The maximum terrain or obstacle elevation whichever is highest; plus

(ii) 1,000 ft for elevation up to and including 6,000 ft; or

(iii) 2,000 ft for elevation exceeding 6,000 ft rounded up to the next 100 ft.

A. The lowest MOCA to be indicated is 2,000 ft.

B. From a VOR station, the corridor width is defined as a borderline starting 5 nm either side of the VOR, diverging 4° from centreline until a width of 20 nm is reached at 70 nm out, thence paralleling the centreline until 140 nm out, thence again diverging 4° until a maximum width of 40 nm is reached at 280 nm out. Thereafter the width remains constant (see figure 1).

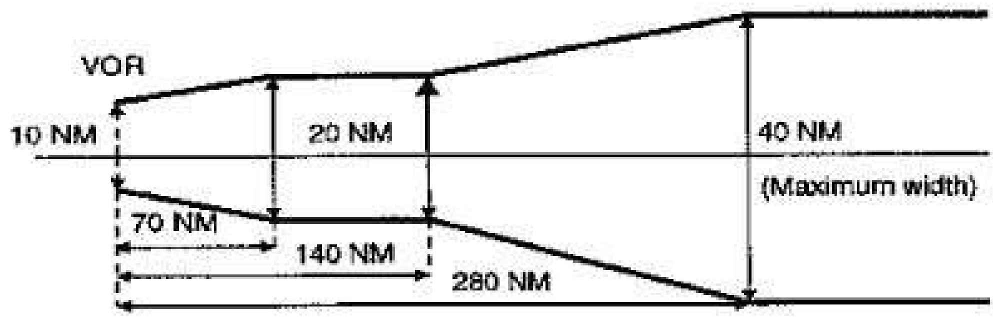


FIGURE 1

C. From an NDB, similarly, the corridor width is defined as a borderline starting 5 nm either side of the NDB diverging 7° until a width of 20 nm is reached 40 nm out, thence paralleling the centreline until 80 nm out, thence again diverging 7° until a maximum width of 60 nm is reached 245 nm out. Thereafter the width remains constant (see figure 2).

D. MOCA does not cover any overlapping of the corridor.

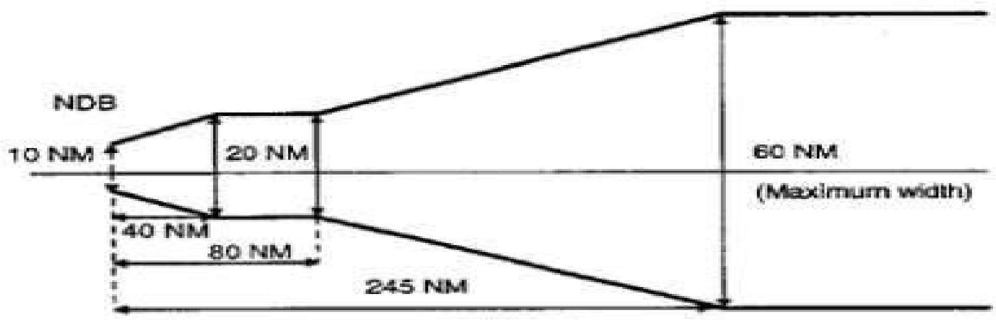


FIGURE 2

(2) Minimum off-route altitude (MORA). MORA is calculated for an area bounded by every or every second LAT/LONG square on the Route Facility Chart (RFC)/Terminal Approach Chart (TAC) and is based on a terrain clearance as follows:

(i) Terrain with elevation up to 6,000 ft (2,000 m) – 1,000 ft above the highest terrain and obstructions;

(ii) Terrain with elevation above 6,000 ft (2,000 m) – 2,000 ft above the highest terrain and obstructions.

(c) Jeppesen Formula (see figure 3)

(1) MORA is a minimum flight altitude computed by Jeppesen from current ONC or WAC charts. Two types of MORAs are charted which are:

(i) Route MORAs e.g. 9800a; and

(ii) Grid MORAs e.g. 98.

(2) Route MORA values are computed on the basis of an area extending 10 nm to either side of route centreline and including a 10 nm radius beyond the radio fix/reporting point or mileage break defining the route segment.

(3) MORA values clear all terrain and man-made obstacles by 1,000 ft in areas where the highest terrain elevation or obstacles are up to 5,000 ft. A clearance of 2,000 ft is provided above all terrain or obstacles which are 5,001 ft and above.

(4) A Grid MORA is an altitude computed by Jeppesen and the values are shown within each Grid formed by charted lines of latitude and longitude. Figures are shown in thousands and hundreds of feet (omitting the last two digits so as to avoid chart congestion). Values followed by ± are believed not to exceed the altitudes shown. The same clearance criteria as explained in paragraph 3(c) above apply.

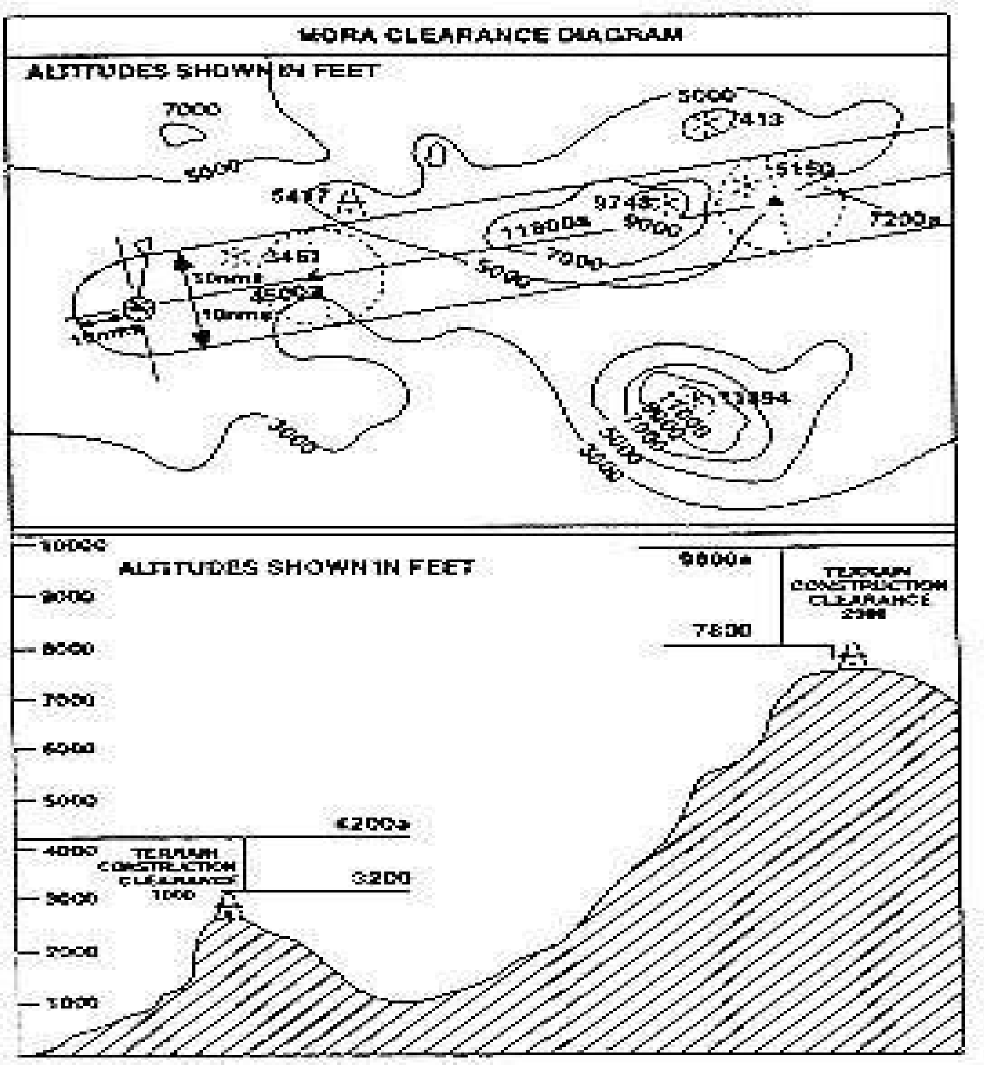


FIGURE 3

(d) ATLAS Formula

(1) Minimum safe En-route Altitude (MEA). Calculation of the MEA is based on the elevation of the highest point along the route segment concerned (extending from navigational aid to navigational aid) within a distance on either side of track as specified below:

(i) Segment length up to 100 nm – 10 nm (See Note 1 below).

(ii) Segment length more than 100 nm – 10% of the segment length up to a maximum of 60 nm (See Note 2 below).

NOTE 1: This distance may be reduced to 5 nm within TMAs where, due to the number and type of available navigational aids, a high degree of navigational accuracy is warranted.

NOTE 2: In exceptional cases, where this calculation results in an operationally impracticable value, an additional special MEA may be calculated based on a distance of not less than 10 nm either side of track. Such special MEA will be shown together with an indication of the actual width of protected airspace.

(2) The MEA is calculated by adding an increment to the elevation specified above as appropriate:

Elevation of highest point	***Increment***
Not above 5,000 ft	1,500 ft
Above 5,000 ft but not above 10,000 ft	2,000 ft
Above 10,000 ft	10% of elevation plus 1,000 ft

NOTE: For the last route segment ending over the initial approach fix, a reduction to 1,000 ft is permissible within TMAs where, due to the number and type of available navigation aids, a high degree of navigational accuracy is warranted.

The resulting value is adjusted to the nearest 100 ft.

(3) Minimum safe Grid Altitude (MGA). Calculation of the MGA is based on the elevation of the highest point within the respective grid area. The MGA is calculated by adding an increment to the elevation specified above as appropriate:

Elevation of highest point	***Increment***
Not above 5, 000 ft	1,500 ft
Above 5,000 ft but not above 10,000 ft	2,000 ft
Above 10,000 ft	10% of elevation plus 1,000 ft

The resulting value is adjusted to the nearest 100 ft.

AMC OPS-3.255 Fuel Policy

(See OPS 3.255)

The operator should base the company fuel policy, including calculation of the amount of fuel to be carried, on the following planning criteria:

(a) The amount of:

(1) Taxi fuel, which should not be less than the amount, expected to be used prior to take-off. Local conditions at the departure heliport and APU consumption should be taken into account.

(2) Trip fuel, which should include:

(i) Fuel for take-off and climb from heliport elevation to initial cruising level/altitude, taking into account the expected departure routing;

(ii) Fuel from top of climb to top of descent, including any step climb/descent;

(iii) Fuel from top of descent to the point where the approach procedure is initiated, taking into account the expected arrival procedure; and

(iv) Fuel for approach and landing at the destination heliport.

(3) Contingency fuel, which should be:

(i) For IFR flights, or for VFR flights in hostile environment, 10% of the planned trip fuel;or

(ii) For VFR flights in a non-hostile environment, 5% of the planned trip fuel;

(4) Alternate fuel, which should be:

(i) Fuel for a missed approach from the applicable MDA/DH at the destination heliport to missed approach altitude, taking into account the complete missed approach procedure;

(ii) Fuel for a climb from missed approach altitude to cruising level/altitude;

(iii) Fuel for the cruise from top of climb to top of descent;

(iv) Fuel for descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

(v) Fuel for executing an approach and landing at the destination alternate heliport selected in accordance with OPS 3.295.

(vi) For helicopters operating to or from helidecks located in a hostile environment, 10% of a. to e. above.

(5) Final reserve fuel, which is:

(i) For VFR flights navigating by day with reference to visual landmarks, 20 minutes fuel at best range speed; or

(ii) For IFR flights or when flying VFR and navigating by means other than by reference to visual landmarks or at night, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the destination heliport in standard conditions calculated with the estimated mass on arrival above the alternate, or the destination, when no alternate is required.

(6) Extra fuel, which should be at the discretion of the commander.

(b) Isolated heliport IFR procedure. If the operator's fuel policy includes planning to an isolated heliport flying IFR, or when flying VFR and navigating by means other than by reference to visual landmarks, for which a destination alternate does not exist, the amount of fuel at departure should include:

(1) Taxi fuel;

(2) Trip fuel;

(3) Contingency fuel calculated in accordance with sub-paragraph 1.3 above;

(4) Additional fuel to fly for two hours at holding speed including final reserve fuel; and

(5) Extra fuel at the discretion of the commander.

(c) Sufficient fuel should be carried at all times to ensure that following the failure of a power unit which occurs at the most critical point along the route, the helicopter is able to: a. Descend as necessary and proceed to an adequate heliport; and

(1) Hold there for 15 minutes at 1 500 ft (450 m) above heliport elevation in standard conditions; and

(2) Make an approach and landing. (See AMC OPS 3.500(a)(5) and AMC OPS 3.530(a)(5)).

AMC OPS-3.255(c)(3)(i) Contingency Fuel

(See CAR OPS-3.255(c)(3)(i))

(a) At the planning stage, not all factors which could have an influence on the fuel consumption to the destination heliport can be foreseen. Therefore, contingency fuel is carried to compensate for items such as:

(1) Deviations of an individual Helicopter from the expected fuel consumption data;

(2) Deviations from forecast meteorological conditions; and

(3) Deviations from planned routings and/or cruising levels/altitudes.

IEM OPS-3.260 Carriage of persons with Reduced Mobility

(See CAR OPS-3.260)

(a) A person with reduced mobility (PRM) is understood to mean a person whose mobility is reduced due to physical incapacity (sensory or locomotory), an intellectual deficiency, age, illness or any other cause of disability when using transport and when the situation needs special attention and the adaptation to a person's need of the service made available to all passengers.

(b) In normal circumstances PRMs should not be seated adjacent to an emergency exit.

(c) In circumstances in which the number of PRMs forms a significant proportion of the total number of passengers carried on board:

(1) The number of PRMs should not exceed the number of able-bodied persons capable of assisting with an emergency evacuation; and
(2) The guidance given in paragraph (2) above should be followed to the maximum extent possible.

AMC OPS-3.270 Cargo carriage in the passenger cabin
(See CAR OPS-3.270)

(a) In establishing procedures for the carriage of cargo in the passenger cabin of a Helicopter, an operator should observe the following:
   (1) That dangerous goods are not permitted (See also CAR OPS-3.1310(a));
   (2) That a mix of the passengers and live animals should not be permitted except for pets (weighing not more than 8 kg) and guide dogs;
   (3) That the weight of the cargo does not exceed the structural loading limit(s) of the cabin floor or seat(s);
   (4) That the number/type of restraint devices and their attachment points should be capable of restraining the cargo in accordance with EASA CS-25 or equivalent as accepted by the CAA;
   (5) That the location of the cargo should be such that, in the event of an emergency evacuation, it will not hinder egress nor impair the cabin crew's view.

AC OPS-3.280 Passenger Seating
(See CAR OPS-3.280 & IEM OPS-3.280)

(a) An operator should establish procedures to ensure that:
   (1) The passengers who are allocated seats which permit direct access to emergency exits, shall appear to be reasonably fit, strong and able to assist the rapid evacuation of the Helicopter in an emergency after the appropriate briefing by the crew:
   (2) In all cases, passengers who, because of their condition, may hinder other passengers during an evacuation or who may impede the crew in carrying out their duties, should not be allocated seats which permit direct access to emergency exits. If the operator is unable to establish procedures which can be implemented at the time of passenger 'check-in', an alternative procedure acceptable to the Authority will be established that allows for correct seat allocation prior to departure.
(b) The above text does not apply to helicopters where the normal exit also serves as an emergency exit. However in these circumstances, the operator should apply discretion when choosing passengers to sit next to a normal exit to ensure that evacuation is not hindered in the case of an emergency.

IEM OPS-3.280 Passenger Seating
(See CAR OPS-3.280)

(a) The following categories of passengers are among those who should not be allocated to, or directed to seats which permit direct access to emergency exits:
   (1) Passengers suffering from obvious physical, mental, or handicapped to the extent that they would have difficulty in moving quickly if asked to do so;
   (2) Passengers who have either impaired vision or impaired hearing to the extent that they might not readily understand printed or verbal instructions given;
   (3) Passengers who may have difficulty in moving quickly due of age, frail or sickness will be allocated a seat where assistance can be organised;
   (4) Obese passengers who would have difficulty in moving quickly or reaching and passing through the adjacent emergency exit;

(5) Children (whether accompanied or not) and infants;
(6) Deportees or prisoners in custody; and,
(7) Passengers with animals.

Note: "Direct access" means a seat from which a passenger can proceed directly to the exit without entering an aisle or passing around an obstruction.

AMC OPS 3.295(c)(1) Selection of Heliports
(See OPS 3.295(c)(1))

(a) Any alleviation from the requirement to select an alternate heliport for a flight to a coastal heliport is applicable only to helicopters routing from offshore, and should be based on an individual safety case assessment.

(b) The following should be taken into account:
- (1) Suitability of the weather based on the landing forecast for the destination;
- (2) The fuel required to meet the requirements of OPS 3.255 less alternate fuel;
- (3) Where the destination coastal heliport is not directly on the coast it should be:
  - (i) Within a distance that, with the fuel specified in 2.2. above, the helicopter can, at any time after crossing the coastline, return to the coast, descend safely and carry out a visual approach and landing with VFR fuel reserves intact, and
  - (ii) Geographically sited so that the helicopter can, within the Rules of the Air, and within the landing forecast:
    - (A) proceed inbound from the coast at 500 ft AGL and carry out a visual approach and landing; or
    - (B) proceed inbound from the coast on an agreed route and carry out a visual approach and landing.
- (4) Procedures for coastal heliports should be based on a landing forecast no worse than:
  - (i) By Day. A cloud base of DH/MDH + 400ft, and a visibility of 4km, or, if descent over the sea is intended, a cloud base of 600ft and a visibility of 4km.
  - (ii) By Night. A cloud base of 1 000ft and a visibility of 5km.
- (5) The descent to establish visual contact with the surface should take place over the sea or as part of the instrument approach;
- (6) Routings and procedures for coastal heliports nominated as such should be included in the Operations Manual Part C - Route and Heliport Instructions and Information;
- (7) The MEL should reflect the requirement for Airborne Radar and Radio Altimeter for this type of operation;
- (8) Operational limitations for each coastal heliport should be acceptable to the Authority.

(c) The procedures contained in AMC OPS 3.295(c)(1) are weather critical. Consequently, a "Landing forecast" conforming to the standards contained in the Regional Air Navigation Plan and ICAO Annex 3 has been specified.

(d) The "Landing forecast" consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or heliport during the two-hour period immediately following the time of issue. It contains surface wind, visibility, significant weather and cloud elements, and may contain other significant information, such as barometric pressure and temperature, as agreed between the meteorological authority and the operators concerned.

(e) The detailed description of the landing forecast is promulgated in the ICAO Regional Air Navigation Plan and also in ICAO Annex 3, together with the operationally desirable accuracy of the forecast elements. In particular, the value of the observed cloud height and visibility elements should remain within the +/- 30% of the forecast values in 90% of the cases.

(a) The landing forecast most commonly takes the form of a routine or special selected meteorological report in the METAR code to which a TREND is added. The code words “NOSIG”, i.e. no significant change expected; “BECMG” (becoming); or “TEMPO” (temporarily); followed by the expected change, are used. The two-hour period of validity of the forecast commences at the time of the meteorological report.

AMC OPS 3.295 (e) Selection of Heliports

(See OPS 3.295 (e))

(a) Offshore alternate deck landing environment

The landing environment of a helideck that is proposed for use as an Offshore Alternate should be pre-surveyed and, as well as the physical characteristics, the effect of wind direction and strength, and turbulence established. This information, which should be available to the Commander at the planning stage and in flight, should be published in an appropriate form in the Operations Manual Part C (including the orientation of the helideck) such that the suitability of the helideck for use as an Offshore Alternate, can be assessed. The alternate helideck should meet the criteria for size and obstacle clearance appropriate to the performance requirements of the type of helicopter concerned.

(b) Performance considerations

The use of an Offshore Alternate is restricted to helicopters which can achieve One Engine Inoperative (OEI) In Ground Effect (IGE) hover at an appropriate power rating at the Offshore alternate. Where the surface of the Offshore alternate helideck, or prevailing conditions (especially wind velocity), precludes an OEI In Ground Effect hover (IGE), OEI Out of Ground Effect (OGE) hover performance at an appropriate power rating should be used to compute the landing mass. The landing mass should be calculated from graphs provided in the relevant Part B of the Operations Manual. (When arriving at this landing mass, due account should be taken of helicopter configuration, environmental conditions and the operation of systems which have an adverse effect on performance.) The planned landing mass of the helicopter including crew, passengers, baggage, cargo plus 30 minutes Final Reserve fuel, should not exceed the OEI landing mass at the time of approach to the Offshore alternate.

(c) Weather considerations

(1) Meteorological Observations

When the use of an Offshore Alternate is planned, the meteorological observations at the destination and alternate should be taken by an Observer acceptable to the Authority responsible for the provision of meteorological services. (Automatic meteorological observations stations may be used if acceptable).

(2) Weather Minima

When the use of an Offshore alternate is planned, the operator should not select a helideck as a destination or offshore alternate unless the aerodrome forecast, indicates that, during a period commencing one hour before and ending one hour after the expected time of arrival at the destination and offshore alternate, the weather conditions will be at or above the planning minima shown in Table 1 below.

Table 1

	Day	Night
Cloud Base	600 ft	800 ft
Visibility	4 km	5 km

(3) Conditions of Fog
Where fog is forecast, or has been observed within the last two hours within 60 nm of the destination or alternate, offshore alternates should not be used.

(d) Actions at Point of No Return
Before passing the Point of No Return - which should not be more that 30 minutes from the destination - the following actions should have been completed:

(1) Confirmation that navigation to the destination and offshore alternate can be assured.
(2) Radio contact with the destination and offshore alternate (or master station) has been established.
(3) The landing forecast at the destination and offshore alternate have been obtained and confirmed to be at or above the required minima.
(4) The requirements for One Engine Inoperative landing (see paragraph 2 above) have been checked (in light of the latest reported weather conditions) to ensure that they can be met.
(5) To the extent possible, having regard to information on current and forecast use of the offshore alternate and on conditions prevailing, the availability of the offshore alternate should be guaranteed by the duty holder (the rig operator in the case of fixed installations and the owner in the case of mobiles) until the landing at the destination, or the offshore alternate, has been achieved (or until offshore shuttling has been completed).

(e) Offshore shuttling
Provided that the actions in paragraph 4 above have been completed, offshore shuttling, using an offshore alternate, may be carried out.

AMC OPS 3.295(e) Off-shore Alternates

(See OPS 3.295(e))

When operating off shore, any spare payload capacity should be used to carry additional fuel if it would facilitate the use of an onshore alternate.

AMC OPS 3.295(e)(4) Selection of Heliports - Landing Forecast See OPS 3.295(e)(4)

(a) The procedures contained in AMC OPS 3.295(e) are weather critical. Consequently, meteorological data conforming to the standards contained in the Regional Air Navigation Plan and ICAO Annex 3 has been specified. As the following meteorological data is point specific, caution should be exercised when associating it with nearby heliports (or helidecks).

(b) Meteorological Reports (METARs)

(1) Routine and special meteorological observations at offshore installations should be made during periods and at a frequency agreed between the meteorological authority and the operator concerned. They should comply with the requirements contained in the meteorological section of the ICAO Regional Air Navigation Plan, and should conform to the standards and recommended practices, including the desirable accuracy of observations, promulgated in ICAO Annex 3.
(2) Routine and selected special reports are exchanged between meteorological offices in the METAR or SPECI code forms prescribed by the World Meteorological Organisation.

(c) Aerodrome Forecasts (TAFS)

(1) The aerodrome forecast consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or heliport during a specified period of validity, which is normally not less than 9 hours, or more than 24 hours in duration. The forecast includes surface wind, visibility, weather and cloud, and expected changes of one or more of these elements during the period. Additional elements may be included as agreed between the

meteorological authority and the operators concerned. Where these forecasts relate to offshore installations, barometric pressure and temperature should be included to facilitate the planning of helicopter landing and take-off performance.

(2) Aerodrome forecasts are most commonly exchanged in the TAF code form, and the detailed description of an aerodrome forecast is promulgated in the ICAO Regional Air Navigation Plan and also in ICAO Annex 3, together with the operationally desirable accuracy elements. In particular, the observed cloud height should remain within +/- 30% of the forecast value in 70% of cases, and the observed visibility should remain within +/- 30% of the forecast value in 80% 0f cases.

(d) Landing Forecasts (TRENDS)

(1) The landing forecast consists of a concise statement of the mean or average meteorological conditions expected at an aerodrome or heliport during the two-hour period immediately following the time of issue. It contains surface wind, visibility, significant weather and cloud elements, and other significant information, such as barometric pressure and temperature, as may be agreed between the meteorological authority and the operators concerned.

(2) The detailed description of the landing forecast is promulgated in the ICAO Regional Air Navigation Plan and also in ICAO Annex 3, together with the operationally desirable accuracy of the forecast elements. In particular, the value of the observed cloud height and visibility elements should remain within +/-30% of the forecast values in 90% of the cases.

(3) Landing forecasts most commonly take the form of routine or special selected meteorological reports in the METAR code, to which either the code words “NOSIG”, i.e. no significant change expected; “BECMG” (becoming), or “TEMPO” (temporarily), followed by the expected change, are added. The two-hour period of validity commences at the time of the meteorological report.

AMC OPS 3.295 (e)(5) In-flight procedures: Meteorological Observations

Note: The procedures for making meteorological observations on board aircraft in flight and for recording and reporting them are contained in Annex 3, the PANS-ATM (Doc 4444), the PANS-MET (Doc 10157) and the appropriate Regional Supplementary Procedures (Doc 7030). Refer to CAR 174 and related AMC for additional information.

AMC OPS-3.300 Submission of ATS Flight plan

(See CAR OPS-3.300)

(a) Flights without ATS flight plan. When unable to submit or to close the ATS flight plan due to lack of ATS facilities or any other means of communications to ATS, an operator should establish procedures, instructions and a list of authorised persons to be responsible for alerting search and rescue services.

(b) To ensure that each flight is located at all times, these instructions should:

(1) Provide the authorised person with at least the information required to be included in a VFR Flight plan, and the location, date and estimated time for re-establishing communications;

(2) If a Helicopter is overdue or missing, provide for notification to the appropriate ATS or Search and Rescue facility; and

(3) Provide that the information will be retained at a designated place until the completion of the flight.

IEM OPS-3.305 Refuelling/Defuelling with passengers embarking, on board or disembarking

(See CAR OPS-3.305)

When refuelling/defuelling with passengers on board, ground servicing activities and work inside the Helicopter, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and that the aisles and emergency doors are unobstructed.

IEM OPS-3.307 Refuelling/Defuelling with wide-cut fuel

(See CAR OPS 3.307)

(a) 'Wide cut fuel' (designated JET B, JP-4 or AVTAG) is an aviation turbine fuel that falls between gasoline and kerosene in the distillation range and consequently, compared to kerosene (JET A or JET A1), it has the properties of higher volatility (vapour pressure), lower flash point and lower freezing point.

(b) Wherever possible, an operator should avoid the use of wide-cut fuel types. If a situation arises such that only wide-cut fuels are available for refuelling/defuelling, operators should be aware that mixtures of wide-cut fuels and kerosene turbine fuels can result in the air/fuel mixture in the tank being in the combustible range at ambient temperatures. The extra precautions set out below are advisable to avoid arcing in the tank due to electrostatic discharge. The risk of this type of arcing can be minimised by the use of a static dissipation additive in the fuel. When this additive is present in the proportions stated in the fuel specification, the normal fuelling precautions set out below are considered adequate.

(c) Wide-cut fuel is considered to be "involved" when it is being supplied or when it is already present in aircraft fuel tanks.

(d) When wide-cut fuel has been used, this should be recorded in the Technical Log. The next two uplifts of fuel should be treated as though they too involved the use of wide-cut fuel.

(e) When refuelling/defuelling with turbine fuels not containing a static dissipator, and where wide-cut fuels are involved, a substantial reduction on fuelling flow rate is advisable. Reduced flow rate, as recommended by fuel suppliers and/or Helicopter manufacturers, has the following benefits:

  (1) It allows more time for any static charge build-up in the fuelling equipment to dissipate before the fuel enters the tank;

  (2) It reduces any charge which may build up due to splashing; and

  (3) Until the fuel inlet point is immersed, it reduces misting in the tank and consequently the extension of the flammable range of the fuel.

(f) The flow rate reduction necessary is dependent upon the fuelling equipment in use and the type of filtration employed on the Helicopter fuelling distribution system. It is difficult, therefore, to quote precise flow rates. Reduction in flow rate is advisable whether pressure fuelling or over-wing fueling is employed.

IEM OPS-3.310(b) Cabin crew seating positions

(See CAR OPS-3.310(b))

(a) When determining cabin crew seating positions, the operator should ensure that they are:

  (1) Close to a floor level exit;

  (2) Provided with a good view of the area(s) of the passenger cabin for which the cabin crew member is responsible; and

  (3) Evenly distributed throughout the cabin, in the above order of priority.

(b) Paragraph (1) above should not be taken as implying that, in the event of there being more such cabin crew stations than required cabin crew, the number of cabin crew members should be increased.

AC OPS-3.345 Ice and other contaminants Procedures

(a) **General**

  (1) Any deposit of frost, ice, snow or slush on the external surfaces of a Helicopter may drastically affect its flying qualities because of reduced aerodynamic lift, increased drag, modified stability and control characteristics. Furthermore, freezing deposits may cause moving parts, such as elevators, ailerons, flap actuating mechanism etc., to jam and create a potentially hazardous condition.

  Propeller/engine/APU/systems performance may deteriorate due to the presence of frozen contaminants to blades, intakes and components. Also, engine operation may be seriously affected by the ingestion of snow or ice, thereby causing engine stall or compressor damage. In addition, ice/frost may form on certain external surfaces (e.g. wing upper and lower surfaces, etc.) due to the effects of cold fuel/structures, even in ambient temperatures well above 0° C.

(2) The procedures established by the operator for de-icing and/or anti-icing in accordance with CAR OPS-3.345 are intended to ensure that the Helicopter is clear of contamination so that degradation of aerodynamic characteristics or mechanical interference will not occur and, following anti-icing, to maintain the airframe in that condition during the appropriate holdover time. The de-icing and/or anti- icing procedures should therefore include requirements, including type-specific, taking into account manufacturer's recommendations and cover:

(i) Contamination checks, including detection of clear ice and under-wing frost.
Note: Limits on the thickness/area of contamination published in the AFM or other manufacturers' documentation should be followed;

(ii) De-icing and/or anti-icing procedures including procedures to be followed if deicing and/or anti-icing procedures are interrupted or unsuccessful;

(iii) Post treatment checks;

(iv) Pre-take-off checks;

(v) Pre take-off contamination checks;

(vi) The recording of any incidents relating to de-icing and/or anti-icing; and

(vii) The responsibilities of all personnel involved in de-icing and/or anti-icing.

(3) Under certain meteorological conditions de-icing and/or anti-icing procedures may be ineffective in providing sufficient protection for continued operations. Examples of these conditions are freezing rain, ice pellets and hail, heavy snow, high wind velocity, fast dropping OAT or any time when freezing precipitation with high water content is present. No Holdover Time Guidelines exist for these conditions.

(4) Material for establishing operational procedures can be found, for example, in:

(i) ICAO Annex 3, Meteorological Service for International Air Navigation;

(ii) ICAO Doc 9640-AN/940"Manual of aircraft ground de-icing/anti-icing operations";

(iii) ISO 11075 (*) ISO Type I fluid;

(iv) ISO 11076 (*) Aircraft de-icing/anti-icing methods with fluids;

(v) ISO 11077 (*) Self-propelled de-icing/anti-icing vehicles-functional requirements;

(vi) ISO 11078 (*) ISO Type II fluid;

(vii) EUROCAE ED-104/SAE AS 5116 Minimum operational performance specification for ground ice detection systems;

(viii) SAE ARP 4737 Aircraft de-icing/anti-icing methods;

(ix) SAE AMS 1424 Type I fluids;

(x) SAE AMS 1428 Type II, III and IV fluids;

(xi) SAE ARP 1971 Aircraft De-icing Vehicle, Self-Propelled, Large and Small Capacity;

(xii) SAE ARD 50102 Forced air or forced air/fluid equipment for removal of frozen contaminants;

(xiii) SAE ARP 5149 Training Programme Guidelines for De-icing/Anti-icing of Aircraft on Ground.

(b) **Terminology**

Terms used in the context of this AC have the following meanings. Explanations of other definitions may be found elsewhere in the documents listed in paragraph (1)(d). In particular, meteorological definitions may be found in ICAO Doc. 9640.

(1) ***Anti-icing.*** The procedure that provides protection against the formation of frost or ice and

accumulation of snow on treated surfaces of the Helicopter for a limited period of time (holdover time).

(2) ***Anti-icing fluid.*** Anti-icing fluid includes but is not limited to the following:
   (i) Type I fluid if heated to min 60° C at the nozzle;
   (ii) Mixture of water and Type I fluid if heated to min 60°C at the nozzle;
   (iii) Type II fluid;
   (iv) Mixture of water and Type II fluid;
   (v) Type III fluid;
   (vi) Mixture of water and Type III fluid;
   (vii) Type IV fluid;
   (viii) Mixture of water and Type IV fluid.

Note: On uncontaminated Helicopter surfaces Type II, III and IV anti-icing fluids are normally applied unheated.

(3) ***Clear ice.*** A coating of ice, generally clear and smooth, but with some air pockets. It forms on exposed objects, the temperature of which are at, below or slightly above the freezing temperature, by the freezing of super-cooled drizzle, droplets or raindrops.

(4) ***Conditions conducive to Helicopter icing on the ground.*** Freezing fog, freezing precipitation, frost, rain or high humidity (on cold soaked wings), mixed rain and snow and snow.

(5) ***Contamination.*** Contamination in this context is understood as all forms of frozen or semi-frozen moisture such as frost, snow, slush, or ice.

(6) ***Contamination check.*** Check of Helicopter for contamination to establish the need for de-icing.

(7) ***De-icing.*** The procedure by which frost, ice, snow or slush is removed from a Helicopter in order to provide non-contaminated surfaces.

(8) ***De-icing fluid.*** Such fluid includes, but is no limited to, the following:
   (i) Heated water;
   (ii) Type I fluid;
   (iii) Mixture of water and Type I fluid;
   (iv) Type II fluid;
   (v) Mixture of water and Type II fluid;
   (vi) Type III fluid;
   (vii) Mixture of water and Type III fluid;
   (viii) Type IV fluid;
   (ix) Mixture of water and Type IV fluid.

Note: De-icing fluid is normally applied heated to ensure maximum efficiency.

(9) ***De-icing/anti-icing***. This is the combination of de-icing and anti-icing performed in either one or two steps.

(10) ***Ground Ice Detection System (GIDS).*** System used during Helicopter ground operations to inform the ground crew and/or the flight crew about the presence of frost, ice, snow or slush on the Helicopter surfaces.

(11) ***Holdover time (HOT).*** The estimated period of time for which an anti-icing fluid is expected to prevent the formation of frost or ice and the accumulation of snow on the treated surfaces of a Helicopter on the ground in the prevailing ambient conditions.

(12) ***Lowest Operational Use Temperature (LOUT).*** The lowest temperature at which a fluid has been tested and certified as acceptable in accordance with the appropriate aerodynamic acceptance test whilst still maintaining a freezing point buffer of not less than:
   (i) 10° C for a Type I de-icing/anti-icing fluid,
   (ii) 7° C for Type II, III or IV de-/anti-icing fluids.

(13) ***Post treatment check.*** An external check of the Helicopter after de-icing and/or anti- icing treatment accomplished from suitably elevated observation points (e.g. from the deicing equipment itself or other elevated equipment) to ensure that the Helicopter is free from any frost, ice, snow, or slush.

(14) ***Pre-take-off check.*** An assessment, normally performed from within the flight deck, to validate the applied holdover time.

(15) ***Pre-take-off contamination check.*** A check of the treated surfaces for contamination, performed when the hold-over-time has been exceeded or if any doubt exists regarding the continued effectiveness of the applied anti-icing treatment. It is normally accomplished externally, just before the commencement of the take-off run.

(c) **Fluids**

(1) ***Type I fluid.*** Due to its properties, Type I fluid forms a thin, liquid-wetting film on surfaces to which it is applied which, under certain weather conditions, gives a very limited holdover time. With this type of fluid, increasing the concentration of fluid in the fluid/water mix does not provide any extension in holdover time.

(2) ***Type II and Type IV fluids contain thickener which enable the fluid to form a thicker liquid-wetting film on surfaces to which it is applied.*** Generally, this fluid provides a longer holdover time than Type I fluids in similar conditions. With this type of fluid, the holdover time can be extended by increasing the ratio of fluid in the fluid/water mix.

(3) ***Type III fluid:*** a thickened fluid intended especially for use on Helicopters with low rotation speeds.

(4) ***Fluids used for de-icing and/or anti-icing should be acceptable to the operator and the Helicopter manufacturer.*** These fluids normally conform to specifications such as SAE AMS 1424, 1428 or equivalent. Use of non-conforming fluids is not recommended due to their characteristics not being known.

Note: The anti-icing and aerodynamic properties of thickened fluids may be seriously degraded by, for example, inappropriate storage, treatment, application, application equipment and age.

(d) **Communications**

(1) Before Helicopter treatment.
When the Helicopter is to be treated with the flight crew on board, the flight and ground crews should confirm the fluid to be used, the extent of treatment required, and any Helicopter type specific procedure(s) to be used. Any other information needed to apply the HOT tables should be exchanged.

(2) Anti-icing code

(i) The operator's procedures should include an anti-icing code, which indicates the treatment the Helicopter has received. This code provides the flight crew with the minimum details necessary to estimate a holdover time (see para 5 below) and confirms that the Helicopter is free of contamination.

(ii) The procedures for releasing the Helicopter after the treatment should therefore provide the Commander with the anti-icing code.

(3) Anti-icing Codes to be used (examples):

(i) ”Type I“ at (start time) – To be used if anti-icing treatment has been performed with a Type I fluid;

(ii) ”Type II/100“ at (start time) – To be used if anti-icing treatment has been performed with undiluted Type II fluid;

(iii) ”Type II/75“ at (start time) – To be used if anti-icing treatment has been performed with a mixture of 75% Type II fluid and 25% water;

(iv) "Type IV/50" at (start time) – To be used if anti-icing treatment has been performed with a mixture of 50% Type IV fluid and 50% water.

Note 1: When a two-step de-icing/anti-icing operation has been carried out, the Anti-Icing Code is determined by the second step fluid. Fluid brand names may be included, if desired.

(4) After Treatment

Before reconfiguring or moving the Helicopter, the flight crew should receive a confirmation from the ground crew that all de-icing and/or anti-icing operations are complete and that all personnel and equipment are clear of the Helicopter.

(e) **Holdover protection**

(1) Holdover protection is achieved by a layer of anti-icing fluid remaining on and protecting Helicopter surfaces for a period of time. With a one-step de-icing/anti-icing procedure, the holdover time (HOT) begins at the commencement of de-icing/anti- icing. With a two step procedure, the holdover time begins at the commencement of the second (anti-icing) step. The holdover protection runs out:

(i) At the commencement of take-off roll (due to aerodynamic shedding of fluid); or

(ii) When frozen deposits start to form or accumulate on treated Helicopter surfaces, thereby indicating the loss of effectiveness of the fluid.

(2) The duration of holdover protection may vary subject to the influence of factors other than those specified in the holdover time (HOT) tables. Guidance should be provided by the operator to take account of such factors which may include:

(i) Atmospheric conditions, e.g. exact type and rate of precipitation, wind direction and velocity, relative humidity and solar radiation; and

(ii) The Helicopter and its surroundings, such as Helicopter component inclination angle, contour and surface roughness, surface temperature, operation in close proximity to other Helicopters (jet or propeller blast) and ground equipment and structures.

(3) Holdover times are not meant to imply that flight is safe in the prevailing conditions if the specified holdover time has not been exceeded. Certain meteorological conditions, such as freezing drizzle or freezing rain, may be beyond the certification envelope of the Helicopter.

(4) The operator should publish in the Operations Manual the holdover times in the form of a table or diagram to account for the various types of ground icing conditions and the different types and concentrations of fluids used. However, the times of protection shown in these tables are to be used as guidelines only and are normally used in conjunction with pre-take-off check.

(5) References to usable HOT tables should be used for de-/anti-icing aircraft on ground'.

(f) **Procedures to be used**. Operator's procedures should ensure that:

(1) When Helicopter surfaces are contaminated by ice, frost, slush or snow, they are de- iced prior to take-off; according to the prevailing conditions. Removal of contaminants may be performed with mechanical tools, fluids (including hot water), infra-red heat or forced air, taking account of Helicopter type specific requirements.

(2) Account is taken of the wing skin temperature versus OAT, as this may affect:

(i) The need to carry out Helicopter de-icing and/or anti-icing; and

(ii) The performance of the de-icing/anti-icing fluids.

(3) When freezing precipitation occurs or there is a risk of freezing precipitation occurring, which would contaminate the surfaces at the time of take-off, Helicopter surfaces should be anti-iced. If both de-icing and anti-icing are required, the procedure may be performed in a one or two-step process depending upon weather conditions, available equipment, available fluids and the desired holdover time. One-step deicing/ anti-icing means that deicing and anti-icing are carried out at the same time using a mixture of deicing/ anti-icing fluid and water. Two-step de-icing/anti-

icing means that de-icing and anti-icing are carried out in two separate steps. The Helicopter is first de-iced using heated water only or a heated mixture of deicing/anti-icing fluid and water.

After completion of the de-icing operation a layer of a mixture of deicing/anti-icing fluid and water, or of de-icing/anti-icing fluid only, is to be sprayed over the Helicopter surfaces. The second step will be applied, before the first step fluid freezes, typically within three minutes and, if necessary, area by area.

(4) When a Helicopter is anti-iced and a longer holdover time is needed/desired, the use of a less diluted Type II or Type IV fluid should be considered.

(5) All restrictions relative to Outside Air Temperature (OAT) and fluid application (including, but not necessarily limited to temperature and pressure), published by the fluid manufacturer and/or Helicopter manufacturer, are followed. Procedures, limitations and recommendations to prevent formation of fluid residues are followed.

(6) During conditions conducive to Helicopter icing on the ground or after de-icing and/or anti-icing, a Helicopter is not dispatched for departure unless it has been given a contamination check or a post treatment check by a trained and qualified person. This check should cover all treated surfaces of the Helicopter and be performed from points offering sufficient accessibility to these parts. To ensure that there is no clear ice on suspect areas, it may be necessary to make a physical check (e.g. tactile).

(7) The required entry is made in the Technical Log. (See CAR OPS-3.1055).

(8) The Commander continually monitors the environmental situation after the performed treatment. Prior to take-off he performs a pre-take-off check, which is an assessment whether the applied HOT is still appropriate. This pre-take-off check includes, but is not limited to, factors such as precipitation, wind and OAT.

(9) If any doubt exists as to whether a deposit may adversely affect the Helicopter's performance and/or controllability characteristics, the Commander should require a pre-take-off contamination check to be performed in order to verify that the Helicopter's surfaces are free of contamination. Special methods and/or equipment may be necessary to perform this check, especially at night time or in extremely adverse weather conditions. If this check cannot be performed just prior take-off, re-treatment should be applied.

(10) When re-treatment is necessary, any residue of the previous treatment should be removed and a completely new de-icing/anti-icing treatment applied.

(11) When a Ground Ice Detection System (GIDS) is used to perform a Helicopter surfaces check prior to and/or after a treatment, the use of GIDS by suitably trained personnel should be a part of the procedure.

(g) **Special operational considerations**

(1) When using thickened de-icing/anti-icing fluids, the operator should consider a two- step deicing/anti- icing procedure, the first step preferably with hot water and/or non- thickened fluids.

(2) The use of de-icing/anti-icing fluids has to be in accordance with the Helicopter manufacturer's documentation. This is particular true for thickened fluids to assure sufficient flow-off during take-off.

(3) The operator should comply with any type-specific operational requirement(s) such as a Helicopter mass decrease and/or a take-off speed increase associated with a fluid application.

(4) The operator should take into account any flight handling procedures (stick force, rotation speed and rate, take-off speed, Helicopter attitude etc.) laid down by the Helicopter manufacturer when associated with a fluid application.

(5) The limitations or handling procedures resulting from (c) and/or (d) above should be part of the

flight crew pre-take-off briefing.

(h) **Special maintenance considerations**

(1) ***General***

The operator should take proper account of the possible side-effects of fluid use. Such effects may include, but are not necessarily limited to, dried and/or re-hydrated residues, corrosion and the removal of lubricants.

(2) ***Special considerations due to residues of dried fluids***.

The operator should establish procedures to prevent or detect and remove residues of dried fluid. If necessary, the operator should establish appropriate inspection intervals based on the recommendations of the airframe manufacturers and/or own experience:

(i) *Dried fluid residues.*

Dried fluid residue could occur when surfaces has been treated but the aircraft has not subsequently been flown and not been subject to precipitation. The fluid may then have dried on the surfaces;

(ii) *Re-hydrated fluid residues.*

Repetitive application of thickened de-icing/anti-icing fluids may lead to the subsequent formation/buildup of a dried residue in aerodynamically quiet areas, such as cavities and gaps. This residue may re-hydrate if exposed to high humidity conditions, precipitation, washing, etc., and increase to many times its original size/volume. This residue will freeze if exposed to conditions at or below 0°C. This may cause moving parts such as elevators, ailerons, and flap actuating mechanisms to stiffen or jam in flight. Re-hydrated residues may also form on exterior surfaces, which can reduce lift, increase drag and stall speed. Re-hydrated residues may also collect inside control surface structures and cause clogging of drain holes or imbalances to flight controls. Residues may also collect in hidden areas: around flight control hinges, pulleys, grommets, on cables and in gaps;

(iii) Operators are strongly recommended to request information about the fluid dry-out and rehydration characteristics from the fluid manufacturers and to select products with optimised characteristics;

(iv) Additional information should be obtained from fluid manufacturers for handling, storage, application and testing of their products.

(i) **Training**

(1) An operator should establish appropriate initial and recurrent de-icing and/or anti-icing training programmes (including communication training) for flight crew and those of his ground crew who are involved in de-icing and/or anti-icing.

(2) These de-icing and/or anti-icing training programmes should include additional training if any of the following will be introduced:

(i) A new method, procedure and/or technique;

(ii) A new type of fluid and/or equipment; and

(iii) A new type(s) of Helicopter.

(j) **Subcontracting (see AMC OPS-3.035 paragraphs (4) and (5))**

The operator should ensure that the subcontractor complies with the operator's quality and training/qualification requirements together with the special requirements in respect of:

(1) De-icing and/or anti-icing methods and procedures

(2) Fluids to be used, including precautions for storage and preparation for use;

(3) Specific Helicopter requirements (e.g. no-spray areas, propeller/engine de-icing, APU operation etc.);

(4) Checking and communications procedures.

AC OPS-3.346 Flight in expected or actual icing conditions

(See CAR OPS-3.346)

(a) The procedures to be established by an operator should take account of the design, the equipment or the configuration of the Helicopter and also of the training which is needed. For these reasons, different Helicopter types operated by the same company may require the development of different procedures. In every case, the relevant limitations are those which are defined in the Helicopter Flight Manual (HFM) and other documents produced by the manufacturer.

(b) For the required entries in the Operations Manual, the procedural principles which apply to flight in icing conditions are referred to under Appendix 1 to CAR OPS-3.1045, Part A, paragraph 8.3.8 and should be cross- referenced, where necessary, to supplementary, type specific data under Part B, paragraph 4.1.1.

(c) ***Technical content of the Procedures.*** The operator should ensure that the procedures take account of the following:

(1) CAR OPS-3.675;

(2) The equipment and instruments which must be serviceable for flight in icing conditions;

(3) The limitations on flight in icing conditions for each phase of flight. These limitations may be imposed by the Helicopter's de-icing or anti-icing equipment or the necessary performance corrections which have to be made;

(4) The criteria the Flight Crew should use to assess the effect of icing on the performance and/or controllability of the Helicopter;

(5) The means by which the Flight Crew detects, by visual cues or the use of the Helicopter's ice detection system, that the flight is entering icing conditions; and

(6) The action to be taken by the Flight Crew in a deteriorating situation (which may develop rapidly) resulting in an adverse effect on the performance and/or controllability of the Helicopter, due to either:

(i) the failure of the Helicopter's anti-icing or de-icing equipment to control a buildup of ice, and/or

(ii) ice build-up on unprotected areas.

(d) ***Training for dispatch and flight in expected or actual icing conditions.*** The content of the Operations Manual, Part D, should reflect the training, both conversion and recurrent, which Flight Crew, Cabin Crew and all other relevant operational personnel will require in order to comply with the procedures for dispatch and flight in icing conditions.

(1) For the Flight Crew, the training should include:

(i) Instruction in how to recognise, from weather reports or forecasts which are available before flight commences or during flight, the risks of encountering icing conditions along the planned route and on how to modify, as necessary, the departure and in-flight routes or profiles;

(ii) Instruction in the operational and performance limitations or margins;

(iii) The use of in-flight ice detection, anti-icing and de-icing systems in both normal and abnormal operation; and

(iv) Instruction in the differing intensities and forms of ice accretion and the consequent action which should be taken.

(2) For the Cabin Crew, the training should include;

(i) Awareness of the conditions likely to produce surface contamination; and

(ii) The need to inform the Flight Crew of significant ice accretion.

AC OPS-3.390(a)(2) Working Schedules and Record Keeping

(See CAR OPS 1.390(a)(2))

Where in-flight exposure of crew members to cosmic radiation is likely to exceed 1 mSv per year the operator should arrange working schedules, where practicable, to keep exposure below 6 mSv per year. For the purpose of this regulation crew members who are likely to be exposed to more than 6 mSv per year are considered highly exposed and individual records of exposure to cosmic radiation should be kept for each crew member concerned.

AC OPS-3.390(a)(3) Explanatory Information

(See CAR OPS-3.390(a)(3))

Operators should explain the risks of occupational exposure to cosmic radiation to their crew members. Female crew members should know of the need to control doses during pregnancy, and the operator consequently notified so that the necessary dose control measures can be introduced.

AC OPS-3.398 Use of Airborne Collision Avoidance System (ACAS)

(See CAR OPS-3.398)

(a) The ACAS operational procedures and training programmes established by the operator should take into account AMC-29 (EASA) "Operators on Training Programmes for the Use of ACAS". This AMC incorporates advice contained in:
   (1) ICAO Annex 10 Volume 4;
   (2) ICAO Doc 8168 PANS OPS Volume 1;
   (3) ICAO Doc 4444 PANS RAC Part X paragraph 3.1.2; and
   (4) ICAO guidance material “ACAS Performance - Based Training Objectives” (published under Attachment E to State letter AN 7/1.3.7.2-97/77.)

(b) Purpose
   (1) The purpose of this AC is to provide guidance to operators of aircraft that carry airborne collision avoidance systems (ACAS I) equipment. It includes information on the capabilities and limitations of the equipment, and the traffic advisories (TAs) it may generate, together with advice concerning the appropriate flight crew response. Information is also provided on details that should be included in checklists, and in Operations and Training Manuals.
   (2) A list of definitions is provided in Appendix A to this AC.

(c) General
   (1) Notwithstanding that a flight may be made with an air traffic control clearance, it remains the duty of a commander to take all possible measures to ensure that his aircraft does not collide with any other aircraft. Information from an air traffic control (ATC) system may be available, but this may do no more than provide advice as to the proximity of an aircraft that is perceived to constitute a potential threat and, possibly, advise the commander as to how he might best manoeuvre his aircraft to avoid it. ACAS provides flight crew with an independent back up to visual search and the ATC system by alerting them to collision hazards.
   As helicopter performance generally cannot comply with the avoidance criteria present in the algorithms for ACAS II, Resolution Advisories (RAs) and RA avoidance techniques are not covered by this AC. Unless otherwise stated in this document the term ‘ACAS’ refers to ACAS 1 systems

(d) Examples of Limitations of ACAS Equipment
   (1) Dependence on Active Transponder Equipment
   As ACAS relies upon information received from airborne transponders, it cannot detect the presence of aircraft whose transponders are unserviceable or which have not been selected to operate. TAs will not be produced in such circumstances, and they will not be produced in respect

of any aircraft that does not carry transponder equipment, or one whose equipment is incompatible with the international standard.

(2) Limited Capability

ACAS equipment is not capable of resolving the bearing, heading or vertical rates of intruders accurately. For this reason, pilots should not attempt to manoeuvre solely on the basis of TA information (for example in IMC).

(3) Dependence on Altitude-Reporting Transponder Equipment As a comparison cannot be made of both the intruder and the subject aircraft's altitudes or flight levels, ACAS is not dependent on Altitude-Reporting Transponder equipment (SSR Mode C or S). However a TA will be produced, if appropriate, in these circumstances. If this should occur, flight crew should not delay making a visual search supplemented, if the potential threat cannot be seen and gives cause for concern, with a request for assistance from ATC to help them to decide whether a change of flight path should be made.

(4) False and Nuisance TAs

ACAS may generate false and nuisance TAs under normal and safe operating conditions.

(i) False TAs may occur as a result of deficiencies in the equipment or data with which it is provided.

(ii) Nuisance TAs may occur if aircraft flight paths are computed by ACAS to result in potential conflicts, but the advisories are perceived by flight crew to be unwarranted due to:

(A) the intended change of flight path of either aircraft or,

(B) the observance that adequate separation exists and that it is being maintained by both aircraft.

TAs should be treated as genuine unless the intruder has been positively identified and assessed as constituting neither a threat nor a hazard.

(5) Operating Limits

(i) ACAS will be inhibited from producing a full range of TAs in such circumstances of flight as are outside the minimum altitudes specified for operation of the equipment. For this reason, flight crew should be aware of when ACAS will not provide a full range of TA information.

(6) ACAS II Requirements versus Helicopter Performance

(i) ACAS II relies on altitude reporting information from a SSR transponder transmitting in Mode C or Mode S. The resulting altitude deviations require minimum performance criteria to resolve the Resolution Advisory generated by the ACAS II software algorithms. For example the minimum rate of closing speed below Flight Level (FL) 100 is 480 knots, and the minimum Rate of Climb or Descent (RCOD) is 1 500 ft/MIN. Helicopters and most small fixed-wing aircraft cannot comply with these performance criteria and therefore installation of ACAS II (or ACAS III) will not be mandated for these types in the future.

(e) Operations Manuals and Checklists

(1) Operations Manuals should contain, in their introduction to ACAS, information similar to that given in Section 2 above. It should be emphasised that ACAS is not to be regarded as a substitute for the visual search expected to be maintained by flight crew, nor is it intended to replace a clearance given by ATC.

(2) Technical details of the system should at least contain brief descriptions of: Input sources, with reference to TAs; Audio and visual indications of TAs Equipment limitations.

(3) Operational instructions should specify what checks flight crew should carry out prior to take-off to ensure that the ACAS equipment is serviceable, and the action they should take in the event that abnormal or fault conditions arise on the ground or in the air.

(4) Minimum Equipment Lists should define a minimum despatch standard on occasions when ACAS may be partially or fully unserviceable. In this respect full account must be taken of any appropriate legislation that may exist, and of recommendations made by the Authority.

(5) The Operations Manual should state clearly the actions to be taken by crews following receipt of TAs. Section 6 contains detailed guidance. Instructions should take full account of operational constraints consequent upon limitations of the equipment, such as are described in Section 3.

(f) Training

(1) The purpose for which training in the use of ACAS equipment should be provided is to ensure that pilots take appropriate action on receiving TAs.

(2) Training should provide flight crew with information sufficient to enable them to understand the operation of ACAS equipment, including its capabilities and limitations, and the procedures they must use in response to any advisory information that may be generated.

(3) The ground-training syllabus should include the following items:

(i) Descriptions of equipment carried on board the aircraft together with associated controls, circuit protections, information displays and all audio and visual indications.

(ii) Abnormal or fault conditions, and such corrective or disabling actions as may be required.

(iii) Descriptive terms associated with ACAS, and such limitations as necessarily prevent the equipment from providing total protection from approaching aircraft.

(iv) The full sequence of events that may follow from the time an intruder aircraft is first determined to exist until such time as, both aircraft are again proceeding on their cleared or intended courses and, if appropriate, at their assigned altitudes or flight levels. Emphasis should be placed on the need to initiate manoeuvres promptly once these are deemed necessary.

(4) In-flight training covering full ACAS operation including demonstration TAs is impractical. If appropriate a suitably equipped flight simulator is a more desirable way of providing training in the use of ACAS equipment and of providing crew with situations in which they may practice making proper responses.

(5) Records of training provided and competency achieved should be raised and retained for a period of 2 years.

(g) Action to be taken on Receiving TAs

(1) The purposes of a TA are to alert flight crew to the presence of an intruder aircraft, which could require a change to the flight path of the subject aircraft, and to advise them that they should attempt to sight the potential threat.

(2) Flight crew should immediately assimilate information provided by the TA, and commence a visual search of that portion of the sky within which the potential threat should be seen. They should prepare to manoeuvre the aircraft if necessary. If the potential threat cannot be seen and gives cause for concern, flight crew should seek advice from ATC.

(3) If the potential threat is seen and is perceived as likely to result in a definite risk of collision, pilots should manoeuvre their aircraft as necessary ensuring where possible that the sky ahead is clear of other traffic.

(4) When clear of the potential threat and provided no other conflicts are seen to exist, the aircraft should be returned promptly to its intended flight path and ATC advised of any deviation from an air traffic control clearance.

(5) Aircraft Management

(i) Operators should emphasise that flight crew should verify to the best of their ability that the airspace in which they intend to manoeuvre is clear of other aircraft, and that they should inform ATC as soon as it is possible to do so of any departure made from an air traffic control clearance.

(ii) It should be understood that any deviation from an air traffic control clearance has the potential to cause disruption to the controller's tactical plan, and so might result in a reduction in separation between aircraft other than those originally involved. Therefore it is vital that crews maintain an effective look-out and that they return to their intended flight path as soon as is safe and practical to do so.

Appendix A Definitions

(a) ACAS: An acronym for airborne collision avoidance systems.
   (1) ACAS I: An airborne collision avoidance system which utilises interrogations of, and replies from, airborne radar beacon transponders. It provides traffic advisories only.
   (2) ACAS II: An airborne collision avoidance system which utilises interrogations of, and replies from, airborne radar beacon transponders. It provides traffic advisories, and resolution advisories in the vertical plane. Requires specific minimum aircraft performance.
   (3) ACAS III: An airborne collision avoidance system which utilises interrogations of, and replies from, airborne radar beacon transponders. It provides traffic advisories, and resolution advisories in the vertical and horizontal planes. Requires specific minimum aircraft performance.

(b) TCAS: An acronym for traffic alert and collision avoidance systems having specific capabilities. TCAS has been developed in the USA to implement ACAS.

Note: When used within this document the terms 'ACAS' and 'TCAS', if not followed by numeric identifiers, are generic and refer to any ACAS 1 or TCAS 1 system respectively.

(c) Protected Volume: A volume of airspace enclosing the ACAS aircraft which, when penetrated by or containing an intruder, will normally result in the generation of a traffic advisory or a resolution advisory.

(d) Closest Point of Approach (CPA**):** The occurrence of minimum range between own ACAS aircraft and an intruder. Thus range at closest point of approach is the smallest range between the two aircraft, and time of closest approach is the time at which this occurs.

(e) Traffic Advisory (TA): Advisory information provided by ACAS to caution flight crews as to the proximity of a potential threat. It should occur when the time to CPA is sensed by ACAS to have reached a set value, usually 40 seconds.
   (1) Traffic advisories aid visual acquisition, and may include range, altitude, and bearing of the potential threat relative to the ACAS aircraft.
   (2) Traffic advisories without altitude may also be reported from non-altitude reporting transponder Mode A-equipped potential threats.

(f) Traffic: An aircraft that has come within the surveillance range of ACAS.

(g) Proximate Traffic**:** An aircraft that has come within ± 1 200 ft and 6 nm of ACAS.

(h) Intruder: A transponder-equipped aircraft within the surveillance range of ACAS for which ACAS has an established track.

(i) Potential Threat: An intruder that has penetrated the TA-protected volume.

(j) Co-ordination: The process by which two ACAS-equipped aircraft select compatible RAs by the exchange of resolution advisory complements.

(k) Subject Aircraft: The ACAS-equipped aircraft that may need to manoeuvre in order to maintain adequate separation from an established threat.

(l) Genuine TA: The equipment provides a TA in accordance with its technical specification.

(m) Nuisance TA: The equipment provides a TA in accordance with its technical specification, but no risk of collision exists.

(n) False TA: A fault or failure in the system causes the equipment to provide a TA that is not in accordance with its technical specification.

Note: The FAA have published a list of definitions, details of which vary slightly from some of those given above. Others which are likely to be significant are shown below:

(1) Alert: An indicator (visual or auditory) which provides information to flight crew in a timely manner about a non-normal situation.

(2) Intruder: A target which has satisfied the traffic advisory detection criteria.

IEM OPS-3.400 Approach and Landing Conditions

(See CAR OPS-3.400)

The in-flight determination of the landing distance should be based on the latest available report, preferably not more than 30 minutes before the expected landing time.

AMC OPS-3.420(d)(7) Notification of Communicable Disease Onboard Aircraft

(See CAR OPS-3.420(d)(7))

When the commander becomes aware of a suspected communicable disease case(s) onboard the aircraft, they shall transmit the following information via air traffic control to the destination for action by the responsible health officials:

(a) Aircraft identification;
(b) Departure heliport;
(c) Destination heliport;
(d) Estimated time of arrival;
(e) Number of persons on board;
(f) Number of suspected case(s) on board; and (g) Nature of the public health risk, if known?

AMC OPS 3.420(e) Dangerous Goods Occurrence Reporting

(See OPS 3.420(e))

(a) To assist the ground services in preparing for the landing of a helicopter in an emergency situation, it is essential that adequate and accurate information about any dangerous goods on board be given to the appropriate air traffic services unit. Wherever possible this information should include the proper shipping name and/or the UN/ID number, the class/division and for Class 1 the compatibility group, any identified subsidiary risk(s), the quantity and the location on board the helicopter.

(b) When it is not considered possible to include all the information, those parts thought most relevant in the circumstances, such as the UN/ID numbers or classes/divisions and quantity, should be given.

AC OPS-3.425 Deficiencies reported by an Inspecting Authority

(See CAR-OPS-3.425 Deficiencies reported by an Inspecting Authority)

For deficiencies raised by to the SAFA programme, the corrective/ preventive action plan should be sent to CAA Oman.

IEM OPS-3.425 Inspecting Authority

(See CAR-OPS-3.425 - Deficiencies reported by an Inspecting Authority)

Inspecting Authority is the National Aviation Authority which performs inspections on aircraft under the operational control of the Oman registered aircraft while abroad.

For any unresolved/pending issues with the inspecting Authority, the Authority national coordinator shall be contacted.

AC OPS 3.426 Flight hours Reporting

(See OPS 3.426)

(a) The requirement of OPS 3.426 may be achieved by making available either:

(b) the flight hours flown by each helicopter – identified by its serial number and registration mark -during the elapsed calendar year; or

(c) the total flight hours of each helicopter – identified by its serial number and registration mark – on the 31s t of December of the elapsed calendar year.

(d) Where possible, the operator should have available, for each helicopter, the breakdown of hours for CAT, aerial work, general aviation. If the exact hours for the functional activity cannot be established, the estimated proportion will be sufficient.

SECTION 1 - SUBPART E – ALL WEATHER OPERATIONS

CAR OPS 3.430 Heliport or Landing Location Operating Minima - General

(See Appendix 1 to OPS 3.430)

(a) The pilot-in-command shall establish operating minima in accordance with criteria specified by the State of Registry for each heliport or landing location to be used in operations. When establishing aerodrome operating minima, any conditions that may be prescribed in the list of specific approvals shall be observed. Such minima shall not be lower than any that may be established by the State of the Aerodrome, except when specifically approved by that State.

(b) Notwithstanding paragraph (a) above, in-flight calculation of minima for use at unplanned alternate heliports and/or for approaches utilising EVS shall be carried out in accordance with a method acceptable to the Authority.

Note: The above paragraph does not prohibit in-flight calculation of minima for a non-planned alternate heliport if carried out in accordance with an accepted method.

(c) The Authority shall authorise operational credit(s) for operations with helicopters equipped with automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS. Where the operational credit relates to low visibility operations, the Authority, as the State of the Operator, shall issue a specific approval. Such authorizations shall not affect the classification of the instrument approach procedure.

Note: Operational credit includes:

(1) for the purposes of an approach ban, a minima below the heliport or landing location operating minima;

(2) reducing or satisfying the visibility requirements; or

(3) requiring fewer ground facilities as compensated for by airborne capabilities.

(d) In establishing the operating minima for each heliport or landing location which will apply to any particular operation, the operator must take full account of:

(1) The type, performance and handling characteristics of the helicopter;

(2) The composition of the flight crew, their competence and experience;

(3) The dimensions and characteristics of the FATOs/runways which may be selected for use, as well as the direction of approach;

(4) The adequacy and performance of the available visual and non-visual ground aids; (see AMC OPS 3.430(b)(4))

(5) The equipment available on the helicopter for the purpose of navigation, acquisition of visual references and/or control of the flight path during the approach, landing and the missed approach;

(6) The obstacles in the approach, missed approach and the climb-out areas required for the execution of contingency procedures and necessary clearance;

(7) The obstacle clearance altitude/height for the instrument approach procedures; and

(8) The means to determine and report meteorological conditions.

(9) The conditions prescribed in the operations specifications; and

(10) Any minima that may be promulgated by the State of the Aerodrome.

(e) Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows;

(1) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and

(2) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:

(i) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800 m or a runway visual range not less than 550 m;

(ii) Category II (CAT II): a decision height lower than 60 m (200 ft), but not lower than 30 m (100 ft) and a runway visual range not less than 300 m;

(iii) Category III: a decision height lower than 100 ft (30 m) or no decision height and a runway visual range less than 300 m or no runway visual range limitation.

These are;

(A) Category IIIA (CAT IIIA): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range not less than 175 m;

(B) Category IIIB (CAT IIIB): a decision height lower than 15 m (50 ft), or no decision height and a runway visual range less than 175 m but not less than 50 m; and

(C) Category IIIC (CAT IIIC): no decision height and no runway visual range limitations.

Note 1: Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the requirements of the most demanding category (e.g. an operation with a DH in the range of CAT IIIA but with an RVR in the range of CAT IIIB would be considered a CAT IIIB operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation).This does not apply if the RVR and/or DH has been approved as operational credit.

Note 2: The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aeroplane position and rate of change of position, in relation to the desired flight path. In the case of a circling approach operation the required visual reference is the runway environment.

(f) The operating minima for 2D instrument approach operations using instrument approach procedures shall be determined by establishing a minimum descent altitude (MDA) or minimum descent height (MDH), minimum visibility and, if necessary, cloud conditions.

(g) The operating minima for 3D instrument approach operations using instrument approach procedures shall be determined by establishing a decision altitude (DA) or decision height (DH) and the minimum visibility or RVR.

(h) The Authority shall issue a specific approval for instrument approach operations in low visibility which shall only be conducted when RVR information is provided.

(i) For take-off in low visibility, the Authority shall issue a specific approval for the minimum takeoff RVR.

CAR OPS-3.435 Terminology

(a) Terms used in this Subpart and not defined in CAR–1 have the following meaning:

(1) ***Circling.*** The visual phase of an instrument approach to bring an aircraft into position for landing on a runway which is not suitably located for a straight-in approach.

(2) ***Cloud base.*** The height of the base of the lowest observed, or forecast, cloud element in the vicinity of an aerodrome, or heliport, or within a specified area of operations. The height of the cloud base is normally measured above aerodrome elevation, but in the case of offshore operations cloud base in measured above mean sea level

(3) ***Low Visibility Procedures (LVP)***. Procedures applied at an heliport for the purpose of ensuring safe operations during: Lower than Standard Category I, Other than Standard Category II, Category II and III approaches and Low Visibility Take- offs.

(4) ***Low visibility operations (LVO).*** Approach operations in RVR's less that 550m and/or with a decision (DH) less than 60m (200ft) or take-off operations in RVR's less than 400m.

(5) ***Low Visibility Take-Off (LVTO).*** A take-off where the Runway Visual Range (RVR) is less than 400 m.

(6) ***Flight control system.*** A system which includes an automatic landing system and/or a hybrid landing system.

(7) ***Fail-Passive flight control system.*** A flight control system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude but the landing is not completed automatically. For a fail-passive automatic flight control system the pilot assumes control of the Helicopter after a failure.

(8) ***Fail-Operational flight control system.*** A flight control system is fail-operational if, in the event of a failure below alert height, the approach, flare and landing, can be completed automatically. In the event of a failure, the automatic landing system will operate as a fail- passive system.

(9) ***Fail-operational hybrid landing system.*** A system which consists of a primary failpassive automatic landing system and a secondary independent guidance system enabling the pilot to complete a landing manually after failure of the primary system.

(10) ***Visual approach.*** An approach when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to the terrain.

(11) ***Continuous Descent Final Approach (CDFA).*** A technique, consistent with stabilized approach procedures, for flying the final approach segment (FAS) of an instrument non-precision approach (NPA) procedure as a continuous descent, without level-off, from an altitude/height at or above the final approach fix altitude/height to a point approximately 15 m (50 ft) above the landing runway threshold or the point where the flare manoeuvre begins for the type of aircraft flown; for the FAS of an NPA procedure followed by a circling approach, the CDFA technique applies until circling approach minima (circling OCA/H) or visual flight manoeuvre altitude/height are reached.

(12) ***Stabilised Approach (SAp).*** An approach which is flown in a controlled and appropriate manner in terms of configuration, energy and control of the flight path from a predetermined point or altitude/height down to a point 50 feet above the threshold or the point where the flare manoeuvre is initiated if higher.

(13) ***Head-Up Display (HUD).*** A display system which presents flight information into the pilot’s forward external field of view and which does not significantly restrict the external view.

(14) ***Head-Up Guidance Landing System (HUDLS).*** The total airborne system which provides head-up guidance to the pilot during the approach and landing and/or goaround. It includes all sensors, computers, power supplies, indications and controls. A HUDLS is typically used for primary approach guidance to decision heights of 50 ft.

(15) ***Hybrid Head-Up Display Landing System (3.650 HUDLS).*** A system which consists of a primary fail-passive automatic landing system and a secondary independent HUD/HUDLS enabling the pilot to complete a landing manually after failure of the primary system.

Note: Typically, the secondary independent HUD/HUDLS provides guidance which normally takes the form of command information, but it may alternatively be situation (or deviation) information.

(16) ***Enhanced Vision System (EVS).*** An electronic means of displaying a real-time image of the external scene through the use of imaging sensors.

(17) ***Converted Meteorological Visibility (CMV).*** A value (equivalent to an RVR) which is derived from the reported meteorological visibility, as converted in accordance with the requirements in this subpart.

(18) ***Lower than Standard Category I Operation.*** A Category I Instrument Approach and Landing Operation using Category I DH, with an RVR lower than would normally be associated with the

applicable DH.

(19) ***Other than Standard Category II Operation.*** A Category II Instrument Approach and Landing Operation to a runway where some or all of the elements of the ICAO Annex 14 Precision Approach Category II lighting system are not available.

(20) ***GNSS Landing System (GLS).*** An approach operation using augmented GNSS information to provide guidance to the aircraft based on its lateral and vertical GNSS position. (It uses geometric altitude reference for its final approach slope.

(21) ***Minimum descent altitude (MDA) or minimum descent height (MDH).*** A specified altitude or height in a 2D instrument approach operation or circling approach operation below which descent must not be made without the required visual reference.

Note 1: Minimum descent altitude (MDA) is referenced to mean sea level and minimum descent height (MDH) is referenced to the heliport elevation or to the threshold elevation if that is more than 2 m (7 ft) below the heliport elevation. A minimum descent height for a circling approach is referenced to the heliport elevation.

Note 2: The required visual reference means that section of the visual aids or of the approach area which should have been in view for sufficient time for the pilot to have made an assessment of the aircraft position and rate of change of position, in relation to the desired flight path.

In the case of a circling approach the required visual reference is the runway environment.

Note 3: For convenience when both expressions are used they may be written in the form "minimum descent altitude/height" and abbreviated "MDA/H".

CAR OPS-3.440 Low visibility operations – General operating rules

(See Appendix 1 to CAR OPS-3.440)

(a) The Authority shall issue a specific approval for the following:

(1) Instrument approach operations in low visibility which shall only be conducted when RVR information is provided;

(2) For low visibility take-off, the minimum take-off RVR;

Note: In general, visibility for take-off is defined in terms of RVR. An equivalent horizontal visibility may also be used.

(3) These specific approvals will be included within the operations specifications.

(b) An operator shall not conduct Lower than Standard Category I operations unless approved by the Authority.

(c) An operator shall not conduct Category II, Other than Standard Category II or III operations unless:

(1) Each Helicopter concerned is certificated for operations with decision heights below 200ft, or no decision height and equipped in accordance with CS–AWO, or an equivalent accepted by the Authority;

(2) A suitable system for recording approach and/or automatic landing success and failure is established and maintained to monitor the overall safety of the operation;

(3) The operations are approved by the Authority;

(4) The flight crew consists of at least two (2) pilots;

(5) Decision Height is determined by means of a radio altimeter.

(6) RVR information is provided; and

(d) An operator shall not conduct low visibility take-offs in less than 150 m RVR (Category A, B and C Helicopters) or 200 m RVR (Category D Helicopters) unless approved by the Authority.

CAR OPS-3.445 Low visibility operations – Heliport considerations

(a) An operator shall not use a heliport for Category II or III operations unless the heliport is approved for such operations by the State in which the heliport is located.

(b) An operator shall verify that Low Visibility Procedures (LVP) have been established, and will be enforced, at those heliports where low visibility operations are to be conducted.

(c) An operator shall not conduct instrument approach and landing operations in less than 800 m visibility (heliport operating minima) unless RVR information is provided.

Note: Guidance on the operationally desirable and currently attainable accuracy of measurement or observation is given in Annex 3, Attachment B the PANS-MET (Doc 10157), Attachment A. Refer to CAR 174 for additional information.

CAR OPS-3.450 Low visibility operations – Training and Qualifications

(See Appendix 1 to CAR OPS-3.450)

(a) An operator shall ensure that, prior to conducting Low Visibility Take-Off, Lower than Standard Category I, other than Standard Category II, Category II and III operations or approaches utilising EVS:

 (1) Each flight crew member:

  (i) Completes the training and checking requirements prescribed in Appendix 1 including Flight Simulator training in operating to the limiting values of RVR/CMV and Decision Height appropriate to the operator's Category II/III approval; and

  (ii) Is qualified in accordance with Appendix 1;

 (2) The training and checking is conducted in accordance with a detailed syllabus approved by the Authority and included in the Operations Manual. This training is in addition to that prescribed in Subpart N; and

 (3) The flight crew qualification is specific to the operation and the Helicopter type.

CAR OPS-3.455 Low visibility operations – Operating Procedures

(See Appendix 1 to CAR OPS-3.455)

(a) An operator must establish procedures and instructions to be used for Low Visibility Take-Off, approaches utilising EVS, Lower than Standard Category I, Other than Standard Category II, and Category II and III operations. These procedures must be included in the Operations Manual and contain the duties of flight crew members during taxiing, take-off, approach, flare, landing, roll-out and missed approach as appropriate.

(b) The commander shall satisfy himself that:

 (1) The status of the visual and non-visual facilities is sufficient prior to commencing a Low Visibility Take-Off, an Approach utilising EVS, a Lower than Standard Category I, and other than Standard Category II, or a Category II or III approach;

 (2) Appropriate LVPs are in force according to information received from Air Traffic Services, before commencing a Low Visibility Take-off, a Lower than Standard Category I, and other than Standard Category II, or a Category II or III approach; and

 (3) The flight crew members are properly qualified prior to commencing a Low Visibility Take-off in an RVR of less than 150 m (Category A, B and C Helicopters), an Approach utilising EVS, a Lower than Standard Category I, and Other than Standard Category II, or a Category II or III approach.

CAR OPS-3.460 Low visibility operations – Minimum equipment

(a) An operator must include in the Operations Manual the minimum equipment that has to be serviceable at the commencement of a Low Visibility Take-off, a Lower than Standard Category I approach, an Other than Standard Category II approach, an approach utilising EVS, or a Category II or III approach in accordance with the HFM or other approved document.

(b) The commander shall satisfy himself that the status of the Helicopter and of the relevant airborne systems is appropriate for the specific operation to be conducted.

CAR OPS-3.465 VFR Operating minima

(See Appendix 1 to CAR OPS-3.465 and CAR-180.101)

(a) An operator shall ensure that:

(1) VFR flights are conducted in accordance with the Visual Flight Rules and in accordance with the Table in Appendix 1 to CAR OPS-3.465.

(2) Subject to sub-paragraph (3) and (4) below, helicopters are operated in a flight visibility of not less than 1,500 m during daylight and not less than 5 km by night. Flight visibility may be reduced to 800 m for short periods during daylight, when in sight of land, if the helicopter is manoeuvred at a speed that will give adequate opportunity to observe other traffic and any obstacles in time to avoid a collision. Low level overwater flights out of sight of land are only to be conducted under VFR when the cloud ceiling is greater than 600 ft by day and 1,200 ft by night.

(3) In Class G airspace, when flying between helidecks where the overwater sector is less than 10 nm, VFR flights are conducted in accordance with Appendix 2 to OPS 3.465; and

(4) Special VFR flights comply with any State or Zone minima in force.

Appendix 1 to OPS 3.430 Heliport or Landing Location Operating Minima

(See AMC Appendix 1 to OPS 3.430)

(a) *Take-off Minima*

(1) *General*

(i) Take-off minima established by the operator must be expressed as visibility or RVR limits, taking into account all relevant factors for each heliport planned to be used and the helicopter characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions (e.g. ceiling) must be specified.

(ii) The commander shall not commence take-off unless the weather conditions at the heliport of departure are equal to or better than applicable minima for landing at that heliport unless a suitable take-off alternate heliport is available.

(iii) When the reported meteorological visibility is below that required for take-off and RVR is not reported, a take-off may only be commenced if the commander can determine that the RVR/Visibility along the take-off FATO/runway is equal to or better than the required minimum.

(iv) When no reported meteorological visibility or RVR is available, a take-off may only be commenced if the commander can determine that the RVR/Visibility along the take-off FATO/runway is equal to or better than the required minimum.

(2) *Visual reference*.

(i) The take-off minima must be selected to ensure sufficient guidance to control the helicopter in the event of both a discontinued take-off in adverse circumstances and a continued take-off after failure of the critical power unit.

(ii) For night operations ground lighting must be available to illuminate the FATO/runway and any obstacles unless otherwise agreed by the Authority.

(3) *Required RVR/Visibility*

(i) For Performance Class 1 operations, the operator must establish an RVR and visibility respectively (RVR/VIS) as take-off minima in accordance with the following table (See AMC Appendix 1 to OPS 3.430 sub-paragraph (a)(3)(i):

Table 1 - RVR/Visibility for Take-off

Onshore heliports with IFR departure procedures	RVR/Visibility
No lighting and no markings (Day)	250m or the rejected take-off distance, whichever is greater
No markings (Night)	800m
Runway edge/FATO lighting and centre line marking	200m
Runway edge/FATO lighting, centre line marking and RVR information	150m
Offshore Helideck	
Two pilot operations	250m (1)
Single pilot operations	500m (1)

Note: The commander must establish that the take-off flight path is free of obstacles.

(ii) For Performance Class 2 operations onshore, the commander must operate to take-off minima of 800 m RVR/VIS and remain clear of cloud during the takeoff manoeuvre until reaching Performance Class 1 capabilities.

(iii) For Performance Class 2 operations offshore, the commander must operate to minima not less than that for Class 1 and remain clear of cloud during the takeoff manoeuvre until reaching Performance Class 1 capabilities. (See note 1 to Table 1 above.)

(iv) Table 6 below, for converting reported meteorological visibility to RVR, must not be used for calculating take-off minima.

(b) *Non-Precision approach*

(1) *System minima*

(i) The operator must ensure that system minima for non-precision approach procedures, which are based upon the use of ILS without glidepath (LLZ only), VOR, NDB, SRA and VDF are not lower than the MDH values given in Table 2 below.

Table 2 – System Minima for Non-precision Approach Aids

System Minima	
Facility	**Lowest DH (MDH)**
ILS/MLS/GLS	200 ft
GNSS/SBAS (LPV)	200 ft
GNSS (LNAV)	250 ft
GNSS/Baro-VNAV (LNAV/VNAV)	250 ft
Localizer with or without DME	250 ft
SRA (terminating at ½ NM)	250 ft
SRA (terminating at 1 NM)	300 ft
SRA (terminating at 2 NM or more)	350 ft
VOR	300 ft
VOR/DME	250 ft
NDB	350 ft
NDB/DME	300 ft
VDF	350 ft

Note: The following abbreviations apply to Table 3.

DME: distance measuring equipment;

GNSS: global navigation satellite system;

ILS: instrument landing system;

LNAV: lateral navigation;

LOC: localiser;

LPV: localiser performance with vertical guidance

SBAS: satellite-based augmentation system;

SRA: surveillance radar approach;

VDF: VHF direction finder;

VNAV: vertical navigation;

VOR: VHF omnidirectional radio range.

(2) *Minimum Descent Height*. The operator must ensure that the minimum descent height for a non-precision approach is not lower than either: (i) The OCH/OCL for the category of helicopter; or

(i) The system minimum.

(3) *Visual Reference*. A pilot may not continue an approach below MDA/MDH unless at least one of the following visual references for the intended FATO/runway is distinctly visible and identifiable to the pilot:

(i) Elements of the approach light system;

(ii) The threshold;

(iii) The threshold markings;

(iv) The threshold lights;

(v) The threshold identification lights;

(vi) The visual glide slope indicator;

(vii) The touchdown zone or touchdown zone markings;

(viii) The touchdown zone lights;

(ix) FATO/Runway edge lights; or

(x) Other visual references accepted by the Authority.

(4) *Required RVR*. (See AMC OPS 3.430(b)(4).)

(i) For non-precision approaches by helicopters operated in Performance Class 1 or 2, the minima given in the following Table shall apply:

Table 3 – Onshore Non-precision Approach Minima

Onshore Non-Precision Approach Minima (5)(6)(7)				
MDH (ft)	**Facilities/RVR**			
	Full (1)	**Intermediate (2)**	**Basic (3)**	**Nil (4)**
250-299 ft	600 m	800 m	1 000 m	1 000 m
300-449 ft	800 m	1 000 m	1 000 m	1 000 m
450 ft and above	1 000 m	1 000 m	1 000 m	1 000 m

Note 1: Full facilities comprise FATO/runway markings, 720 m or more of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note2: Intermediate facilities comprise FATO/runway markings, 420 - 719 m of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 3: Basic facilities comprise FATO/runway markings, <420 m HI/MI approach lights, any length of LI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 4: Nil approach light facilities comprise FATO/runway markings, FATO/runway edge *lights, threshold lights, FATO/runway end lights or no lights at all.*

Note 5: The tables are only applicable to conventional approaches with a nominal descent slope of not greater than 4°. Greater descent slopes will usually require that visual glide slope guidance (e.g. PAPI) is also visible at the Minimum Descent Height.

Note 6: The above figures are either reported RVR or meteorological visibility converted to RVR as in sub-paragraph (h) below.

Note 7: The MDH mentioned in Table 3 refers to the initial calculation of MDH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest ten feet, which may be done for operational purposes, e.g. conversion to MDA.

(ii) Where the missed approach point is within ½ nm of the landing threshold, the approach minima given for full facilities may be used regardless of the length of approach lighting available. However, FATO/runway edge lights, threshold lights, end lights and FATO/runway markings are still required.

(iii) *Night operations*. For night operations ground lighting must be available to illuminate the FATO/runway and any obstacles unless otherwise agreed by the Authority.

(iv) *Single pilot operations*. For single pilot operations the minimum RVR is 800 m or the Table 3 minima whichever is higher.

(c) *Precision approach - Category I operations*

(1) *General*. A Category I operation is a precision instrument approach and landing using ILS, MLS or PAR with a decision height not lower than 200 ft and with a runway visual range not less than 500 m.

(2) *Decision Height*. The operator must ensure that the decision height to be used for a Category I precision approach is not lower than:

(i) The minimum decision height specified in the Helicopter Flight Manual (HFM) if stated;

(ii) The minimum height to which the precision approach aid can be used without the required visual reference;

(iii) The OCH/OCL for the category of helicopter; or

(iv) 200 ft.

(3) *Visual Reference*. A pilot may not continue an approach below the Category I decision height, determined in accordance with sub-paragraph (c)(2) above, unless at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

(i) Elements of the approach light system;

(ii) The threshold;

(iii) The threshold markings;

(iv) The threshold lights;

(v) The threshold identification lights;

(vi) The visual glide slope indicator;

(vii) The touchdown zone or touchdown zone markings;

(viii) The touchdown zone lights; or

(ix) FATO/runway edge lights.

(4) *Required RVR*. For Category I operations by Performance Class 1 and 2 helicopters the following minima shall apply:

Table 4 - Onshore Precision Approach Minima - Category I

Onshore Precision Approach Minima Category I (5)(6)(7)				
DH (ft)	**Facilities/RVR**			
	Full (1)	**Intermediate** (2)	**Basic** (3)	**Nil** (4)
200 ft	500 m	600 m	700 m	1 000 m
201-250 ft	550 m	650 m	750 m	1 000 m
251-300 ft	600 m	700 m	800 m	1 000 m
301 ft & above	750 m	800 m	900 m	1 000 m

Note 1: Full facilities comprise FATO/runway markings, 720 m or more of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 2: Intermediate facilities comprise FATO/runway markings, 420 - 719 m of HI/MI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 3: Basic facilities comprise FATO/runway markings, <420 m of HI/MI approach lights, any length of LI approach lights, FATO/runway edge lights, threshold lights and FATO/runway end lights. Lights must be on.

Note 4: Nil approach light facilities comprise FATO/runway markings, FATO/runway edge lights, threshold lights, FATO/runway end lights or no lights at all.

Note 5: The above figures are either the reported RVR or meteorological visibility converted to RVR in accordance with paragraph (h).

Note 6: The Table is applicable to conventional approaches with a glide slope angle up to and including 4°.

Note 7: The DH mentioned in the Table 4 refers to the initial calculation of DH. When selecting the associated RVR, there is no need to take account of a rounding up to the nearest ten feet, which may be done for operational purposes, (e.g. conversion to DA).

(i) *Night operations*. For night operations ground lighting must be available to illuminate the FATO/runway and any obstacles unless otherwise agreed by the Authority.

(ii) *Single pilot operations*. For single pilot operations, the operator must calculate the minimum RVR for all approaches in accordance with OPS 3.430 and this Appendix. An RVR of less than 800 m is not permitted except when using a suitable autopilot coupled to an ILS or MLS, in which case normal minima apply.
The Decision Height applied must not be less than 1·25 x the minimum use height for the autopilot.

(d) *Onshore precision approach - Category II operations* (See AMC OPS 3.430, sub-paragraph (d))

(1) *General*. A Category II operation is a precision instrument approach and landing using ILS or MLS with:

(i) A decision height below 200 ft but not lower than 100 ft; and

(ii) A runway visual range of not less than 300 m.

(2) *Decision Height*. The operator must ensure that the decision height for a Category II operation is not lower than:

(i) The minimum decision height specified in the HFM;

(ii) The minimum height to which the precision approach aid can be used without the required visual reference;

(iii) The OCH/OCL for the category of helicopter;
(iv) The decision height to which the flight crew is authorised to operate; or
(v) 100 ft.

(3) *Visual reference*. A pilot may not continue an approach below the Category II decision height determined in accordance with sub-paragraph (d)(2) above unless visual reference containing a segment of at least 3 consecutive lights being the centre line of the approach lights, or touchdown zone lights, or FATO/runway centre line lights, or FATO/runway edge lights, or a combination of these is attained and can be maintained. This visual reference must include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barette of the touchdown zone lighting.

(4) *Required RVR*. For Category II approaches by performance class 1 helicopters the following minima shall apply:

Table 5 - RVR for Category II Approach vs. DH

Onshore Precision Approach Minima – Category II	
Decision height	**Auto-coupled to below DH (1) RVR**
100 - 120 ft	300 m
121 - 140 ft	400 m
141 ft and above	450 m

Note: The reference to 'auto-coupled to below DH' in this table means continued use of the automatic flight control system down to a height which is not greater than 80% of the applicable DH. Thus airworthiness requirements may, through minimum engagement height for the automatic flight control system, affect the DH to be applied.

(e) *Intentionally blank*

(f) *Onshore circling*

(1) Circling is the term used to describe the visual phase of an instrument approach, to bring an aircraft into position for landing on a FATO/runway which is not suitably located for a straight in approach.

(2) For circling the specified MDH shall not be less than 250 ft, and the meteorological visibility shall not be less than 800 m.

Note: Visual manoeuvring (circling) with prescribed tracks is an accepted procedure within the meaning of this paragraph.

(g) *Visual Approach*. The operator shall not use an RVR of less than 800 m for a visual approach.

(h) *Conversion of Reported Meteorological Visibility to RVR*

(1) The operator must ensure that a meteorological visibility to RVR conversion is not used for calculating take-off minima, Category II or III minima or when a reported RVR is available.

(2) When converting meteorological visibility to RVR in all other circumstances than those in sub-paragraph (h)(1) above, the operator must ensure that the following Table is used:

Table 6 - Conversion of Visibility to RVR

Lighting elements in operation	**RVR = Met visibility multiplied by:**	
	Day	Night
Hi approach and runway lighting	1·5	2·0
Any type of lighting	1·0	1·5
No lighting	1·0	Not applicable

(i) *Airborne Radar Approach (ARA) for overwater operations* (See AMC Appendix 1 to CAR OPS-3.430, sub-paragraph (i)

(1) *General*

(i) The operator shall not conduct ARAs unless authorised by the Authority.

(ii) Airborne Radar Approaches are only permitted to rigs or vessels under way when a multi-crew concept is used.

(iii) A commander shall not undertake an Airborne Radar Approach unless the radar can provide course guidance to ensure obstacle clearance.

(iv) Before commencing the final approach the commander shall ensure that a clear path exists on the radar screen for the final and missed approach segments. If lateral clearance from any obstacle will be less than 1.0 nm, the commander shall:

(A) Approach to a nearby target structure and thereafter proceed visually to the destination structure; or

(B) Make the approach from another direction leading to a circling manoeuvre.

(v) The Commander shall ensure that the cloud ceiling is sufficiently clear above the helideck to permit a safe landing.

(2) *Minimum Descent Height (MDH)*. Notwithstanding the minima at sub-paragraphs (i) and (ii) below, the MDH shall not be less than 50 ft above the elevation of the helideck.

(i) The MDH is determined from a radio altimeter. The MDH for an airborne radar approach shall not be lower than:

(A) 200 ft by day;

(B) 300 ft by night.

(ii) The MDH for an approach leading to a circling manoeuvre shall not be lower than:

(A) 300 ft by day;

(B) 500 ft by night.

(3) *Minimum descent altitude (MDA)*. An MDA may only be used if the radio altimeter is unserviceable. The MDA shall be a minimum of MDH +200 ft and shall be based on a calibrated barometer at the destination or on the lowest forecast QNH for the region.

(4) *Decision range*. The Decision Range shall not be less than 0·75 nm unless the operator has demonstrated to the Authority that a lesser Decision Range can be used at an acceptable level of safety.

(5) *Visual reference*. No pilot may continue an approach beyond Decision Range or below MDH/MDA unless he is visual with the destination.

(6) *Single pilot operations*. The MDH/MDA for a single pilot ARA shall be 100 ft higher than that calculated using sub-paragraphs (2) and (3) above. The Decision Range shall not be less than 1·0 nm.

Appendix 1 to OPS 3.440 Low Visibility Operations - General Operating Rules

(a) *General*. The following procedures apply to the introduction and approval of low visibility operations.

(b) *Airborne Systems Operational Demonstration*. The operator must comply with the requirements prescribed in sub-paragraph (c) below when introducing a helicopter type which is new to the Authority into Category II or III service.

Note: For helicopter types already used for Category II or III operations in another State, the inservice proving programme in paragraph (f) applies instead.

(1) *Operational reliability*. The Category II and III success rate must not be less than that required by CS- AWO.

(2) *Criteria for a successful approach*. An approach is regarded as successful if:

(i) The criteria are as specified in CS- AWO or its equivalent;

(ii) No relevant helicopter system failure occurs.

(c) *Data Collection during Airborne System Demonstration*. General

(1) The operator must establish a reporting system to enable checks and periodic reviews to be made during the operational evaluation period before the operator is authorised to conduct Category II or III operations. The reporting system must cover all successful and unsuccessful approaches, with reasons for the latter, and include a record of system component failures. This reporting system must be based upon flight crew reports and automatic recordings as prescribed in paragraphs (d) and (e) below.

(2) The recordings of approaches may be made during normal line flights or during other flights performed by the operator.

(d) *Data Collection during Airborne System Demonstration - Operations with DH not less than 50 ft.*

(1) For operations with DH not less than 50 ft, data must be recorded and evaluated by the operator and evaluated by the Authority when necessary.

(2) It is sufficient for the following data to be recorded by the flight crew:

(i) Heliport and runway used;

(ii) Weather conditions;

(iii) Time;

(iv) Reason for failure leading to an aborted approach;

(v) Adequacy of speed control;

(vi) Trim at time of automatic flight control system disengagement;

(vii) Compatibility of automatic flight control system, flight director and raw data;

(viii) An indication of the position of the helicopter relative to the ILS centreline when descending through 30 m (100 ft); and

(ix) Touchdown position.

(3) The number of approaches, as approved by the Authority, made during the initial evaluation must be sufficient to demonstrate that the performance of the system in actual airline service is such that a 90% confidence and a 95% approach success will result.

(e) *Data Collection during Airborne System Demonstration - Operations with DH less than 50 ft or no DH*

(1) For operations with DH less than 50 ft or no DH, a flight data recorder, or other equipment giving the appropriate information, must be used in addition to the flight crew reports to confirm that the system performs as designed in actual airline service. The following data is required:

(i) Distribution of ILS deviations at 30 m (100 ft), at touchdown and, if appropriate, at disconnection of the roll-out control system and the maximum values of the deviations between those points; and

(ii) Sink rate at touchdown.

(2) Any landing irregularity must be fully investigated using all available data to determine its cause.

(f) *In-service proving*

Note: The operator fulfilling the requirements of sub-paragraph (b) above will be deemed to have satisfied the in-service proving requirements contained in this paragraph.

(1) The system must demonstrate reliability and performance in line operations consistent with the operational concepts. A sufficient number of successful landings, as determined by the Authority, must be accomplished in line operations, including training flights, using the autoland and roll-out system installed in each helicopter type.

(2) The demonstration must be accomplished using a Category II or Category III ILS. However, if the operator chooses to do so, demonstrations may be made on other ILS facilities if sufficient data is recorded to determine the cause of unsatisfactory performance.

(3) If the operator has different variants of the same type of helicopter utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of helicopter, the operator shall show that the variants comply with the basic system performance criteria, but the operator need not conduct a full operational demonstration for each variant.

(4) Where the operator introduces a helicopter type which has already been approved by the Authority of any State for Category II and/or III operations a reduced proving programme may be approved.

(g) *Continuous Monitoring*

(1) After obtaining the initial authorisation, the operations must be continuously monitored by the operator to detect any undesirable trends before they become hazardous. Flight crew reports may be used to achieve this.

(2) The following information must be retained for a period of 12 months:

(i) The total number of approaches, by helicopter type, where the airborne Category II or III equipment was utilised to make satisfactory, actual or practice, approaches to the applicable Category II or III minima; and

(ii) Reports of unsatisfactory approaches and/or automatic landings, by heliport and helicopter registration, in the following categories:

(A) Airborne equipment faults;

(B) Ground facility difficulties;

(C) Missed approaches because of ATC instructions; or

(D) Other reasons.

(3) The operator must establish a procedure to monitor the performance of the automatic landing system of each helicopter.

(h) *Transitional periods*

(1) *Operators with no previous Category II or III experience*

(i) The operator without previous Category II or III operational experience may be approved for Category II or IIIA operations, having gained a minimum experience of 6 months of Category I operations on the helicopter type.

(1) On completing 6 months of Category II or IIIA operations on the helicopter type the operator may be approved for Category IIIB operations. When granting such an approval, the Authority may impose higher minima than the lowest applicable for an additional period. The increase in minima will normally only refer to RVR and/or a restriction against operations with no decision height and must be selected such that they will not require any change of the operational procedures.

(2) *Operators with previous Category II or III experience*. The operator with previous Category II or III experience may obtain authorisation for a reduced transition period by application to the Authority.

(j) *Maintenance of Category II, Category III and LVTO equipment*. Maintenance instructions for the on-board guidance systems must be established by the operator, in liaison with the manufacturer, and included in the operator's helicopter maintenance programme prescribed in OPS 3.910 which must be approved by the Authority.

Appendix 1 to OPS 3.450 Low Visibility Operations - Training & Qualifications

(a) *General*. The operator must ensure that flight crew member training programmes for Low Visibility Operations include structured courses of ground, flight simulator and/or flight training. The operator may abbreviate the course content as prescribed by sub-paragraphs (2) and (3) below provided the content of the abbreviated course is acceptable to the authority.

(1) Flight crew members with no Category II or Category III experience must complete the full training programme prescribed in sub-paragraphs (b), (c) and (d) below.

(2) Flight crew members with Category II or Category III experience with another acceptable operator may undertake an abbreviated ground training course.

(3) Flight crew members with Category II or Category III experience with the operator may undertake an abbreviated ground, flight simulator and/or flight training course. The abbreviated course is to include at least the requirements of sub-paragraphs (d)(1), (d)(2)(i) or (d)(2)(ii) as appropriate and (d)(3)(i).

(b) *Ground Training*. The operator must ensure that the initial ground training course for Low Visibility Operations covers at least:

(1) The characteristics and limitations of the ILS and/or MLS;

(2) The characteristics of the visual aids;

(3) The characteristics of fog;

(4) The operational capabilities and limitations of the particular airborne system;

(5) The effects of precipitation, ice accretion, low level wind shear and turbulence;

(6) The effect of specific helicopter malfunctions;

(7) The use and limitations of RVR assessment systems;

(8) The principles of obstacle clearance requirements;

(9) Recognition of and action to be taken in the event of failure of ground equipment;

(10) The procedures and precautions to be followed with regard to surface movement during operations when the RVR is 400 m or less and any additional procedures required for take-off in conditions below 150 m;

(11) The significance of decision heights based upon radio altimeters and the effect of terrain profile in the approach area on radio altimeter readings and on the automatic approach/landing systems;

(12) The importance and significance of Alert Height if applicable and the action in the event of any failure above and below the Alert Height;

(13) The qualification requirements for pilots to obtain and retain approval to conduct Low Visibility Take-offs and Category II or III operations; and

(14) The importance of correct seating and eye position.

(c) *Flight Simulator training and/or flight training*

(1) The operator must ensure that flight simulator and/or flight training for Low Visibility Operations includes:

(i) Checks of satisfactory functioning of equipment, both on the ground and in flight;

(ii) Effect on minima caused by changes in the status of ground installations;

(iii) Monitoring of automatic flight control systems and autoland status annunciators with emphasis on the action to be taken in the event of failures of such systems;

(iv) Actions to be taken in the event of failures such as engines, electrical systems, hydraulics or flight control systems;

(v) The effect of known unserviceabilities and use of minimum equipment lists;

(vi) Operating limitations resulting from airworthiness certification;

(vii) Guidance on the visual cues required at decision height together with information on maximum deviation allowed from glidepath or localiser; and

(viii) The importance and significance of Alert Height if applicable and the action in the event of any failure above and below the Alert Height.

(2) The operator must ensure that each flight crew member is trained to carry out his duties and

instructed on the coordination required with other crew members. Maximum use should be made of suitably equipped flight simulators for this purpose.

(3) Training must be divided into phases covering normal operation with no helicopter or equipment failures but including all weather conditions which may be encountered and detailed scenarios of helicopter and equipment failure which could affect Category II or III operations. If the helicopter system involves the use of hybrid or other special systems (such as head up displays or enhanced vision equipment) then flight crew members must practice the use of these systems in normal and abnormal modes during the flight simulator phase of training.

(4) Incapacitation procedures appropriate to Low Visibility Take-offs and Category II and III operations shall be practiced.

(5) For helicopters with no type specific flight simulator, operators must ensure that the flight training phase specific to the visual scenarios of Category II operations is conducted in a flight simulator approved for that purpose by the Authority. Such training must include a minimum of 4 approaches. The training and procedures that are type specific shall be practiced in the helicopter.

(6) Category II and III training shall include at least the following exercises:

(i) Approach using the appropriate flight guidance, autopilots and control systems installed in the helicopter, to the appropriate decision height and to include transition to visual flight and landing;

(ii) Approach with all engines operating using the appropriate flight guidance systems, autopilots and control systems installed in the helicopter down to the appropriate decision height followed by missed approach; all without external visual reference;

(iii) Where appropriate, approaches utilising automatic flight systems to provide automatic flare, hover, landing and roll-out; and

(iv) Normal operation of the applicable system both with and without acquisition of visual cues at decision height.

(7) Subsequent phases of training must include at least:

(i) Approaches with engine failure at various stages on the approach;

(ii) Approaches with critical equipment failures (e.g. electrical systems, autoflight systems, ground and/or airborne ILS/MLS systems and status monitors);

(iii) Approaches where failures of autoflight equipment at low level require either;

(A) Reversion to manual flight to control flare, hover, landing and roll out or missed approach; or

(B) Reversion to manual flight or a downgraded automatic mode to control missed approaches from, at or below decision height including those which may result in a touchdown on the runway;

(iv) Failures of the systems which will result in excessive localiser and/or glideslope deviation, both above and below decision height, in the minimum visual conditions authorised for the operation. In addition, a continuation to a manual landing must be practiced if a head-up display forms a downgraded mode of the automatic system or the head-up display forms the only flare mode; and

(v) Failures and procedures specific to helicopter type or variant.

(8) The training programme must provide practice in handling faults which require a reversion to higher minima.

(9) The training programme must include the handling of the helicopter when, during a fail passive Category III approach, the fault causes the autopilot to disconnect at or below decision height when the last reported RVR is 300 m or less.

(10) Where take-offs are conducted in RVRs of 400 m and below, training must be established to cover systems failures and engine failure resulting in continued as well as rejected take-offs.

(d) *Conversion Training Requirements to conduct Low Visibility Take-off and Category II and III Operations*. The operator shall ensure that each flight crew member completes the following Low Visibility Procedures training if converting to a new type or variant of helicopter in which Low Visibility Take-off and Category II and III Operations will be conducted. The flight crew member experience requirements to undertake an abbreviated course are prescribed in sub-paragraphs (a)(2) and (a)(3), above;

(1) *Ground Training*. The appropriate requirements prescribed in sub-paragraph (b) above, taking into account the flight crew member's Category II and Category III training and experience.

(2) *Simulator Training and/or Flight training.*

(i) A minimum of 8 approaches and/or landings in a flight simulator approved for the purpose.

(ii) Where no type-specific flight simulator is available, a minimum of 3 approaches including at least 1 go-around is required on the helicopter.

(iii) Appropriate additional training if any special equipment is required such as head-up displays or enhanced vision equipment.

(3) *Flight Crew Qualification*. The flight crew qualification requirements are specific to the operator and the type of helicopter operated.

(i) The operator must ensure that each flight crew member completes a check before conducting Category II or III operations.

(ii) The check prescribed in sub-paragraph (i) above may be replaced by successful completion of the flight simulator and/or flight training prescribed in subparagraph (d)(2) above.

(4) *Line Flying under Supervision*. The operator must ensure that each flight crew member undergoes the following line flying under supervision:

(i) For Category II when a manual landing is required, a minimum of 3 landings from autopilot disconnect;

(ii) For Category III, a minimum of 3 autolands except that only 1 autoland is required when the training required in sub-paragraph (d)(2) above has been carried out in a full flight simulator usable for zero flight time training.

(e) *Type and command experience*. The following additional requirements are applicable to commanders who are new to the helicopter type:

(1) 50 hours or 20 sectors as pilot-in-command on the type before performing any Category II or Category III operation; and

(2) 100 hours or 40 sectors as pilot-in-command on the type. 100 m must be added to the applicable Category II or Category III RVR minima unless he has been previously qualified for Category II or III operations with an acceptable operator.

(3) The Authority may authorise a reduction in the above command experience requirements for flight crew members who have Category II or Category III command experience.

(f) *Low Visibility Take-Off with RVR less than 150 m*

(1) The operator must ensure that prior to authorisation to conduct take-offs in RVRs below 150 m the following training is carried out:

(i) Normal take-off in minimum authorised RVR conditions;

(ii) Take-off in minimum authorised RVR conditions with an engine failure at or after TDP; and

(iii) Take-off in minimum authorised RVR conditions with an engine failure before the TDP.

(2) The operator must ensure that the training required by sub-paragraph (1) above is carried out in

an approved flight simulator. This training must include the use of any special procedures and equipment. Where no approved flight simulator exists, the Authority may approve such training in a helicopter without the requirement for minimum RVR conditions. (See Appendix 1 to OPS 3.965.)

(3) The operator must ensure that a flight crew member has completed a check before conducting low visibility take-offs in RVRs of less than 150 m if applicable. The check may only be replaced by successful completion of the flight simulator and/or flight training prescribed in sub- paragraph (f)(1) on initial conversion to a helicopter type.

(g) *Recurrent Training and Checking - Low Visibility Operations*

(1) The operator must ensure that, in conjunction with the normal recurrent training and operator proficiency checks, a pilot's knowledge and ability to perform the tasks associated with the particular category of operation, including LVTO, for which he is authorised is checked. The required number of approaches to be conducted during such recurrent training is to be a minimum of two, one of which is to be a missed approach and at least one low visibility take off to the lowest applicable minima. The period of validity for this check is 6 months including the remainder of the month of issue.

(2) For Category III operations the operator must use a flight simulator approved for Category III training.

(3) The operator must ensure that, for Category III operations on helicopters with a fail passive flight control system, a missed approach is completed at least once every 18 months as the result of an autopilot failure at or below decision height when the last reported RVR was 300 m or less.

(4) The Authority may authorise recurrent training for Category II operations in a helicopter type where no approved flight simulator is available.

(h) *LVTO and Category II/III Recency Requirements*

(1) The operator must ensure that, in order for pilots to maintain a Category II and Category III qualification, they have conducted a minimum of 3 approaches and landings using approved Category II/III procedures during the previous six month period, at least one of which must be conducted in the helicopter.

(2) Recency for LVTO is maintained by retaining the Category II or III qualification prescribed in sub-paragraph (h)(1) above.

(3) The operator may not substitute this recency requirement for recurrent training.

Appendix 1 to OPS 3.455 Low Visibility Operations- Operating procedures

(a) *General*. Low Visibility Operations include:

(1) Manual take-off (with or without electronic guidance systems);

(2) Auto-coupled approach to below DH, with manual flare, hover, landing and roll-out;

(3) Auto-coupled approach followed by auto-flare, hover, autolanding and manual roll-out; and

(4) Auto-coupled approach followed by auto-flare, hover, autolanding and auto-roll-out, when the applicable RVR is less than 400 m.

Note 1: A hybrid system may be used with any of these modes of operations.

Note 2: Other forms of guidance systems or displays may be certificated and approved.

(b) *Procedures and Operating Instructions*

(1) The precise nature and scope of procedures and instructions given depend upon the airborne equipment used and the flight deck procedures followed. The operator must clearly define flight crew member duties during take-off, approach, flare, hover, rollout and missed approach in the Operations Manual. Particular emphasis must be placed on flight crew responsibilities during transition from non-visual conditions to visual conditions, and on the procedures to be used in

deteriorating visibility or when failures occur. Special attention must be paid to the distribution of flight deck duties so as to ensure that the workload of the pilot making the decision to land or execute a missed approach enables him to devote himself to supervision and the decision making process.

(2) The operator must specify the detailed operating procedures and instructions in the Operations Manual. The instructions must be compatible with the limitations and mandatory procedures contained in the Helicopter Flight Manual and cover the following items in particular:

(i) Checks for the satisfactory functioning of the helicopter equipment, both before departure and in flight;
(ii) Effect on minima caused by changes in the status of the ground installations and airborne equipment;
(iii) Procedures for the take-off, approach, flare, hover, landing, roll-out and missed approach;
(iv) Procedures to be followed in the event of failures, warnings and other non-normal situations;
(v) The minimum visual reference required;
(vi) The importance of correct seating and eye position;
(vii) Action which may be necessary arising from a deterioration of the visual reference;
(viii) Allocation of crew duties in the carrying out of the procedures according to subparagraphs (i) to (iv) and (vi) above, to allow the Commander to devote himself mainly to supervision and decision making;
(ix) The requirement for all height calls below 200 ft to be based on the radio altimeter and for one pilot to continue to monitor the helicopter instruments until the landing is completed;
(x) The requirement for the Localiser Sensitive Area to be protected;
(xi) The use of information relating to wind velocity, windshear, turbulence, runway contamination and use of multiple RVR assessments;
(xii) Procedures to be used for practice approaches and landing on runways at which the full Category II or Category III heliport procedures are not in force;
(xiii) Operating limitations resulting from airworthiness certification; and
(xiv) Information on the maximum deviation allowed from the ILS glide path and/or localiser.

Appendix 1 to OPS 3.465 Minimum Visibilities for VFR Operations

Airspace class	**A B C D E** (Note 1)	**F G**
	Above 900 m (3 000 ft) AMSL or above 300 m (1,000 ft) above terrain, whichever is the higher	At and below 900 m (3 000 ft) AMSL or 300 m (1 000 ft) above terrain, whichever is the higher
Distance from cloud	1 500 m horizontally 300 m (1 000 ft) vertically	Clear of cloud and in sight of the surface
Flight visibility	5 km (Note 3)	

Note 1: VMC Minima for Class A airspace are included for guidance but do not imply acceptance of VFR flights in Class A airspace.

Note 2: When the height of the transition altitude is lower than 3 050 m (10 000 ft) AMSL, FL 100 should be used in lieu of 10 000ft.

Note 3: Helicopters may be operated in flight visibility down to 1 500 m by day, provided the appropriate ATS authority permits use of a flight visibility less than 5 km, and the circumstances are such, that the probability of encounters with other traffic is low, and the IAS is 140 kts or less. When so prescribed by the appropriate ATS Authority, helicopters may be permitted to operate down to a flight visibility of 800 m by day.

Appendix 2 to OPS 3.465 Minima for Flying Between Helidecks Located in Class G Airspace

	Day		**Night**	
	Height (Note 1)	**Visibility**	**Height** (Note 1)	**Visibility**
Single Pilot	300 ft	3 km	500 ft	5 km
Two Pilots	300 ft	(Note 2)	500 ft	5 km (Note 3)

Note 1: The cloud base shall be such as to allow flight at the specified height below and clear of cloud

Note 2: Helicopters may be operated in flight visibility down to 800 m provided the destination, or an intermediate structure, is continuously visible.

Note 3: Helicopters may be operated in flight visibility down to 1,500 m provided the destination or an intermediate structure are continuously visible.

GM OPS-3.430 Documents containing information related to All Weather Operations
(See CAR OPS-3.430 Subpart E)

(1) The purpose of this IEM is to provide operators with a list of documents related to AWO.

(a) ICAO Annex 2 / Rules of the Air;
(b) ICAO Annex 6 / Operation of Aircraft, Part 3;
(c) ICAO Annex 10 / Telecommunications Vol 1;
(d) ICAO Annex 14 / Heliports Vol 1;
(e) ICAO Doc 8186 / PANS - OPS Aircraft Operations;
(f) ICAO Doc 9365 / AWO Manual;
(g) ICAO Doc 9476 / SMGCS Manual (Surface Movement Guidance and Control Systems);
(h) ICAO Doc 9157 / Heliport Design Manual;
(i) ICAO Doc 9328 / Manual for RVR Assessment;
(j) ECAC Doc 17, Issue 3 (partly incorporated in CAR OPS-3); and
(k) CS-AWO (EASA - Airworthiness Certification).

AMC OPS-3.430(b)(4) Effect on Landing Minima of temporarily failed or downgraded Ground Equipment
(See CAR OPS-3.430(b)(4)

(a) **Introduction**
(1) This AMC provides operators with instructions for flight crews on the effects on landing minima of temporary failures or downgrading of ground equipment.
(2) Heliport facilities are expected to be installed and maintained to the standards prescribed in ICAO Annexes 10 and 14. Any deficiencies are expected to be repaired without unnecessary delay.

(b) **General.** These instructions are intended for use both pre-flight and in-flight. It is not expected however that the commander would consult such instructions after passing the outer marker or equivalent position. If failures of ground aids are announced at such a late stage, the approach could be continued at the commander's discretion. If, however, failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in Tables 1A and 1B below, and the approach may have to be abandoned to allow this to happen.

(c) **Operations with no Decision Height (DH)**
(1) An operator should ensure that, for Helicopters authorised to conduct no DH operations with the lowest RVR limitations, the following applies in addition to the content of Tables 1A and 1B, below:
(i) RVR. At least one RVR value must be available at the heliport;
(ii) Runway lights
(A) No runway edge lights, or no centre lights – Day – RVR 200 m; Night – Not allowed;
(B) No TDZ lights – No restrictions;
(C) No standby power to runway lights – Day – RVR 200 m; Night – not allowed.

(d) **Conditions applicable to Tables 1:**
(1) Multiple failures of runway lights other than indicated in Table 1B are not acceptable.
(2) Deficiencies of approach and runway lights are treated separately.
(3) Category II or III operations. A combination of deficiencies in runway lights and RVR assessment equipment is not allowed.

(4) Failures other than ILS affect RVR only and not DH.

Table 1. Failed or downgraded equipment – Effect on landing minima

<table>
<tr><th rowspan="2">Failed or downgraded equipment</th><th colspan="5">Effect on landing minima</th></tr>
<tr><th>CAT IIIB (Note 1)</th><th>CAT IIIA</th><th>CAT II</th><th>CAT I</th><th>Non precision</th></tr>
<tr><td>ILS stand-by transmitter</td><td colspan="2">Not allowed</td><td colspan="3">No effect</td></tr>
<tr><td>Outer marker</td><td colspan="4">No effect if replaced by published equivalent position</td><td>Not applicable</td></tr>
<tr><td>Middle marker</td><td colspan="4">No effect</td><td>No effect unless used as MAPT</td></tr>
<tr><td>Touchdown zone RVR assessment system</td><td colspan="3">May be temporarily replaced with midpoint RVR if approved by the State of the heliport. RVR may be reported by human observation</td><td colspan="2">No effect</td></tr>
<tr><td>Midpoint or stop-end RVR</td><td colspan="5">No effect</td></tr>
<tr><td>Anemometer for runway in use</td><td colspan="5">No effect if other ground source available</td></tr>
<tr><td>Celiometer</td><td colspan="5">No effect</td></tr>
<tr><td>Approach lights</td><td colspan="2">Not allowed for operations with DH > 50ft</td><td>Not allowed</td><td colspan="2">Minima for nil facilities</td></tr>
<tr><td>Approach light except for the last 210 m</td><td colspan="2">No effect</td><td>Not allowed</td><td colspan="2">Minima for nil facilities</td></tr>
<tr><td>Approach light except for the last 420 m</td><td colspan="3">No effect</td><td colspan="2">Minima as for intermediate facilities</td></tr>
<tr><td>Standby power for approach lights</td><td colspan="2">Not allowed</td><td colspan="2">RVR as for CAT 1 basic facilities</td><td>No Effect</td></tr>
<tr><td>Whole FATOlight system</td><td colspan="3">Not allowed</td><td colspan="2">Day – minima as for nil facilities Night – not allowed</td></tr>
<tr><td>Edge lights</td><td colspan="5">Day only; Night – not allowed</td></tr>
<tr><td>Centreline lights</td><td colspan="2">Day – RVR 300m
Night – not allowed</td><td>Day – RVR 300m
Night – 550m</td><td colspan="2">No Effect</td></tr>
<tr><td>Centreline lights spacing increased to 30m</td><td>RVR 150 m</td><td colspan="4">Not effect</td></tr>
<tr><td>Touchdown zone lights</td><td colspan="2">Day – RVR 200m
Night – 300 m</td><td>Day – RVR 300m
Night – 550m</td><td colspan="2">No Effect</td></tr>
<tr><td>Standby power for FATO lights</td><td colspan="2">Not allowed</td><td>No effect</td><td colspan="2">No effect</td></tr>
<tr><td>Taxiway light system</td><td colspan="5">No effect – except delays due to reduced movement rate</td></tr>
</table>

Note 1: For CAT IIIB with no DH, see also paragraph 3 above.

AMC OPS-3.430(d) Continuous Descent Final Approach (CDFA)

(See CAR OPS-3.430(d))

1. Introduction

1.1. Controlled-Flight-Into-Terrain (CFIT) is a major causal category of accident and hull loss in commercial aviation. Most CFIT accidents occur in the final approach segment of non- precision approaches; the use of stabilised-approach criteria on a continuous descent with a constant, predetermined vertical path is seen as a major improvement in safety during the conduct of such approaches. Operators should ensure that the following techniques are adopted as widely as possible, for all approaches.

1.2. The elimination of level flight segments at Minimum Descent Altitude (MDA) close to the ground during approaches, and the avoidance of major changes in attitude and power / thrust close to the runway which can destabilise approaches, are seen as ways to reduce operational risks significantly.

1.3. For completeness this AMC also includes criteria which should be considered to ensure the stability of an approach (in terms of the Helicopter's energy and approach-path control).

1.3. The term Continuous Descent Final Approach (CDFA) has been selected to cover a technique for any type of non-precision approach

1.4. Non-precision approaches operated other than using a constant pre-determined vertical path or when the facility requirements and associated conditions do not meet the conditions specified in Para 2.4 below RVR penalties apply. However, this should not preclude an operator from applying CDFA technique to such approaches. Those operations should be classified as special letdown procedures, since it has been shown that such operations, flown without additional training, may lead to inappropriately steep descent to the MDA(H), with continued descent below the MDA(H) in an attempt to gain (adequate) visual reference.

1.5. The advantages of CDFA are:

(a) The technique enhances safe approach operations by the utilisation of standard operating practices;

(b) The profile reduces the probability of infringement of obstacle-clearance along the final approach segment and allows the use of MDA as DA;

(c) The technique is similar to that used when flying an ILS approach, including when executing the missed approach and the associated go-around manoeuvre;

(d) The Helicopter attitude may enable better acquisition of visual cues;

(e) The technique may reduce pilot workload;

(f) The Approach profile is fuel efficient;

(g) The Approach profile affords reduced noise levels;

(h) The technique affords procedural integration with APV approach operations;

(i) When used and the approach is flown in a stabilised manner is the safest approach technique for all approach operations.

2. CDFA (Continuous Descent Final Approach)

2.1. ***Continuous descent final approach (CDFA).*** A technique, consistent with stabilized approach procedures, for flying the final approach segment (FAS) of an instrument non-precision approach (NPA) procedure as a continuous descent, without level-off, from an altitude/height at or above the final approach fix altitude/height to a point approximately 15 m (50 ft) above the landing runway threshold or the point where the flare manoeuvre begins for the type of aircraft flown; for the FAS of an NPA procedure followed by a circling approach, the CDFA technique applies until circling approach minima (circling OCA/H) or visual flight manoeuvre altitude/height are reached.

2.2. An approach is only suitable for application of CDFA technique when it is flown along a predetermined vertical slope (See sub- paragraph (a) below) which follows a designated or nominal vertical profile (See sub-paragraphs (a)(i) and (ii) below):

(a) Predetermined Approach Slope: Either the designated or nominal vertical profile of an approach.
   (i) Designated Vertical Profile: A continuous vertical approach profile which forms part of the approach procedure design. APV is considered to be an approach with a designated vertical profile.
   (ii) Nominal Vertical Profile: A vertical profile not forming part of the approach procedure design, but which can be flown as a continuous descent.

Note: The nominal vertical profile information may be published or displayed (on the approach chart) to the pilot by depicting the nominal slope or range / distance vs height.

(b) Approaches with a nominal vertical profile are considered to be:
   (i) NDB, NDB/DME;
   (ii) VOR, VOR/DME;
   (iii) LLZ, LLZ/DME;
   (iv) VDF, SRA or
   (v) GNSS/LNAV/LPV/PinS.

2.3. Stabilised Approach (SAp): An approach which is flown in a controlled and appropriate manner in terms of configuration, energy and control of the flight path from a pre-determined point or altitude/height down to a point 50 feet above the threshold or the point where the flare manoeuvre is initiated if higher.

(a) The control of the descent path is not the only consideration when using the CDFA technique. Control of the Helicopter's configuration and energy is also vital to the safe conduct of an approach.

(b) The control of the flight path, described above as one of the requirements for conducting an SAp, should not be confused with the path requirements for using the CDFA technique. The predetermined path requirements for conducting SAp are established by the operator and published in the Operations Manual (OM) Part B; guidance for conducting SAp operations is given in paragraph 5 below.

(c) The predetermined approach slope requirements for applying the CDFA technique are established by:
   (i) The instrument-procedure design when the approach has a designated vertical profile;
   (ii) The published 'nominal' slope information when the approach has a nominal vertical profile;
   (iii) The designated final-approach segment minimum of 3nm, and maximum, when using timing techniques, of 8nm.

(d) A Stabilised Approach will never have any level segment of flight at DA(H) (or MDA(H) as applicable). This enhances safety by mandating a prompt go-around manoeuvre at DA(H) (or MDA(H))

(e) An approach using the CDFA technique will always be flown as an SAp, since this is a requirement for applying CDFA; however, an SAp does not have to be flown using the CDFA technique, for example a visual approach.

2.4. Approach with a designated vertical profile using the CDFA technique:

(a) The optimum angle for the approach slope is 3 degrees, and the gradient should preferably not exceed 6.5 percent which equates to a slope of 3.77 degrees, (400 ft/NM) for procedures intended for conventional Helicopter types/classes and/or operations. In any case, conventional approach slopes should be limited to 4.5 degrees for Category A and B Helicopters and 3.77 degrees for Category C and D Helicopters, which are the upper limits for applying the CDFA technique. A 4.5-degree approach slope is the upper limit for certification of conventional Helicopters

(b) The approach is to be flown utilising operational flight techniques and onboard navigation system(s) and navigation aids to ensure it can be flown on the desired vertical path and track in a stabilised manner, without significant vertical path changes during the final segment descent to the runway. APV is included.

(c) The approach is flown to a DA(H).

(d) No MAPt is published for these procedures.

2.5. Approach with a nominal vertical profile using the CDFA technique:

(a) The optimum angle for the approach slope is 3 degrees, and the gradient should preferably not exceed 6.5 percent which equates to a slope of 3.77 degrees, (400 ft/NM) for procedures intended for conventional Helicopter types / class and / or operations. In any case, conventional approaches should be limited to 4.5 degrees for Category A and B Helicopters and 3.77 degrees for Category C and D Helicopters, which are the upper limits for applying CDFA technique. A 4.5-degree approach slope is the upper limit for certification of conventional Helicopters.

(b) The approach should meet at least the following facility requirements and associated conditions. NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA, GNSS(LNAV) with a procedure which fulfils the following criteria:

(i) The final approach track off-set is 5-degrees except for Category A and B Helicopters, where the approach-track off-set is 15-degrees; and

(ii) A Final Approach Fix (FAF), or another appropriate fix where descent is initiated is available; and

(iii) The distance from the FAF to the THR is less than or equal to 8 NM in the case of timing; or

(iv) The distance to the threshold (THR) is available by FMS/RNAV or DME; or

(v) The minimum final-segment of the designated constant angle approach path should not be less than 3 NM from the THR unless approved by the Authority.

(c) CDFA may also be applied utilising the following:

(i) GNSS/LNAV with altitude/height cross checks against positions or distances from the THR; or

(ii) Height crosscheck compared with DME distance values.

(d) The approach is flown to a DA(H).

(e) The approach is flown as a SAp.

Note: Generally, a MAPt is published for these procedures.

3. Operational Procedures

3.1. A MAPt should be specified to apply CDFA with a nominal vertical profile as for any non- precision approach.

3.2. The flight techniques associated with CDFA employ the use of a predetermined approach slope. The approach, in addition, is flown in a stabilised manner, in terms of configuration, energy and control of the flight path. The approach should be flown to a DA(H) at which the decision to land or go-around is made immediately. This approach technique should be used when conducting:

3.2.1. All non-precision approaches (NPA) meeting the specified CDFA criteria in para 2.4; and

3.2.2. All approaches categorised as APV.

3.3. The flight techniques and operational procedures prescribed above should always be applied; in particular, with regard to control of the descent path and the stability of the Helicopter on the approach prior to reaching MDA(H). Level flight at MDA(H) should be avoided as far as practicable. In addition, appropriate procedures and training should be established and implemented to facilitate the applicable elements of paragraphs (4), (5) and (8). Particular emphasis should be placed on subparagraphs 4.8, 5.1 to 5.7 and 8.4.

3.4. In cases where the CDFA technique is not used with high MDA(H), it may be appropriate to make an early descent to MDA(H) with appropriate safeguards to include the above training requirements, as applicable, and the application of a significantly higher RVR/Visibility.

3.5. For Circling Approaches (Visual Manoeuvring), all the applicable criteria with respect to the stability of the final descent path to the runway should apply. In particular, the control of the desired final nominal descent path to the threshold should be conducted to facilitate the techniques described in paragraphs (4) and (5) of this ACJ.

3.5.1. Stabilisation during the final straight-in segment for a circling approach should ideally be accomplished by 1000 ft above heliport elevation for turbo-jet Helicopters.

3.5.2. For a circling approach where the landing runway threshold and appropriate visual landing aids may be visually acquired from a point on the designated or published procedure (prescribed tracks), stabilisation should be achieved not later than 500 ft above heliport elevation. It is however recommended that the Helicopter be stabilised when passing 1000 ft above heliport elevation.

3.5.3. When a low-level final turning manoeuvre is required in order to align the Helicopter visually with the landing runway, a height of 300 ft above the runway threshold elevation, or heliport elevation as appropriate, should be considered as the lowest height for approach stabilisation with wings level.

3.5.4. Dependent upon Helicopter type/class the operator may specify an appropriately higher minimum stabilisation height for circling approach operations.

3.5.5. The operator should specify in the OM the procedures and instructions for conducting circling approaches to include at least:

(a) The minimum required visual reference; and
(b) The corresponding actions for each segment of the circling manoeuvre; and
(c) The relevant go-around actions if the required visual reference is lost.
(d) The visual reference requirements for any operations with a prescribed track circling manoeuvre to include the MDA(H) and any published MAPt.

3.6. Visual Approach. All the applicable criteria with respect to the stability of the final descent path to the runway should apply to the operation of visual approaches. In particular, the control of the desired final nominal descent path to the threshold should be conducted to facilitate the appropriate techniques and procedures described in paragraphs (6) & (7) of this proposed ACJ.

3.6.1. Stabilisation during the final straight-in segment for a visual approach should ideally be accomplished by 500 ft above runway threshold elevation for turbo-jet Helicopters.

3.6.2. When a low-level final turning manoeuvre is required in order to align the Helicopter with the landing runway, a minimum height of 300 ft above the runway threshold elevation (or heliport elevation as appropriate) should be considered as the lowest height for visual approach stabilisation with wings level.

3.6.3. Dependent upon Helicopter type/class, the operator may specify an appropriately higher minimum stabilisation height for visual approach operations.

3.6.4. The operator should specify in the OM the procedures and instructions for conducting visual approaches to include at least:

(a) The minimum required visual reference; and
(b) The corresponding actions if the required visual reference is lost during a visual approach manoeuvre; and
(c) The appropriate go around actions.

3.7. The control of the descent path using the CDFA technique ensures that the descent path to the runway threshold is flown using either:

(a) A variable descent rate or flight path angle to maintain the desired path, which may be verified by appropriate crosschecks; or

(b) A pre-computed constant rate of descent from the FAF, or other appropriate fix which is able to define a descent point and/or from the final approach segment step-down fix; or

(c) Vertical guidance, including APV.

The above techniques also support a common method for the implementation of flight- director guided or auto-coupled RNAV(VNAV) or GLS approaches.

3.8. Missed Approach - The manoeuvre associated with the vertical profile of the missed approach should be initiated not later than reaching the MAPt or the DA(H) specified for the approach, whichever occurs first. The lateral part of the missed approach procedure must be flown via the MAPt unless otherwise stated on the approach chart.

3.9. In case the CDFA technique is not used the approach should be flown to an altitude/height at or above the MDA(H) where a level flight segment at or above MDA(H) may be flown to MAPt.

3.10. In case the CDFA technique is not used when flying an approach, an operator should implement procedures to ensure that early descent to the MDA(H) will not result in a subsequent flight below MDA(H) without adequate visual reference. These procedures could include:

(a) Awareness of radio altimeter information with reference to the approach profile;

(b) Enhanced Ground Proximity Warning System and/ or Terrain Awareness information;

(c) Limitation of rate of descent;

(d) Limitation of the number of repeated approaches;

(e) Safeguards against too early descents with prolonged flight at MDA(H);

(f) Specification of visual requirements for the descent from the MDA(H).

4. Flight techniques

4.1. The CDFA technique can be used on almost any published non-precision approach when the control of the descent path is aided by either:

4.1.1. A recommended descent rate, based on estimated ground speed, which may be provided on the approach chart; or

4.1.2. The descent path as depicted on the chart.

4.2. In order to facilitate the requirement of paragraph 4.1.2 above, the operator should either provide charts which depict the appropriate cross check altitudes/heights with the corresponding appropriate range information, or such information should be calculated and provided to the flight-crew in an appropriate and useable format.

4.3. For approaches flown coupled to a designated descent path using computed electronic glideslope guidance (normally a 3-degree path), the descent path should be appropriately coded in the flight management system data base and the specified navigational accuracy (RNP) should be determined and maintained throughout the operation of the approach.

4.4. With an actual or estimated ground speed, a nominal vertical profile and required descent rate, the approach should be flown by crossing the FAF configured and on-speed. The tabulated or required descent rate is established and flown to not less than the DA(H), observing any stepdown crossing altitudes if applicable.

4.5. To assure the appropriate descent path is flown, the pilot not-flying should announce crossing altitudes as published fixes and other designated points are crossed, giving the appropriate altitude or height for the appropriate range as depicted on the chart. The pilot flying should promptly adjust the rate of descent as appropriate.

4.6. With the required visual reference requirements established, the Helicopter should be in position to continue descent through the DA(H) or MDA(H) with little or no adjustment to attitude or thrust/power.

4.7. When applying CDFA on an approach with a nominal vertical profile to a DA(H), it may be necessary to apply an add-on to the published minima (vertical profile only) to ensure sufficient obstacle clearance. The add on, if applicable, should be published in the OM – (Heliport Operating Minima). However, the resulting procedure minimum will still be referred to as the DA(H) for the approach.

4.8. Operators should establish a procedure to ensure that an appropriate callout (automatic or oral) is made when the Helicopter is approaching DA(H). If the required visual references are not established at DA(H), the missed-approach procedure is to be executed promptly. Visual contact with the ground alone is not sufficient for continuation of the approach. With certain combinations of DA(H), RVR and approach slope, the required visual references may not be achieved at the DA(H) in spite of the RVR being at or above the minimum required for the conduct of the approach. The safety benefits of CDFA are negated if prompt go-around action is not initiated.

4.9. The following bracketing conditions in relation to angle of bank, rate of descent and thrust/power management are considered to be suitable for most Helicopter types/class to ensure the predetermined vertical path approach is conducted in a stabilised manner:

4.9.1. Bank angle: As prescribed in the AOM, should generally be less than 30 degrees;

4.9.2. Rate of descent (ROD): The target ROD should not exceed 1000 fpm. The ROD should deviate by no more than + 300 feet per minute (fpm) from the target ROD. Prolonged rates of descent which differ from the target ROD by more than 300 fpm indicate that the vertical path is not being maintained in a stabilised manner. The ROD should not exceed 1200fpm except under exceptional circumstances, which have been anticipated and briefed prior to commencing the approach; for example, a strong tailwind. Note: zero rate of descent may be used when the descent path needs to be regained from below the profile. The target ROD may need to be initiated prior to reaching the required descent point (typically 0.3NM before the descent point, dependent upon ground speed, which may vary for each type/class of Helicopter). See (c) below.

4.9.3. Thrust/power management: The limits of thrust/power and the appropriate range should be specified in the OM, Part B or equivalent documents

4.10. Transient corrections/Overshoots: The above-specified range of corrections should normally be used to make occasional momentary adjustments in order to maintain the desired path and energy of the Helicopter. Frequent or sustained overshoots should require the approach to be abandoned and a go around initiated. A correction philosophy should be applied similar to that described in paragraph 5 below.

4.11. The relevant elements of paragraph 4 above should, in addition, be applied to approaches not flown using the CDFA technique; the procedures thus developed, thereby ensure a controlled flight path to MDA(H). Dependent upon the number of step-down fixes and the Helicopter type/class, the Helicopter should be appropriately configured to ensure safe control of the flight path prior to the final descent to MDA(H).

5. Stabilisation of energy/speed and configuration of the Helicopter on the approach

5.1. The control of the descent path is not the only consideration. Control of the Helicopter’s configuration and energy is also vital to the safe conduct of an approach.

5.2. The approach should be considered to be fully stabilised when the Helicopter is:

(a) tracking on the required approach path and profile; and

(b) in the required configuration and attitude; and (c) flying with the required rate of descent and speed; and (d) flying with the appropriate thrust/power and trim.

5.3. The following flight path control criteria should be met and maintained when the Helicopter passes the gates described in paragraphs 5.6 and 5.7 below.

5.4. The Helicopter is considered established on the required approach path at the appropriate energy for stable flight using the CDFA technique when:

(a) It is tracking on the required approach path with the correct track set, approach aids tuned and identified as appropriate to the approach type flown and on the required vertical profile; and

(b) It is at the appropriate attitude and speed for the required target ROD with the appropriate thrust/power and trim.

5.5. It is recommended to compensate for strong wind/gusts on approach by speed increments given in the Helicopter Operations Manual (AOM). To detect wind shear and magnitude of winds aloft, all available Helicopter equipment such as FMS, INS, etc. should be used.

5.6. It is recommended that stabilisation during any straight-in approach without visual reference to the ground should be achieved at the latest when passing 1,000 ft above runway threshold elevation. For approaches with a designated vertical profile applying CDFA, a later stabilisation in speed may be acceptable if higher than normal approach speeds are required by ATC procedures or allowed by the OM. Stabilisation should, however, be achieved not later than 500 ft above runway threshold elevation.

5.7. For approaches where the pilot has visual reference with the ground, stabilisation should be achieved not later than 500 ft above heliport elevation. However, it is recommended that the Helicopter should be stabilised when passing 1,000 ft above runway threshold elevation.

5.8. The relevant elements of paragraph 5 above should in addition be applied to approaches not flown using the CDFA technique; the procedures thus developed ensure that a controlled and stable path to MDA(H) is achieved. Dependent upon the number of step-down fixes and the Helicopter type/class, the Helicopter should be appropriately configured to ensure safe and stable flight prior to the final descent to MDA(H).

6. Visual Reference and path-control below MDA(H) when not using the CDFA technique

6.1. In addition to the requirements stated in Appendix 1 to CAR OPS-3.430, the pilot should have attained a combination of visual cues to safely control the Helicopter in roll and pitch to maintain the final approach path to landing. This must be included in the standard operating procedures and reflected in the OM.

7. Operational Procedures and Instructions for using the CDFA technique or not

7.1. The operator should establish procedures and instructions for flying approaches using the CDFA technique and not. These procedures should be included in the OM and should include the duties of the flight crew during the conduct of such operations.

(a) The operator should publish in the OM the requirements stated in paragraphs (4) and (5) above, as appropriate to the Helicopter type or class to be operated.

(b) The checklists should be completed as early as practicable and preferably before commencing final descent towards the DA(H).

7.2. The operator's manuals should at least specify the maximum ROD for each Helicopter type/class operated and the required visual reference to continue the approach below:

(a) The DA(H) when applying CDFA;

(b) MDA(H) when not applying CDFA.

7.3. The operator should establish procedures which prohibit level flight at MDA(H) without the flight crew having obtained the required visual references.

Note: It is not the intention of this paragraph to prohibit level flight at MDA(H) when conducting a circling approach, which does not come within the definition of the CDFA technique.

7.4. The operator should provide the flight crew with:

(a) Unambiguous details of the technique used (CDFA or not).

(b) The corresponding relevant minima should include:

(i) Type of decision, whether DA(H) or MDA(H);

(ii) MAPt as applicable;

(iii) Appropriate RVR/Visibility for the approach classification and Helicopter category.

7.5. Specific types/class of Helicopter, in particular certain Performance Class B and Class C Helicopters, may be unable to comply fully with the requirements of this ACJ relating to the operation of CDFA. This problem arises because some Helicopters must not be configured fully into the landing configuration until required visual references are obtained for landing, because of inadequate missed-approach performance engine out. For such Helicopters, the operator should either:

(a) Obtain approval from the Authority for an appropriate modification to the stipulated procedures and flight techniques prescribed herein; or

(b) Increase the required minimum RVR to ensure the Helicopter will be operated safely during the configuration change on the final approach path to landing.

8. Training

8.1. The operator should ensure that, prior to using the CDFA technique or not (as appropriate), each flight crew member undertakes:

8.1.1. The appropriate training and checking as required by Subpart N. Such training should cover the techniques and procedures appropriate to the operation which are stipulated in paragraphs (4) and (5) of this ACJ.

8.1.2. The operator's proficiency check should include at least one approach to a landing or go around as appropriate using the CDFA technique or not. The approach should be operated to the lowest appropriate DA(H) or MDA(H) as appropriate; and, if conducted in a Simulator, the approach should be operated to the lowest approved RVR.

Note. The approach required by paragraph 8.1.2 is not in addition to any manoeuvre currently required by either CAR-FCL or CAR OPS-3. The requirement may be fulfilled by undertaking any currently required approach (engine out or otherwise) other than a precision approach, whilst using the CDFA technique.

8.2. The policy for the establishment of constant predetermined vertical path and approach stability are to be enforced both during initial and recurrent pilot training and checking. The relevant training procedures and instructions should be documented in the OM.

8.3. The training should emphasise the need to establish and facilitate joint crew procedures and CRM to enable accurate descent path control and the requirement to establish the Helicopter in a stable condition as required by the operator's operational procedures. If barometric vertical navigation is used the crews should be trained in the errors associated with these systems.

8.4. During training emphasis should be placed on the flight crew's need to:

(a) Maintain situational awareness at all times, in particular with reference to the required vertical and horizontal profile;

(b) Ensure good communication channels throughout the approach;

(c) Ensure accurate descent-path control particularly during any manually-flown descent phase. The non-operating/non-handling pilot should facilitate good flight path control by:

(i) Communicating any altitude/height crosschecks prior to the actual passing of the range/altitude or height crosscheck;

(ii) Prompting, as appropriate, changes to the target ROD;

(iii) Monitoring flight path control below DA/MDA.

(d) Understand the actions to be taken if the MAPt is reached prior to the MDA(H).

(e) Ensure that the decision to go around must, at the latest, have been taken upon reaching the DA(H) or MDA(H).

(f) Ensure that prompt go around action is taken immediately when reaching DA(H) if the required visual reference has not been obtained as there may be no obstacle protection if the go-around manoeuvre is delayed.

(g) Understand the significance of using the CDFA technique to a DA(H) with an associated MAPt and the implications of early go around manoeuvres.

(h) Understand the possible loss of the required visual reference (due to pitch- change/climb) when not using the CDFA technique for Helicopter types/classes which require a late change of configuration and/or speed to ensure the Helicopter is in the appropriate landing configuration.

8.5. Additional specific training when not using the CDFA technique with level flight at or above MDA(H).

8.5.1. The training should detail:

(a) The need to facilitate good CRM; with good flight-crew communication in particular.

(b) The additional known safety risks associated with the 'dive-and-drive' approach philosophy which may be associated with non-CDFA.

(c) The use of DA(H) during approaches flown using the CDFA technique.

(d) The significance of the MDA(H) and the MAPt where appropriate.

(e) The actions to be taken at the MAPt and the need to ensure the Helicopter remains in a stable condition and on the nominal and appropriate vertical profile until the landing.

(f) The reasons for increased RVR/Visibility minima when compared to application of CDFA.

(g) The possible increased obstacle infringement risk when undertaking level flight at MDA(H) without the required visual references.

(h) The need to accomplish a prompt go around manoeuvre if the required visual reference is lost.

(i) The increased risk of an unstable final approach and an associated unsafe landing if a rushed approach is attempted either from:

(1) Inappropriate and close-in acquisition of the required visual reference;

(2) Unstable Helicopter energy and or flight path control.

(j) The increased risk of CFIT (See introduction).

9. Approvals

9.1. The procedures which are flown with level flight at/or above MDA(H) must be approved by the Authority and listed in the OM.

9.2. Operators should classify heliports where there are approaches which require level flight at/or above MDA(H) as being B and C categorised. Such heliport categorisation will depend upon the operator's experience, operational exposure, training programme(s) and flight crew qualification(s).

9.3. Exemptions granted in accordance with CAR OPS-3.430, paragraph (d)(2) should be limited to locations where there is a clear public interest to maintain current operations. The exemptions should be based on the operator's experience, training programme and flight crew qualification. The exemptions should be reviewed at regular intervals and should be terminated as soon as facilities are improved to allow SAp or CDFA.

Appendix 1 to CAR OPS-3.430 Heliport Operating Minima

(See CAR OPS-3.430 Heliport Operating Minima – General)

(See AMC to Appendix 1 to CAR OPS-3.430 (d) AOM: RVR for CAT I, APV, NPA)

(See GM to Appendix 1 to CAR OPS-3.430 (f)&(g) RVR Category II & III)

(See GM to Appendix 1 to CAR OPS-3.430 (g)(5) - Table 8 Crew actions in case of autopilot failure) (See AMC to Appendix 1 to CAR OPS-3.430 (h) – EVS)

(See AMC to Appendix 1 to CAR OPS-3.430, paragraph (j) – Circling)

Note: The minima stated in this Appendix are based upon the experience of commonly used approach aids. This is not meant to preclude the use of other guidance systems such as Head Up Display (HUD) and Enhanced Visual Systems (EVS) but the applicable minima for such systems will need to be developed as the need arises.

AMC Appendix 1 to OPS 3.430 subparagraph (a)(3)(i) Onshore Heliport Departure Procedures

(See Appendix 1 to OPS 3.430 subparagraph (a)(3)(i))

The cloud base and visibility should be such as to allow the helicopter to be clear of cloud at TDP, and for the pilot flying to remain in sight of the surface until reaching the minimum speed for flight in IMC given in the HFM.

AMC to Appendix 1 to CAR OPS-3.430(d) Heliport Operating Minima: RVR for CAT 1, APV, NPA

Determination of RVR / Visibility Minima for Category I, APV and non-precision approaches

(a) **Introduction**

(1) The minimum RVR values for the conduct of Category I, APV and non-precision approaches shall be the higher of the values derived from Table 5 or 6 of Appendix 1 to CAR OPS-3.430(d).

(2) The tables are to be used for the determination of all applicable operational RVR values except as prescribed in paragraph 1.3 below.

(3) With the approval of the Authority, the formula below may be used with the actual approach slope and or the actual length of the approach lights for a particular runway. This formula may also be used with the approval of the Authority to calculate the applicable RVR for special (oneoff) approach operations which are allowed under CAR OPS-3.430 paragraph (d) (4).

(4) When the formula is utilised as described above, the calculation conventions and methodologies described in the notes applicable to Paragraph 2 below should be used.

(b) **Derivation of Minimum RVR Values.**

(1) The values in Table 5 in Appendix 1 to CAR OPS-3.430(d) are derived from the formula below:
RVR/Visibility (m) = *[(DH/MDH (ft) x 0.3048) / tan α] – length of approach lights (m)*

Note 1: Tan α is the calculation angle, being a default value of 3.00 degrees increasing in steps of 0.10 degrees for each line in Table 5 up to 3.77 degrees and then remains constant.

Note 2: The default value for the length of the approach lights is equal to the minimum length of the various systems described in Table 4 in Appendix 1 to CAR OPS-3.430(d).

Note 3: The values derived from the above formula have been rounded to the nearest 50 metres up to a value of 800 metres RVR and thereafter to the nearest 100 metres.

Note 4: The DH/MDH intervals in Table 5 have been selected to avoid anomalies caused by the rounding of the calculated OCA(H).

Note 5: The height intervals, referred in Note 4 above, are 10 feet up to a DH/MDH of 300 feet, 20 feet up to a DH/MDH of 760 feet and then 50 feet for DH/MDH above 760 feet.

Note 6: The minimum value of the table is 550 metres.

(2) With the approval of the Authority, the formula may be used to calculate the applicable RVR value for approaches with approach-slopes of greater than 4.5 degrees.

(c) **Approach Operations with an RVR of less than 750m (800m for single-pilot operations)**

(1) Providing the DH is not more than 200 ft, approach operations are almost unrestricted with a runway which is equipped with FALS, RTZL and RCLL. Under these circumstances, the applicable RVR of less than 750m (800m for single-pilot operations) may be taken directly from Table 5. The ILS should not be promulgated as restricted in AIPs, NOTAMS or other documents. Unacceptable ILS restrictions would include limitations on the use of the localiser and / or glideslope below a certain height, prohibitions on its use auto-coupled or limitations on the ILS classification.

(2) Without RTZL and RCLL in order to be able to operate to the RVR values of less than 750m (800m for single-pilot operations) in Table 5, the approach must be conducted utilising an approved HUDLS (or equivalent approved system), or be flown as a coupled approach or flight-director flown approach (Note: not for single-pilot operations) to a DH of not greater than 200 ft.

The equivalent system could for instance be an approved HUD which is not certificated as a landing system but is able to provide adequate guidance cues. Other devices may also be suitable, such as Enhanced/Synthetic Vision Systems (E/SVS) or other hybrids of such devices.

(d) **Description of Approach Lighting Systems**

(1) The following table describes the types of approach lighting systems which are acceptable for calculation of the heliport operating minima. The systems described are basically the ICAO systems as described in Annex 14. However, the table also contains shorter systems which are acceptable for operational use. This is concurrent with the fact that approach lighting systems may sometimes be adjusted to the conditions existing before the threshold. Additionally, the table describes the FAA approach lighting systems which are considered to be corresponding for calculation of heliport operating minima.

Table

CAR-OPS Class of Facility	Length, configuration and intensity of approach lights
FALS (Full Approach Light System)	Precision approach category I lighting system as specified in Annex 14, high intensity lights, 720 m or more **FAA:** ALSF1, ALSF2, SSALR, MALSR, high ormedium intensity and/or flashing lights, 720 m or more
IALS (Intermediate Approach Light System)	**EASA:** Simplified Approach Light System as specified in Annex 14, high intensity lights, 420 – 719 m **FAA:** MALSF, MALS, SALS/SALSF, SSALF, SSALS, high or medium intensity and/or flashing lights, 420 – 719 m
BALS (Basic Approach Light System)	**EASA:** High, medium or low intensity lights, 210 - 419 m including one crossbar **FAA:** ODALS, high or medium intensity or flashing lights 210 - 419m
NALS (No Approach Light System)	**EASA:** Approach Light System shorter than 210 m or no approach lights

GM to Appendix 1 to CAR OPS-3.430(f) & (g) Establishment of minimum RVR for Category II and III Operations

(See Appendix 1 to CAR OPS-3.430, paragraphs (d) and (e) or (f) and (g) for CAR OPS-3.430)

(a) **General**

(1) When establishing minimum RVR for Category II and III Operations, operators should pay attention to the following information which originates in ECAC Doc 17, 3rd Edition, Subpart A. It is retained as background information and, to some extent, for historical purposes although there may be some conflict with current practices.

(2) Since the inception of precision approach and landing operations various methods have been devised for the calculation of heliport operating minima in terms of decision height and runway visual range. It is a comparatively straightforward matter to establish the decision height for an operation but establishing the minimum RVR to be associated with that decision height so as to provide a high probability that the required visual reference will be available at that decision height has been more of a problem.

(3) The methods adopted by various States to resolve the DH/RVR relationship in respect of Category II and Category III operations have varied considerably. In one instance there has been a simple approach which entailed the application of empirical data based on actual operating experience in a particular environment. This has given satisfactory results for application within the environment for which it was developed. In another instance a more sophisticated method was employed which utilised a fairly complex computer programme to take account of a wide range of variables. However, in the latter case, it has been found that with the improvement in the performance of visual aids, and the increased use of automatic equipment in the many different types of new aircraft, most of the variables cancel each other out and a simple tabulation can be constructed which is applicable to a wide range of aircraft. The basic principles which are observed in establishing the values in such a table are that the scale of visual reference required by a pilot at and below decision height depends on the task that he has to carry out, and that the degree to which his vision is obscured depends on the obscuring medium, the general rule in fog being that it becomes denser with increase in height. Research using flight simulators coupled with flight trials has shown the following:

(i) Most pilots require visual contact to be established about 3 seconds above decision height though it has been observed that this reduces to about 1 second when a failoperational automatic landing system is being used;

(ii) To establish lateral position and cross-track velocity most pilots need to see not less than a 3-light segment of the centre line of the approach lights, or runway centre line, or runway edge lights;

(iii) For roll guidance most pilots need to see a lateral element of the ground pattern, i.e. an approach lighting cross bar, the landing threshold, or a barrette of the touchdown zone lighting; and

(iv) To make an accurate adjustment to the flight path in the vertical plane, such as a flare, using purely visual cues, most pilots need to see a point on the ground which has a low or zero rate of apparent movement relative to the aircraft.

(v) With regard to fog structure, data gathered in the United Kingdom over a twenty-year period have shown that in deep stable fog there is a 90% probability that the slant visual range from eye heights higher than 15ft above the ground will be less that the horizontal visibility at ground level, i.e. RVR. There are at present no data available to show what the relationship is between the Slant Visual Range and RVR in other low visibility conditions such as blowing snow, dust or heavy rain, but there is some evidence in pilot reports that the lack of contrast between visual aids and the background in such conditions can produce a relationship similar to that observed in fog.

(b) **Category II Operations**

(1) The selection of the dimensions of the required visual segments which are used for Category II operations is based on the following visual requirements:

(i) A visual segment of not less than 90 metres will need to be in view at and below decision height for pilot to be able to monitor an automatic system;

(ii) A visual segment of not less than 120 metres will need to be in view for a pilot to be able to maintain the roll attitude manually at and below decision height; and

(iii) For a manual landing using only external visual cues, a visual segment of 225 metres will be required at the height at which flare initiation starts in order to provide the pilot with sight of a point of low relative movement on the ground.

Note: Before using a Category II ILS for automatic landing, the quality of the localiser between 50 ft and touchdown should be verified.

(c) **Category III fail passive operations**

(1) Category III operations utilising fail-passive automatic landing equipment were introduced in the late 1960's and it is desirable that the principles governing the establishment of the minimum RVR for such operations be dealt with in some detail.

(2) During an automatic landing the pilot needs to monitor the performance of the aircraft system, not in order to detect a failure which is better done by the monitoring devices built into the system, but so as to know precisely the flight situation. In the final stages he should establish visual contact and, by the time he reaches decision height, he should have checked the aircraft position relative to the approach or runway centre-line lights. For this he will need sight of horizontal elements (for roll reference) and part of the touchdown area. He should check for lateral position and cross-track velocity and, if not within the pre-stated lateral limits, he should carry out a go-around. He should also check longitudinal progress and sight of the landing threshold is useful for this purpose, as is sight of the touchdown zone lights.

(3) In the event of a failure of the automatic flight guidance system below decision height, there are two possible courses of action; the first is a procedure which allows the pilot to complete the landing manually if there is adequate visual reference for him to do so, or to initiate a go- around if there is not; the second is to make a go-around mandatory if there is a system disconnect regardless of the pilot's assessment of the visual reference available.

(i) If the first option is selected then the overriding requirement in the determination of a minimum RVR is for sufficient visual cues to be available at and below decision height for the pilot to be able to carry out a manual landing. Data presented in ICAO Doc 9365 showed that a minimum value of 300 metres would give a high probability that the cues needed by the pilot to assess the aircraft in pitch and roll will be available and this should be the minimum RVR for this procedure.

(ii) The second option, to require a go-around to be carried out should the automatic flight guidance system fail below decision height, will permit a lower minimum RVR because the visual reference requirement will be less if there is no need to provide for the possibility of a manual landing. However, this option is only acceptable if it can be shown that the probability of a system failure below decision height is acceptably low. It should be recognised that the inclination of a pilot who experiences such a failure would be to continue the landing manually but the results of flight trials in actual conditions and of simulator experiments show that pilots do not always recognise that the visual cues are inadequate in such situations and present recorded data reveal that pilots' landing performance reduces progressively as the RVR is reduced below 300 metres. It should further be recognised that there is some risk in carrying out a manual go-around from below 50ft in very low visibility and it should therefore be accepted that if an RVR lower than 300 metres is to be authorised, the flight deck procedure should not normally allow the pilot to continue the landing manually in such conditions and the Helicopter system should be sufficiently reliable for the go-around rate to be low.

(4) These criteria may be relaxed in the case of an aircraft with a fail-passive automatic landing system which is supplemented by a head-up display which does not qualify as a fail- operational system but which gives guidance which will enable the pilot to complete a landing in the event of a failure of the automatic landing system. In this case it is not necessary to make a go-around mandatory in the event of a failure of the automatic landing system when the RVR is less than 300 metres.

(d) **Category III fail operational operations - with a Decision Height**

(1) For Category III operations utilising a fail-operational landing system with a Decision Height, a

pilot should be able to see at least 1 centre line light.

(2) For Category III operations utilising a fail-operational hybrid landing system with a Decision Height, a pilot should have a visual reference containing a segment of at least 3 consecutive lights of the runway centre line lights.

(e) **Category III fail operational operations - with No Decision Height**

(1) For Category III operations with No Decision Height the pilot is not required to see the runway prior to touchdown. The permitted RVR is dependent on the level of Helicopter equipment.

(2) A CAT III runway may be assumed to support operations with no Decision Height unless specifically restricted as published in the AIP or NOTAM.

AMC Appendix 1 to OPS 3.430 subparagraph (i) Airborne Radar Approach (ARA) for Overwater Operations

(See Appendix 1 to OPS 3.430 subparagraph (i))

(a) General

(1) The helicopter airborne radar approach procedure (ARA) may have as many as five separate segments. These are the arrival, initial, intermediate, final, and missed approach segments. In addition, the requirements of the circling manoeuvre to a landing under visual conditions should be considered. The individual approach segments can begin and end at designated fixes, however, the segments of an ARA may often begin at specified points where no fixes are available.

(2) The fixes, or points, are named to coincide with the associated segment. For example, the intermediate segment begins at the Intermediate Fix (IF) and ends at the Final Approach Fix (FAF). Where no fix is available or appropriate, the segments begin and end at specified points; for example, Intermediate Point (IP) and final approach point (FAP). The order in which this AMC discusses the segments is the order in which the pilot would fly them in a complete procedure: that is, from the arrival through initial and intermediate to a final approach and, if necessary, the missed approach.

(3) Only those segments which are required by local conditions applying at the time of the approach need be included in a procedure. In constructing the procedure, the final approach track, (which should be orientated so as to be substantially into wind) should be identified first as it is the least flexible and most critical of all the segments. When the origin and the orientation of the final approach have been determined, the other necessary segments should be integrated with it to produce an orderly manoeuvring pattern which does not generate an unacceptably high work-load for the flight crew.

(4) Examples of Airborne Radar Approach procedures, vertical profile and missed approach procedures are contained in Figures 1 to 5.

(b) Obstacle environment

(1) Each segment of the ARA is located in an over-water area which has a flat surface at sea level. However, due to the passage of large vessels which are not required to notify their presence, the exact obstacle environment cannot be determined. As the largest vessels and structures are known to reach elevations exceeding 500 ft amsl, the uncontrolled offshore obstacle environment applying to the arrival, initial and intermediate approach segments can reasonably be assumed to be capable of reaching to at least 500 ft amsl. But, in the case of the final approach and missed approach segments, specific areas are involved within which no radar returns are permitted. In these areas the height of wave crests and the possibility that small obstacles may be present which are not visible on radar, results in an uncontrolled surface environment which extends to an elevation of 50 ft amsl.

(2) Under normal circumstances, the relationship between the approach procedure and the obstacle environment is governed according to the concept that vertical separation is very easy to apply during the arrival, initial and intermediate segments, while horizontal separation, which is much more difficult to guarantee in an uncontrolled environment, is applied only in the final and missed approach segments.

(c) Arrival segment

(1) The arrival segment commences at the last en-route navigation fix, where the aircraft leaves the helicopter route, and it ends either at the Initial Approach Fix (IAF) or, if no course reversal, or similar manoeuvre is required, it ends at the IF. Standard en-route obstacle clearance criteria should be applied to the arrival segment.

(d) Initial approach segment

(1) The initial approach segment is only required if a course reversal, race track, or arc procedure is necessary to join the intermediate approach track. The segment commences at the IAF and on completion of the manoeuvre ends at the intermediate point (IP). The Minimum Obstacle Clearance (MOC) assigned to the initial approach segment is 1 000 ft.

(e) Intermediate approach segment

(1) The intermediate approach segment commences at the IP, or in the case of "straight in" approaches, where there is no initial approach segment, it commences at the IF. The segment ends at the FAP and should not be less than 2 nm in length. The purpose of the intermediate segment is to align and prepare the helicopter for the final approach. During the intermediate segment the helicopter should be lined up with the final approach track, the speed should be stabilised, the destination should be identified on the radar, and the final approach and missed approach areas should be identified and verified to be clear of radar returns. The MOC assigned to the intermediate segment is 500 ft.

(f) Final approach segment

(1) The final approach segment commences at the FAP and ends at the missed approach point (MAPt). The final approach area, which should be identified on radar, takes the form of a corridor between the FAP and the radar return of the destination. This corridor should not be less than 2 nm wide in order that the projected track of the helicopter does not pass closer than 1 nm to the obstacles lying outside the area.

(2) On passing the FAP, the helicopter will descend below the intermediate approach altitude, and follow a descent gradient which should not be steeper than 6·5%. At this stage vertical separation from the offshore obstacle environment will be lost. However, within the final approach area, the minimum descent height (MDH), or minimum descent altitude (MDA), will provide separation from the surface environment. Descent from 1 000 ft amsl to 200 ft amsl at a constant 6·5% gradient will involve a horizontal distance of 2 nm. In order to follow the guideline that the procedure should not generate an unacceptably high work-load for the flight crew, the required actions of levelling at MDH, changing heading at the Offset Initiation Point (OIP), and turning away at MAPt should not be planned to occur at the same time. Consequently, the FAP should not normally be located at less than 4 nm from the destination.

(3) During the final approach, compensation for drift should be applied and the heading which, if maintained, would take the helicopter directly to the destination, should be identified. It follows that, at an OIP located at a range of 1·5 nm, a heading change of 10° is likely to result in a track offset of 15° at 1nm, and the extended centreline of the new track can be expected to have a mean position lying some 300 - 400 metres to one side of the destination structure. The safety margin built in to the 0·75 nm Decision Range (DR) is dependent upon the rate of closure with

the destination. Although the airspeed should be in the range 60/90 kt during the final approach, the ground speed, after due allowance for wind velocity, should be no greater than 70 kts.

(g) Missed approach segment

(1) The missed approach segment commences at the MAPt and ends when the helicopter reaches minimum en-route altitude. The missed approach manoeuvre is a "turning missed approach" which must be of not less than 30° and should not, normally, be greater than 45°. A turn away of more than 45° does not reduce the collision risk factor any further, nor will it permit a closer decision range (DR). However, turns of more than 45° may increase the risk of pilot disorientation and, by inhibiting the rate of climb (especially in the case of a one engine inoperative (OEI) go-around), may keep the helicopter at an extremely low level for longer than is desirable.

(2) The missed approach area to be used should be identified and verified as a clear area on the radar screen during the intermediate approach segment. The base of the missed approach area is a sloping surface at 2·5% gradient starting from MDH at the MAPt. The concept is that a helicopter executing a turning missed approach will be protected by the horizontal boundaries of the missed approach area until vertical separation of more than 130 ft is achieved between the base of the area, and the offshore obstacle environment of 500 ft amsl which prevails outside the area.

(3) A missed approach area, taking the form of a 45° sector orientated left or right of the final approach track, originating from a point 5 nm short of the destination, and terminating on an arc 3 nm beyond the destination, will normally satisfy the requirements of a 30° turning missed approach.

(h) The required visual reference

(1) The visual reference required is that the destination shall be in view in order that a safe landing may be carried out.

(i) Radar equipment

(1) During the ARA procedure colour mapping radar equipment with a 120° sector scan and 2·5 nm range scale selected, may result in dynamic errors of the following order:

(i) bearing/tracking error ± 4·5° with 95% accuracy;

(ii) mean ranging error - 250 m;

(iii) random ranging error ± 250 m with 95% accuracy.

Figure 1 - Arc Procedure

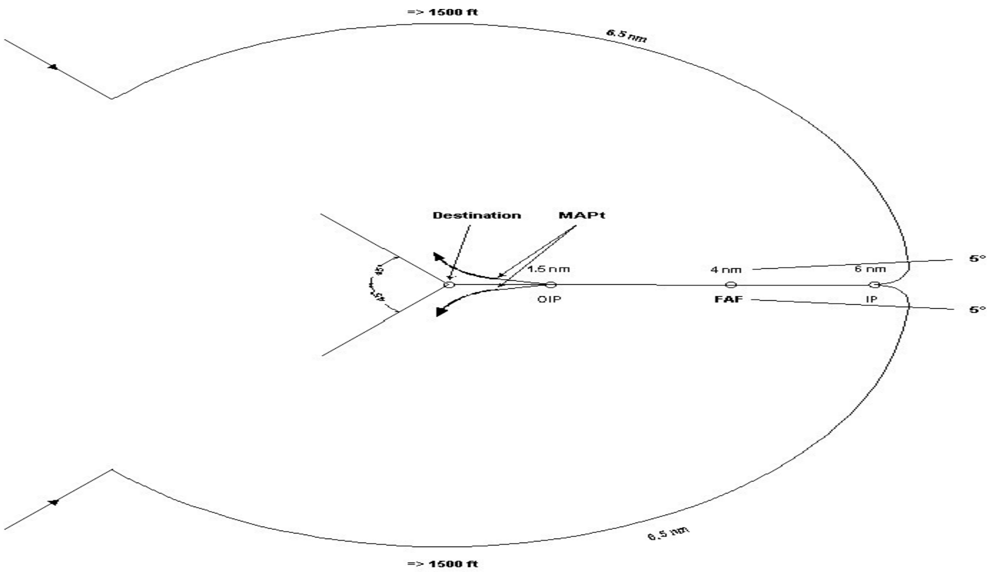


Figure 2 – Base Turn Procedure – Direct Approach

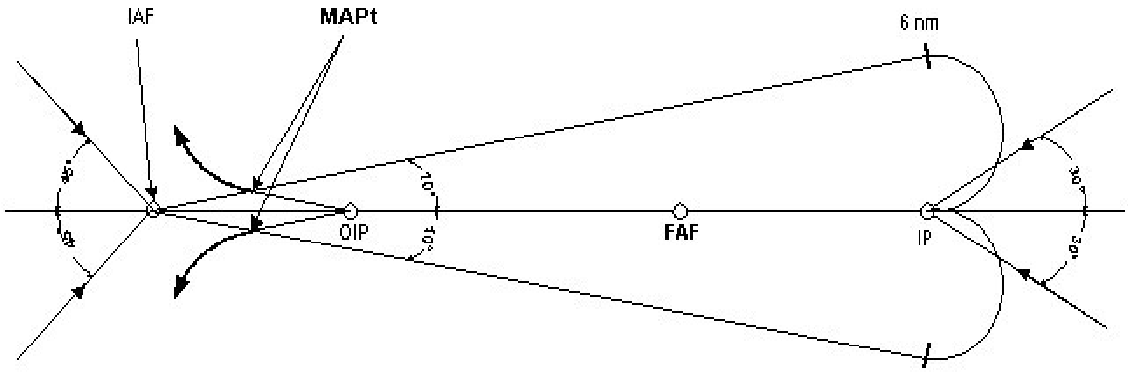


Figure 3 – Vertical Profile

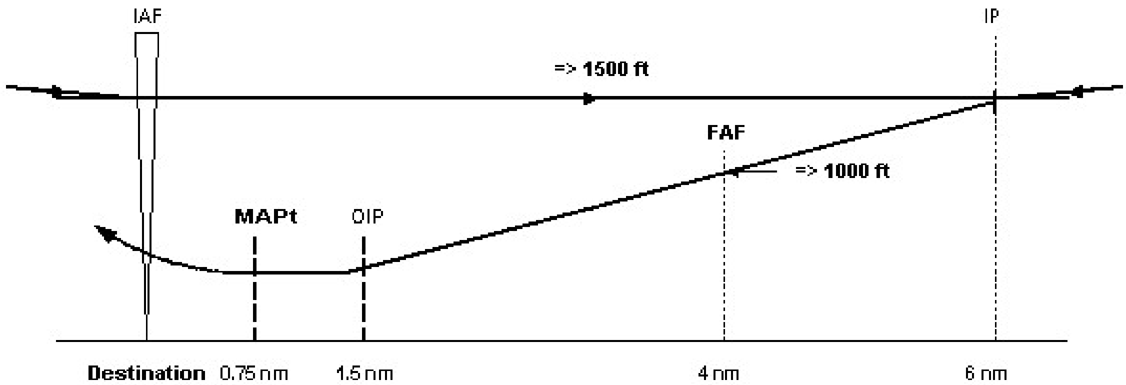


Figure 4 – Holding Pattern & Race Track Procedure

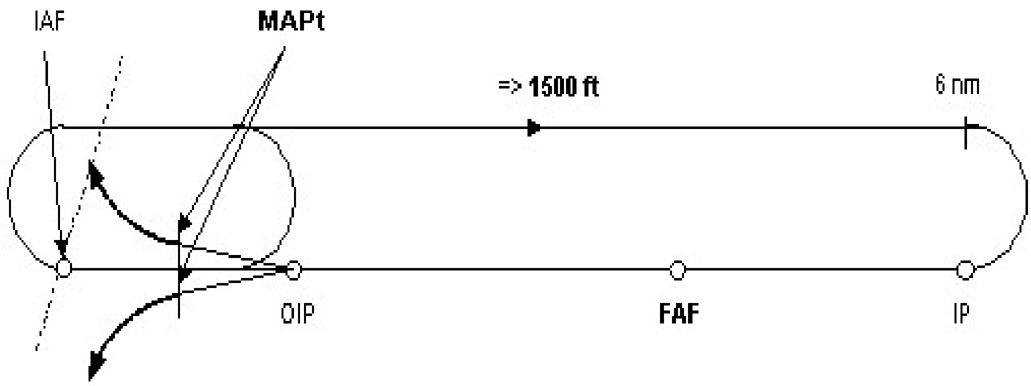
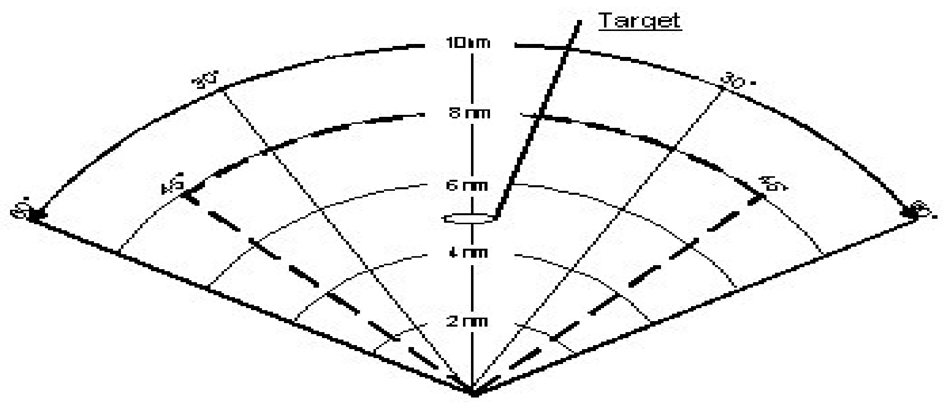


Figure 5 – Missed Approach Area Left & Right



AMC to Appendix 1 to CAR OPS-3.430(j) Circling Terminology: XLS= ILS/MLS/GLS etc.

1. Visual Maneuvering (circling)

1.1 The purpose of this AMC is to provide operators with supplemental information regarding the application of heliport operating minima in relation to circling approaches.

2. Conduct of flight – General

2.1 The Minimum Descent Height (MDH) and Obstacle Clearance Height (OCH) included in the procedure are referenced to heliport elevation.

2.2 The Minimum Descent Altitude (MDA) is referenced to mean sea level.

2.3 For these procedures, the applicable visibility is the meteorological visibility (VIS).

3. Instrument approach followed by visual manoeuvring (circling) without prescribed tracks

3.1 When the Helicopter is on the initial instrument approach, before visual reference is stabilised, but not below MDH/MDA - the Helicopter should follow the corresponding instrument approach procedure until the appropriate instrument Missed Approach Point (MAPt) is reached.

3.2 At the beginning of the level flight phase at or above the MDH/MDA, the instrument approach track determined by radio navigation aids, RNAV, RNP or XLS should be maintained until:

(a) The pilot estimates that, in all probability, visual contact with the runway of intended landing or the runway environment will be maintained during the entire circling procedure; and

(b) The pilot estimates that the Helicopter is within the circling area before commencing circling; and

(c) The pilot is able to determine the Helicopter's position in relation to the runway of intended landing with the aid of the appropriate external references.

3.3 When reaching the published instrument MAPt and the conditions stipulated in paragraph (3.2) above, are unable to be established by the pilot, a missed approach should be carried out in accordance with that instrument approach procedure. (See paragraph 5.)

3.4 After the Helicopter has left the track of the initial (letdown) instrument approach, the flight phase outbound from the runway should be limited to an appropriate distance, which is required to align the Helicopter onto the final approach. Such manoeuvres should be conducted to enable the Helicopter:

(a) To attain a controlled and stable descent path to the intended landing runway; and

(b) Remain within the circling area and in such way that visual contact with the runway of intended landing or runway environment is maintained at all times.

3.5 Flight manoeuvres should be carried out at an altitude/height that is not less than the circling MDH/MDA.

3.6 Descent below MDH/MDA should not be initiated until the threshold of the runway to be used has been appropriately identified and the Helicopter is in a position to continue with a normal rate of descent and land within the touchdown zone.

4. Instrument approach followed by a visual manoeuvring (circling) with prescribed track

4.1 The Helicopter should remain on the initial instrument approach or letdown procedure until one of the following is reached:

(a) The prescribed divergence point to commence circling on the prescribed track; or

(b) The appropriate initial instrument MAPt.

4.2 The Helicopter should be established on the instrument approach track determined by the radio navigation aids, RNAV, RNP, or XLS in level flight at or above the MDH/MDA at or by the circling manoeuvre divergence point.

4.3 If the divergence point is reached before the required visual reference is acquired, a missed approach should be initiated not later than the initial instrument approach MAPt and completed in accordance with the initial instrument approach procedure.

4.4 When commencing the prescribed track-circling manoeuvre at the published divergence point, the subsequent manoeuvres should be conducted to comply with the published routing and promulgated heights/altitudes.

4.5 Unless otherwise specified, once the Helicopter is established on the prescribed track(s), the promulgated visual reference should not be required to be maintained unless:

(a) Required by the Authority;

(b) The Circling MAPt (if published) is reached.

4.6 If the prescribed track-circling manoeuvre has a published MAPt and the required visual reference has not been obtained a missed approach should be executed in accordance with paragraphs 5.2 and 5.3 below.

4.7 Subsequent further descent below MDH/MDA should only commence when the required visual reference is obtained.

4.8 Unless otherwise specified in the procedure, final descent should not be initiated from MDH/MDA until the threshold of the intended landing runway has been appropriately identified and the Helicopter is in a position to continue with a normal rate of descent and land within the touchdown zone.

5. Missed approach

5.1 Missed Approach during Instrument Approach prior to Circling:

(a) If the decision to carry out a missed approach is taken when the Helicopter is positioned on the instrument approach track defined by radio-navigation aids RNAV, RNP, or XLS, and before commencing the circling manoeuvre, the published missed approach for the instrument approach should be followed.

(b) If the instrument approach procedure is carried out with the aid of an XLS or Stabilised Approach (SAp), the (MAPt) associated with an XLS procedure without glide path (GP out procedure) or the SAp, where applicable, should be used.

5.2 If a prescribed missed approach is published for the circling manoeuvre, this overrides the manoeuvres prescribed below.

5.3 If visual reference is lost while circling to land after the Helicopter has departed from the initial instrument approach track, the missed approach specified for that particular instrument approach should be followed. It is expected that the pilot will make an initial climbing turn toward the intended landing runway and continue overhead the heliport where the pilot will establish the Helicopter in a climb on the instrument missed approach track.

5.4 The Helicopter should not leave the visual manoeuvring (circling) area, which is obstacle protected, unless:

(a) Established on the appropriate missed approach track; or

(b) At Minimum Sector Altitude (MSA)

5.5 All turns should (See Note 1 below) be made in the same direction and the Helicopter should remain within the circling protected area while climbing to either:

(a) The altitude assigned to any published circling missed approach manoeuvre if applicable;

(b) The altitude assigned to the missed approach of the initial instrument approach;

(c) The Minimum Sector Altitude (MSA);

(d) The Minimum Holding Altitude (MHA) applicable for transition to a holding facility or fix, or continue to climb to a Minimum Safe Altitude; or

(e) As directed by ATS (C).

Note 1: When the go-around is commenced on the "downwind" leg of the circling manoeuvre, an "S" turn may be undertaken to align the Helicopter on the initial instrument approach missed approach path, provided the Helicopter remains within the protected circling area.

Note 2: The commander should be responsible for ensuring adequate terrain clearance during the above stipulated manoeuvres, particularly during the execution of a missed approach initiated by ATS.

5.6 In as much as the circling manoeuvre may be accomplished in more than one direction, different patterns will be required to establish the Helicopter on the prescribed missed approach course depending on its position at the time visual reference is lost. In particular, all turns are to be in the prescribed direction if this is restricted, e.g. to the west/east (left or right hand) to remain within the protected circling area.

5.7 If a missed approach procedure is promulgated for the runway (XX) onto which the Helicopter is conducting a circling approach and the Helicopter has commenced a manoeuvre to align with the runway; the missed approach for this direction may be accomplished. The ATS should be informed of the intention to fly the promulgated missed approach procedure for runway XX.

5.8 When the option described in paragraph (5.7) above is undertaken the commander should whenever possible, advise at the earliest opportunity, the ATS(C) of the intended go around procedure. This dialogue should, if possible occur during the initial approach phase and include the intended missed approach to be flown and the level off altitude.

5.9 In addition to paragraph (5.8) above, the commander should advise ATS(C) when any go around has commenced the height / altitude the Helicopter is climbing to and the position the Helicopter is proceeding towards and or heading the Helicopter is established on.

GM to Appendix 1 to CAR OPS-3.430 Visual Manoeuvring (circling)

(See Appendix 1 to CAR OPS-3.430)

(1) The purpose of this GM is to provide operators with supplemental information regarding the application of heliport operating minima in relation to circling approaches.

(2) Conduct of flight – General
   - (a) For these procedures, the applicable visibility is the meteorological visibility (VIS).
   - (b) The MDA/H and OCA/H minimums included in the procedure are related to heliport elevation.

(3) Missed approach
   - (a) If the decision to carry out a missed approach is taken when the aircraft is positioned on the approach axis (track) defined by radio-navigation aids, the published missed approach procedure must be followed. If visual reference is lost while circling to land from an instrument approach, the missed approach specified for that particular instrument approach must be followed. It is expected that the pilot will make an initial climbing turn toward the landing runway and overhead the heliport where he will establish the Helicopter in a climb on the missed approach track. In as much as the circling manoeuvre may be accomplished in more than one direction, different patterns will be required to establish the Helicopter on the prescribed missed approach course depending on its position at the time visual reference is lost unless otherwise prescribed.
   - (b) If the instrument approach procedure is carried out with the aid of an ILS, the Missed Approach Point (MAPt) associated with an ILS procedure without glide path (GP out procedure) should be taken in account.

(4) Instrument approach followed by visual manoeuvring (circling) without prescribed tracks:
   - (a) Before visual reference is established, but not below MDA/H – The flight should follow the corresponding instrument approach procedure.
   - (b) At the beginning of the level flight phase at or above the MDA/H – From the beginning of the level flight phase, the instrument approach track determined by radio navigation aids should be

maintained until:

i. The pilot estimates that, in all probability, visual contact with the runway or runway environment will be maintained during the entire procedure;

ii. The pilot estimates that his aircraft is within the circling area before commencing circling; and

iii. The pilot is able to determine his aircraft's position in relation to the runway with the aid of the external references.

(c) If the conditions in paragraph (b) above are not met by the MAPt, a missed approach must be carried out in accordance with the instrument approach procedure.

(d) After the Helicopter has left the track of the corresponding instrument approach procedure, the flight phase outbound from the runway should be limited to the distance which is required to align the Helicopter for the final approach. Flight manoeuvres should be conducted within the circling area and in such way that visual contact with the runway or runway environment is maintained at all times.

(e) Flight manoeuvres should be carried out at an altitude/height which is not less than the circling minimum descent/altitude height (MDA/H).

(f) Descent below MDA/H should not be initiated until the threshold of the runway to be used has been identified and the Helicopter is in a position to continue with a normal rate of descent and land within the touchdown zone.

(5) Instrument approach followed by a visual manoeuvring (circling) with prescribed track

(a) Before visual reference is established, but not below MDA/H – The flight should follow the corresponding instrument approach procedure.

(b) The Helicopter should be established in level flight at or above the MDA/H and the instrument approach track determined by the radio navigation aids maintained until visual contact can be achieved and maintained. At the divergence point, the Helicopter should leave the instrument approach track and the published routing and heights followed.

(c) If the divergence point is reached before the necessary visual reference is acquired, a missed approach procedure should be initiated not later than the MAPt and carried out in accordance with the instrument approach procedure.

(d) The instrument approach track determined by radio navigation aids should only be left at the prescribed divergence point when only the published routing and heights should be followed.

(e) Unless otherwise specified in the procedure, final descent should not be initiated until the threshold of the runway to be used has been identified and the Helicopter is in a position to continue with a normal rate of descent and land within the touchdown zone.

AC to Appendix 1 to CAR OPS-3.440 Operational Demonstrations

(See Appendix 1 to CAR OPS-3.440)

(1) General

(a) Demonstrations may be conducted in line operations, or any other flight where the Operator's procedures are being used.

(b) In unique situations where the completion of 100 successful landings could take an unreasonably long period of time due to factors such as a small number of Helicopters in the fleet, limited opportunity to use runways having Category II/III procedures, or inability to obtain ATS sensitive area protection during good weather conditions, and equivalent reliability assurance can be achieved, a reduction in the required number of landings may be considered on a case-by-case basis. Reduction of the number of landings to be demonstrated requires a justification for the reduction, and prior approval from Authority. However, at the operator's option,

demonstrations may be
made on other runways and facilities. Sufficient information should be collected to determine the cause of any unsatisfactory performance (e.g. sensitive area was not protected).

(c) If an operator has different variants of the same type of Helicopter utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type/classes of Helicopter, the operator should show that the various variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant.

(d) Not more than 30% of the demonstration flights should be made on the same runway.

(2) Data Collection for Operational Demonstrations

(a) Data should be collected whenever an approach and landing is attempted utilising the Category II/ III system, regardless of whether the approach is abandoned, unsatisfactory, or is concluded successfully.

(b) The data should, as a minimum, include the following information:

i. Inability to initiate an Approach. Identify deficiencies related to airborne equipment which preclude initiation of a Category II/III approach.

ii. Abandoned Approaches. Give the reasons and altitude above the runway at which approach was discontinued or the automatic landing system was disengaged.

iii. Touchdown or Touchdown and Roll-out Performance. Describe whether or not the aircraft landed satisfactorily (within the desired touchdown area) with lateral velocity or cross track error which could be corrected by the pilot or automatic system so as to remain within the lateral confines of the runway without unusual pilot skill or technique. The approximate lateral and longitudinal position of the actual touchdown point in relation to the runway centreline and the runway threshold, respectively, should be indicated in the report. This report should also include any Category II/III system abnormalities which required manual intervention by the pilot to ensure a safe touchdown or touchdown and roll-out, as appropriate.

(3) Data Analysis

(a) Unsuccessful approaches due to the following factors may be excluded from the analysis:

i. ATS Factors. Examples include situations in which a flight is vectored too close to the final approach fix/point for adequate localiser and glide slope capture, lack of protection of ILS sensitive areas, or ATS requests the flight to discontinue the approach.

ii. Faulty Navaid Signals. Navaid (e.g. ILS localiser) irregularities, such as those caused by other aircraft taxiing, over-flying the navaid (antenna).

iii. Other Factors. Any other specific factors that could affect the success of Category II/III operations that are clearly discernible to the flight crew should be reported.

IEM to Appendix 1 to CAR OPS-3.440(b) Criteria for a successful CAT II/III approach and automatic landing

(See Appendix 1 to CAR OPS-3.440, paragraph (b))

(1) The purpose of this IEM is to provide operators with supplemental information regarding the criteria for a successful approach and landing to facilitate fulfilling the requirements prescribed in Appendix 1 to CAR OPS-3.440, paragraph (b).

(2) An approach may be considered to be successful if:

(a) From 500 feet to start of flare:

i. Speed is maintained as specified in AC-AWO 231, paragraph 2 'Speed Control'; and

ii. No relevant system failure occurs; and (b)From 300 feet to DH:

i. No excess deviation occurs; and

ii. No centralised warning gives a go-around command (if installed).

(3) An automatic landing may be considered to be successful if:

(a) No relevant system failure occurs;

(b) No flare failure occurs;

(c) No de-crab failure occurs (if installed);

(d) Longitudinal touchdown is beyond a point on the runway 60 metres after the threshold and before the end of the touchdown zone lighting (900 metres from the threshold);

(e) Lateral touchdown with the outboard landing gear is not outside the touchdown zone lighting edge;

(f) Sink rate is not excessive;

(g) Bank angle does not exceed a bank angle limit; and

(h) No roll-out failure or deviation (if installed) occurs.

(4) More details can be found in CS-AWO or an equivalent accepted by the CAA.

IEM OPS-3.450(g)(1) Low Visibility Operations - Training & Qualifications

(See Appendix 1 to CAR OPS-3.450(g)(1))

The number of approaches referred to in Appendix 1 to CAR OPS-3.450(g)(1) includes one approach and landing that may be conducted in the Helicopter using approved Category II/III procedures. This approach and landing may be conducted in normal line operation or as a training flight. It is assumed that such flights will only be conducted by pilots qualified in accordance CAR OPS-3.940 and qualified for the particular category of operation.

SECTION 1 - SUBPART F PERFORMANCE - GENERAL

CAR OPS-3.470 Applicability

(a) Helicopters shall be operated in accordance with the following comprehensive and detailed code of performance of the applicable Subpart F, G, H or I.

Note: The code of performance reflects, for the conduct of operations, both the various phases of flight and the operational environment.

(b) The level of performance defined by the appropriate Subparts referred to in (a) above shall be consistent with the overall level embodied in ICAO Annex 6, Part III, Chapter 3 Standards.

(c) The operator shall ensure that;

(1) helicopters operating to/from heliports located in a congested hostile environment: or

(2) helicopters which have a maximum approved passenger seating configuration (MAPSC) of more than 19;

are operated in accordance with OPS 3, Subpart G (Performance Class 1); except helicopters:

(i) with a maximum approved passenger seating configuration (MAPSC) of more than 19 and operated to/from helidecks; which may be operated in accordance with OPS 3.517(a); or

(ii) which have an operational approval in accordance with Appendix 1 to OPS 3.005(i) (b)

(d) Unless otherwise prescribed by sub-paragraph (c) above, the operator shall ensure that helicopters which have a maximum approved passenger seating configuration of 19 or less but more than 9 are operated in accordance with OPS 3, Subpart G or H (Performance Class 1 or 2);

(e) Unless otherwise prescribed by sub-paragraph (c) above, the operator shall ensure that helicopters which have a maximum approved passenger seating configuration of 9 or less, are operated in accordance with OPS 3, Subpart G, H or I (Performance Class 1, 2 or 3).

(f) Where full compliance with the requirements of the appropriate Subpart cannot be shown due to specific design characteristics, the operator shall apply to the Authority for approved performance standards that ensure a level of safety equivalent to that of the appropriate Subpart.

(g) A flight shall not be commenced unless the performance information provided in the flight manual indicates that the requirements of the Subpart G, H or I, as applicable, can be complied with for the flight to be undertaken.

CAR OPS-3.475 General

(See AMC OPS-3.475(b), GM-1 OPS-3.475(b) & GM-2 OPS-3.475(f))

(a) The operator shall ensure that the mass of the helicopter:

(1) At the start of the take-off; or, in the event of in-flight replanning;

(2) At the point from which the revised operational flight plan applies,

is not greater than the mass at which the requirements of the appropriate Subpart can be complied with for the flight to be undertaken, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is provided for in the particular requirement.

(b) The operator shall ensure that the approved performance data contained in the Helicopter Flight Manual is used to determine compliance with the requirements of the appropriate Subpart, supplemented as necessary with other data acceptable to the Authority as prescribed in the relevant Subpart. When applying the factors prescribed in the appropriate Subpart, account may be taken of any operational factors already incorporated in the Helicopter Flight Manual performance data to avoid double application of factors.

(c) When showing compliance with the requirements of the appropriate Subpart, due account shall be taken of the following parameters:

(1) mass of the helicopter;
(2) helicopter configuration;
(3) environmental conditions, in particular:
    (i) pressure-altitude, and temperature;
    (ii) wind:
        (A) for take-off, take-off flight path and landing requirements, accountability for wind shall be no more than 50% of any reported steady head wind component of 5 knots or more.
        (B) Where take-off and landing with a tail wind component is permitted in the Helicopter Flight Manual, and in all cases for the take-off flight path, not less than 150% of any reported tail wind component shall be taken into account.
        (C) Where precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, alternate wind components specific to a site may be approved by the Authority. (See AC OPS 3.475(c)(3)(ii));
(4) operating techniques;
(5) noise certification standards; and
(6) operation of any system which have adverse effect on performance.

(d) The Authority, as the State of Registry, shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of Subparts G, H and I.
(e) Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed for visual presentation, shall be displayed in the helicopter.
(f) In conditions where the safe continuation of flight is not ensured in the event of a critical engine failure, helicopter operations shall be conducted in conditions of weather and light, and over such routes and diversions that permit a safe forced landing to be executed.
(g) Notwithstanding paragraph (f), the Authority as the State of the Operator may, based on the result of a risk assessment, allow for variations without a safe forced landing to be included in this Code of Performance. The risk assessment shall take into consideration at least the following;
    (1) the type and circumstances of the operation;
    (2) the area/terrain over which the operation is being conducted;
    (3) the probability of, and length of exposure to, a critical engine failure and the tolerability of such an event;
    (4) the procedures and systems for monitoring and maintaining the reliability of the engine(s);
    (5) the training and operational procedures to mitigate the consequences of the critical engine failure; and
    (6) helicopter equipment.

Note: Guidance on conduct of the risk assessment to allow for variations to the need for a safe forced landing, including mitigation strategies to reduce the risk, is contained in ICAO Doc 10110.

OPS 3.477 Obstacle Accountability

(See AC to Subpart H)

(a) The operator shall use available obstacle data to develop procedures to comply with the take-off, initial climb, approach and landing phases detailed in the performance requirements of the applicable Subparts F, G, H or I.
(b) For the purpose of obstacle clearance requirements, an obstacle, located beyond the FATO, in the take-off flight path or the missed approach flight path, shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

(1) For VFR operations:
   (i) half of the minimum FATO (or the equivalent term used in the Flight Manual) width defined in the Helicopter Flight Manual (or, when no width is defined 0.75 D), plus 0.25 times D (or 3 m, whichever is greater), plus:
      A. 0.10 DR for VFR day operations
      B. 0.15 DR for VFR night operations
(2) For IFR operations:
   (i) 1.5 D (or 30 m, whichever is greater), plus:
      A. 0.10 DR for IFR operations with accurate course guidance
      B. 0.15 DR for IFR operations with standard course guidance
      C. 0.30 DR for IFR operations without course guidance
   (ii) when considering the missed approach flight path, the divergence of the obstacle accountability area only applies after the end of the take-off distance available;
   (iii) standard course guidance includes ADF and VOR guidance. Accurate course guidance include ILS, MLS or other course guidance providing an equivalent navigational accuracy.
(3) For operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in (1) apply up to the transition point then the criteria required in (2) apply after the transition point:
   (i) the transition point cannot be located before the end of TODRH for helicopters operating in performance Class 1 and before the DPATO for helicopters operating in performance Class 2;

(c) For take-off using a backup (or a lateral transition) procedure; for the purpose of obstacle clearance requirements, an obstacle, located in the back-up (or lateral transition) area, shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:
   (1) half of the minimum FATO (or the equivalent term used in the Flight Manual) width defined in the Helicopter Flight Manual (or, when no width is defined 0.75 D), plus 0.25 times D (or 3 m, whichever is greater), plus 0.10 for VFR day, or 0.15 for VFR night, of the distance travelled from the back of the FATO. (see AC OPS 3.490(d))
(d) Obstacles may be disregarded if they are situated beyond:
   (1) 7 R for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;
   (2) 10 R for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;
   (3) 300 m if navigational accuracy can be achieved by appropriate navigation aids; and
   (4) 900 m in the other cases.

CAR OPS-3.480 Terminology

(a) Terms used in Subparts F, G, H and I have the following meaning:
   (1) *'Category A'* with respect to helicopters means multi-engine helicopters designed with engine and system isolation features specified in CS-27/29 or equivalent acceptable to the Authority and Helicopter Flight Manual performance information based on a critical engine failure concept which assures adequate designated surface area and adequate performance capability for continued safe flight in the event of an engine failure.
   (2) *'Category B'* with respect to helicopters means single-engine or multi-engine helicopters which do not fully meet all Category A standards. Category B helicopters have no guaranteed stay-up ability in the event of engine failure and unscheduled landing is assumed.

(3) *Committal Point* (CP). The committal point is defined as the point in the approach at which the pilot flying (PF) decides that, in the event of a power unit failure being recognised, the safest option is to continue to the deck.

(4) *Congested area*. In relation to a city, town or settlement, any area which is substantially used for residential, commercial or recreational purposes (See also definitions of hostile and non-hostile environment).

(5) The largest dimension of the helicopter when the rotors are turning.

(6) *Defined point after take-off (DPATO).* The point, within the take-off and initial climb phase, before which the helicopter's ability to continue the flight safely, with the critical power unit inoperative, is not assured and a forced landing may be required.

(7) *Defined point before landing (DPBL)*. The point within the approach and landing phase, after which the helicopter's ability to continue the flight safely, with the critical power unit inoperative, is not assured and a forced landing may be required.

Note: Defined points apply to helicopters operated in Performance Class 2 only.

(8) *Distance DR*. DR is the horizontal distance that the helicopter has travelled from the end of the take-off distance available.

(9) *Elevated heliport*. A heliport which is at least 3 m above the surrounding surface.

(10) *Exposure time.* The actual period during which the performance of the helicopter with the critical power unit inoperative in still air does not guarantee a safe forced landing or the safe continuation of the flight. (See also definition of maximum permitted exposure time).

(11) *Helideck*. A heliport located on a floating or fixed off-shore structure.

(12) *Heliport*. An aerodrome or a defined area of land, water or a structure used or intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

(13) *Hostile environment*:
- (i) An environment in which:
  - (A) A safe forced landing cannot be accomplished because the surface is inadequate; or
  - (B) The helicopter occupants cannot be adequately protected from the elements; or
  - (C) Search and rescue response/capability is not provided consistent with anticipated exposure; or
  - (D) There is an unacceptable risk of endangering persons or property on the ground;
- (ii) In any case, the following areas shall be considered hostile:
  - (A) For overwater operations, the open sea areas designated by the Authority of the State concerned; and
  - (B) Those parts of a congested area without adequate safe forced landing areas.

(See AMC OPS 3.480(a)(12))

(14) *Landing decision point (LDP)*. The point used in determining landing performance from which, a power unit failure having been recognised at this point, the landing may be safely continued or a baulked landing initiated.

(15) *Landing distance available.* The length of the final approach and take-off area plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.

(16) *Landing distance required.* The horizontal distance required to land and come to a full stop from a point 10.7 m (35 ft) above the landing surface.

(17) *Maximum approved passenger seating configuration*. The maximum passenger seating capacity of an individual helicopter, excluding crew seats, used by the operator, approved by the Authority and included in the Operations Manual.

(18) *Maximum permitted exposure time.* A period, determined on the basis of the power unit failure rate recorded for the helicopter's engine type, during which the probability of a power unit failure can be discounted. (See also definition of exposure time).

(19) *Non-hostile environment*.

(i) An environment in which:

(A) A safe forced landing can be accomplished; and

(B) The helicopter occupants can be protected from the elements; and

(C) Search and rescue response/capability is provided consistent with the anticipated exposure;

(ii) In any case, those parts of a congested area with adequate safe forced landing areas shall be considered non-hostile.

(20) *Obstacle*. Obstacles include the surface of the earth, whether land or sea.

(21) *Performance Class 1*. Performance Class 1 operations are those with performance such that, in the event of failure of the critical power unit, the helicopter is able to land within the rejected take-off distance available or safely continue the flight to an appropriate landing area, depending on when the failure occur.

(22) *Performance Class 2*. Performance Class 2 operations are those operations such that, in the event of critical power unit failure, performance is available to enable the helicopter to safely continue the flight, except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required.

(23) *Performance Class 3*. Performance Class 3 operations are those operations such that, in the event of a power unit failure at any time during the flight, a forced landing may be required in a multi-engined helicopter but will be required in a single engine helicopter.

(24) *Rejected take-off distance available (RTODAH).* The length of the final approach and takeoff area declared available and suitable for helicopters operated in Performance Class 1 to complete a rejected take-off.

(25) *Rejected take-off distance required (RDODRH)*. The horizontal distance required from the start of the take-off to the point where the helicopter comes to a full stop following a power unit failure and rejection of the take-off at the take-off decision point.

(26) *Reported headwind component.* Reported headwind component is interpreted as being that reported at the time of flight planning and may be used provided there is no significant change of unfactored wind prior to take-off.

(27) *Rotation Point* (RP). The rotation point is defined as the point at which a cyclic input is made to initiate a nose-down attitude change during the take-off flight path. It is the last point in the take-off path from which, in the event of an engine failure being recognised, a forced landing on the deck can be achieved.

(28) Rotor radius.

(29) *Safe forced landing*. Unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface.

(30) *Take-off decision point (TDP)*. The point used in determining take-off performance from which, a power unit failure having been recognised at this point, either a rejected take-off may be made or a take-off safely continued.

(31) *Take-off distance available (TODAH)*. The length of the final approach and take-off area plus the length of helicopter clearway (if provided) declared available and suitable for helicopters to complete the take-off.

(32) *Take-off distance required (TODRH).* The horizontal distance required from the start of the take-off to the point at which VTOSS, a selected height and a positive climb gradient are

achieved, following failure of the critical power unit being recognised at TDP, the remaining power units within approved operating limits. The selected height is to be determined with the use of Helicopter Flight Manual data, and is to be at least 10.7 m (35 ft) above:

(i) the take-off surface; or

(ii) as an alternative, a level defined by the highest obstacle in the take-off distance required.

(33) *Take-off flight path.* The vertical and horizontal path, with the critical power unit inoperative, from a specified point in the take-off to 1000 ft above the surface.

(34) *Take-off mass*. The take-off mass of the helicopter shall be taken to be its mass, including everything and everyone carried at the commencement of the take-off.

(35) *Touchdown and lift-off area (TLOF)*. A load bearing area on which a helicopter may touchdown or lift off.

(36) Best rate of climb speed.

(b) The terms 'take-off distance required', 'take-off flight path', 'critical power unit inoperative enroute flight path' all have their meanings defined in the airworthiness requirements under which the helicopter was certificated, or as specified by the Authority if it finds the data provided in the Helicopter Flight Manual inadequate for showing compliance with the performance operating limitations.

GM-1 to OPS-3.475(b) Factoring of Automatic Landing Distance Performance Data (Performance Class-A Helicopters only)

(See CAR OPS 3.475(b))

(a) In those cases where the landing requires the use of an automatic landing system, and the distance published in the Helicopter Flight Manual (HFM) includes safety margins equivalent to those contained in CAR OPS-3.515(a)(1) and CAR OPS-3.520, the landing mass of the Helicopter should be the lesser of:
   (1) The landing mass determined in accordance with CAR OPS-3.515(a)(1) or CAR OPS-3.520 as appropriate; or
   (2) The landing mass determined for the automatic landing distance for the appropriate surface condition as given in the HFM, or equivalent document. Increments due to system features such as beam location or elevations, or procedures such as use of overspeed, should also be included.

AC OPS 3.475(c)(3)(ii) Head-wind Component for Take-off and the Take-off Flight Path

(See OPS 3.475(c)(3)(ii))

When considering approving the use of reported wind components in excess of 50% for take-off and the take-off flight path the following should be considered:

(a) The proximity to the FATO, and accuracy enhancements, of the wind measuring equipment; and
(b) The existence of appropriate procedures in a supplement to the Flight Manual; and
(c) The establishment of a safety case.

AC OPS 3.480(a)(1) and (a)(2) Category A and Category B

(See CAR OPS 3.480(a)(1) and (a)(2))

(See CAR OPS 3.485, OPS 3.515(a) & OPS 3.540(a)(1))

(a) Helicopters which have been certificated according to any of the following standards are considered to satisfy the Category A criteria of OPS 3.480(a)(1). Provided that they have the necessary performance information scheduled in the Flight Manual, such helicopters are therefore eligible for Performance Class 1 or 2 operations:
   (1) Certification as Category A under CS-27 or CS-29;
   (2) Certification as Category A under FAR Part 29;
   (3) Certification as Group A under BCAR Section G;
   (4) Certification as Group A under BCAR- 29;
(b) In addition to the above, certain helicopters have been certificated under FAR Part 27 and with compliance with FAR Part 29 engine isolation requirements as specified in FAA Advisory Circular AC 271. These helicopters may be accepted as eligible for Performance Class 1 or 2 operations provided that compliance is established with the following additional requirements of CS-29:
   (1) CS 29.1027(a) Independence of engine and rotor drive system lubrication.
   (2) CS 29.1187(e)
   (3) CS 29.1195(a) & (b) Provision of a one-shot fire extinguishing system for each engine.
   (4) CS 29.1197
   (5) CS 29.1199
   (6) CS 29.1201
   (7) CS 29.1323(c)(1) Ability of the airspeed indicator to consistently identify the take-off decision point.

Note: The requirement to fit a fire extinguishing system may be waived if the helicopters manufacturer can *demonstrate equivalent safety, based on service experience for the entire fleet showing that the actual incidence of fires in the engine fire zones has been negligible.*

(c) The OPS 3 performance operating rules of Subparts G, H and I were drafted in conjunction with the performance requirements of CS-29 and FAR Part 29 at Amendment 29-39. For helicopters certificated under FAR Part 29 at an earlier amendment, or under BCAR Section G or BCAR- 29, performance data will have been scheduled in the Helicopter Flight Manual according to these earlier requirements. This earlier scheduled data may not be fully compatible with the OPS 3 rules. Before Performance Class 1 or 2 operations are approved, it should be established that scheduled performance data is available which is compatible with the requirements of Subparts G or H respectively.

(d) Any properly certificated and appropriately equipped helicopter is considered to satisfy the Category B criteria of OPS 3.480(a)(2). Such helicopters are therefore eligible for Performance Class 3 operations.

AMC OPS 3.480(a)(13) Terminology - Hostile Environment

(See OPS 3.480(a)(13))

Those open sea areas considered to constitute a hostile environment are designated by the Authority in the appropriate Aeronautical Information Publication or other suitable documentation.

AC OPS 3.480(a)(31) The Application of TODRH

(See OPS 3.480(a)(32))

(a) DISCUSSION

Original definitions for helicopter performance were derived from aeroplanes; hence the definition of take-off distance owes much to operations from runways. Helicopters on the other hand can operate from runways, confined and restricted areas and rooftop heliports - all bounded by obstacles. As an analogy this is equivalent to a take-off from a runway with obstacles on and surrounding it.

It can therefore be seen that unless the original definitions from aeroplanes are tailored for helicopters, the flexibility of the helicopter might be constrained by the language of operational performance.

This paper concentrates on the critical term - Take-off Distance Required (TODRH) - and describes the methods to achieve compliance with it and, in particular, the alternative procedure described in ICAO Annex 6 Attachment A 4.1.1.2(b):

The take-off distance required does not exceed the take-off distance available; or

As an alternative, the take-off distance required may be disregarded provided that the helicopter with the critical power-unit failure at the TDP can, when continuing the take-off, clear all obstacles between the end of the take-off distance available and the point at which it becomes established in a climb at VTOSS by a vertical margin of 10.7 m (35 ft) or more. An obstacle is considered to be in the path of the helicopter if its distance from the nearest point on the surface below the intended line of flight does not exceed 30 m or 1.5 times the maximum dimension of the helicopter, whichever is greater.

(b) DEFINITION OF TODRH

The definition of TODRH from OPS 3.480(a)(32) is as follows:

(32) Take-off distance required (TODRH). The horizontal distance required from the start of the take-off to the point at which VTOSS, a selected height, and a positive climb gradient are achieved, following failure of the critical power-unit being recognised at TDP, the remaining power-unit(s) operating within approved operating limits. The selected height is to be determined with the use of Helicopter Flight Manual data, and is to be at least 10.7 m (35 ft) above:

(i) the take-off surface; or

(ii) as an alternative, a level defined by the highest obstacle in the take-off distance required.

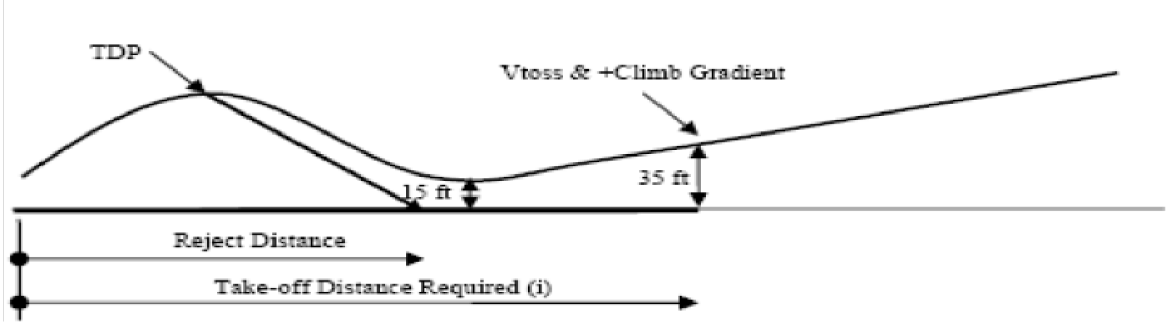
The original definition of TODRH was based only on the first part of this definition.

(c) THE CLEAR AREA PROCEDURE (RUNWAY)

In the past, helicopters certificated in Category A would have had, at the least, a 'clear area' procedure. This procedure is analogous to an aeroplane Category A procedure and assumes a runway (either metalled or grass) with a smooth surface suitable for an aeroplane take-off (see Figure 1).

The helicopter is assumed to accelerate down the FATO (runway) outside of the HV diagram. If the helicopter has an engine failure before TDP, it must be able to land back on the FATO (runway) without damage to helicopter or passengers; if there is a failure at or after TDP the aircraft is permitted to lose height - providing it does not descend below a specified height above the surface (usually 15 ft if the TDP is above 15 ft). Errors by the pilot are taken into consideration but the smooth surface of the FATO limits serious damage if the error margin is eroded (e.g. by a change of wind conditions).

Figure 1 - Clear Area take-off



The operator only has to establish that the distances required are within the distance available (take-off distance and reject distance). The original definition of TODRH meets this case exactly.

From the end of the TODRH obstacle clearance is given by the climb gradient of the first or second climb segment meeting the requirement of OPS 3.495 (or for PC2 - OPS 3.525). The clearance margin from obstacles in the take-off flight path takes account of the distance travelled from the end of the take-off distance required and operational conditions (IMC or VMC).

(d) CATEGORY A PROCEDURES OTHER THAN CLEAR AREA

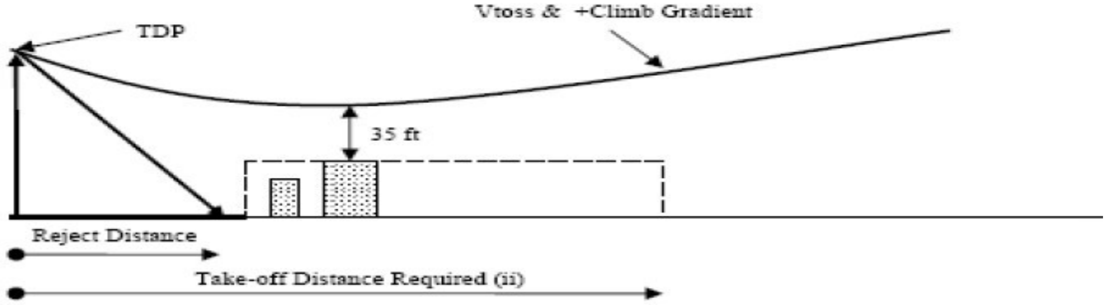
Procedures other than the clear area are treated somewhat differently. However, the short field procedure is somewhat of a hybrid as either part of the definition of TODRH can be utilised (the term 'helipad' is used in the following section to illustrate the principle only - it is not intended as a replacement for 'heliport').

(1) Limited area, restricted area and helipad procedures (other than elevated)

The exact names of the procedure used for other than clear area are as many as there are manufacturers. However, principles for obstacle clearance are generic and the name is unimportant.

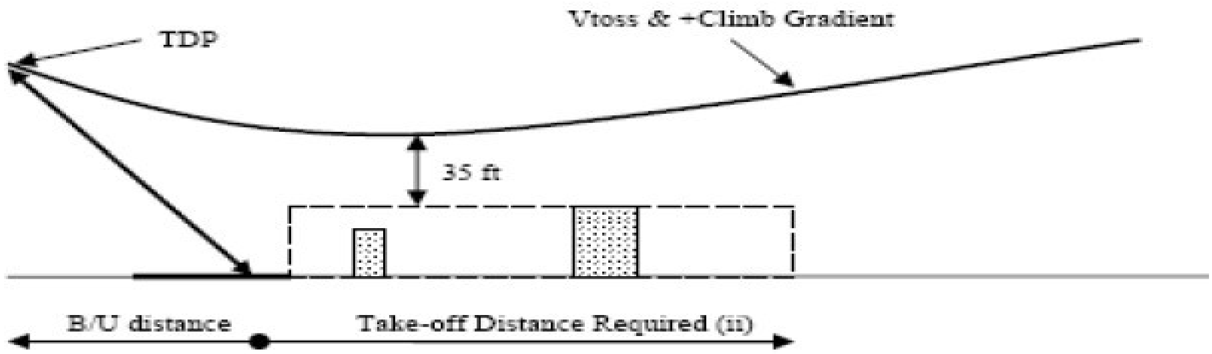
These procedures (see Figure 2 and Figure 3) are usually associated with an obstacle in the continued takeoff area - usually shown as a line of trees or some other natural obstacle. As clearance above such obstacles is not readily associated with an accelerative procedure, as described in 3 above, a procedure using a vertical climb (or a steep climb in the forward, sideways or rearward direction) is utilised.

Figure 2 - Short Field take-off



With the added complication of a TDP principally defined by height together with obstacles in the continued take off area, a drop down to within 15 ft of the take-off surface is not deemed appropriate and the required obstacle clearance is set to 35 ft (usually called min-dip). The distance to the obstacle does not need to be calculated (provided it is outside the rejected distance required), as clearance above all obstacles is provided by ensuring that helicopter does not descend below the min-dip associated with a level defined by the highest obstacle in the continued take-off area.

Figure 3 - Helipad take-off



These procedures depend upon the alternative definition of TODRH.

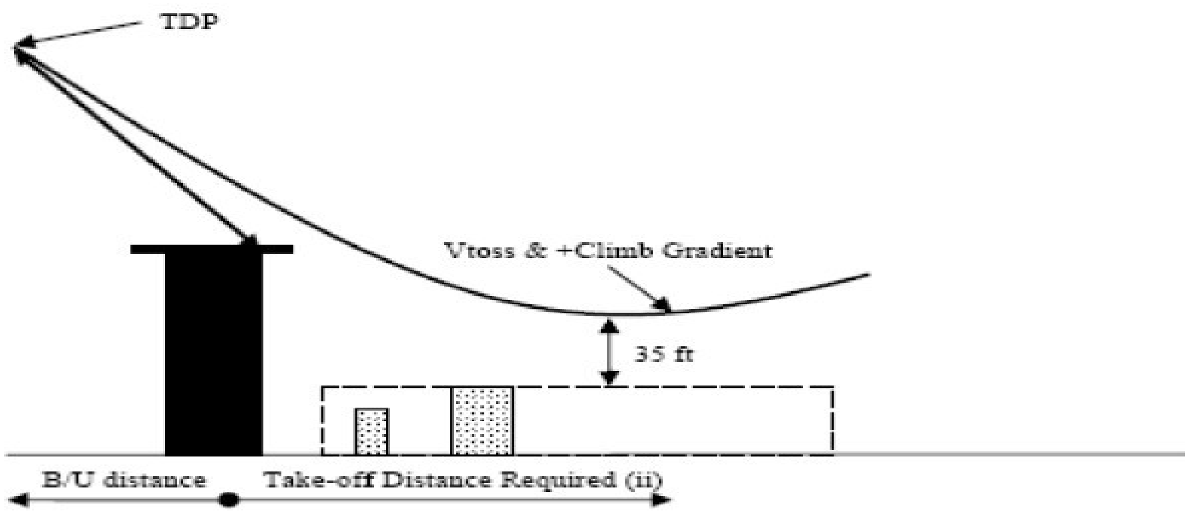
As shown in Figure 3, the point at which Vtoss and a positive rate of climb are met defines the TODRH. Obstacle clearance from that point is assured by meeting the requirement of OPS 3.495 (or for PC2 -OPS 3.525).

Also shown in Figure 3 is the distance behind the helipad which is the back-up distance (B/U distance).

(2) Elevated helipad procedures

The elevated helipad procedure (see Figure 4) is a special case of the ground level helipad procedure discussed above.

Figure 4 - Elevate Helipad take-off



The main difference is that drop down below the level of the take-off surface is permitted. In the drop down phase, the Category A procedure ensures deck-edge clearance but, once clear of the deck-edge, the 35 ft clearance from obstacles relies upon the calculation of drop down. The alternative definition of the TODRH is applied.

Note: 35ft may be inadequate at particular elevated heliports which are subject to adverse airflow effects, turbulence, etc.

SECTION 1 - SUBPART G – PERFORMANCE CLASS 1

CAR OPS-3.485 General

The operator shall ensure that helicopters operated in Performance Class 1 are certificated in Category A. (See AC OPS 3.480(a)(1) and (a)(2))

CAR OPS-3.490 Take-off

(a) The operator shall ensure that:
   (1) The take-off mass does not exceed the maximum take-off mass specified in the Helicopter Flight Manual for the procedure to be used (see AC OPS 3.490 & 3.510).
   (2) The take-off mass is such that:
      (i) it is possible to reject the take-off and land on the FATO in case of the critical power-unit failure being recognized at or before the TDP;
      (ii) The rejected take-off distance required does not exceed the rejected take-off distance available; and
      (iii) The take-off distance required does not exceed the take-off distance available
      (iv) As an alternative, the requirement in OPS 3.490(a)(2)(iii) above may be disregarded provided that the helicopter, with the critical power unit failure recognised at TDP can, when continuing the take-off, clear all obstacles to the end of the take-off distance required by a vertical margin of not less than 10.7 m (35 ft) (see AC OPS 3.480(a)(31));
(b) When showing compliance with subparagraph (a) above, account shall be taken of the appropriate parameters of OPS 3.475(c) at the heliport of departure:
(c) The part of the take-off up to and including TDP shall be conducted in sight of the surface such that a rejected take-off can be carried out.
(d) For take-off using a backup (lateral transition) procedure, the operator shall ensure that, with the critical power-unit inoperative, all obstacles in the back-up (lateral transition) area are cleared by an adequate margin. (see AC OPS 3.490(d))

CAR OPS-3.495 Take-off Flight Path

(a) The operator shall ensure that, from the end of the take-off distance required with the critical power unit failure recognised at the TDP:
   (1) The take-off mass is such that the take-off flight path provides a vertical clearance of not less than 10.7 m (35 ft) for VFR operations and 10.7 m (35 ft) + 0.01 DR for IFR operations above all obstacles located in the climb path. Only obstacles as specified in OPS 3.477 have to be considered.
   (2) Where a change of direction of more than 15° is made, adequate allowance is made for the effect of bank angle on the ability to comply with the obstacle clearance requirements. This turn is not to be initiated before reaching a height of 61 m (200 ft) above the take-off surface unless permitted as part of an approved procedure in the Flight Manual.
(b) When showing compliance with subparagraph (a) above, account shall be taken of the appropriate parameters of OPS 3.475(c) at the heliport of departure.

CAR OPS-3.500 En-route - Critical Power Unit Inoperative

(a) The operator shall ensure that the en-route flight path with the critical power unit inoperative, appropriate to the meteorological conditions expected for the flight complies with either subparagraph (1), (2) or (3) below at all points along the route.
   (1) When it is intended that the flight will be conducted at any time out of sight of the surface, the

mass of the helicopter permits a rate of climb of at least 50 ft/minute with the critical power unit inoperative at an altitude of at least 300 m (1 000 ft) 600 m (2 000 ft) in areas of mountainous terrain, above all terrain and obstacles along the route within 9.3 km (5 nm) on either side of the intended track.

(2) When it is intended that the flight will be conducted without the surface in sight, the flight path permits the helicopter to continue flight from the cruising altitude to a height of 300 m (1000 ft) above a landing site where a landing can be made in accordance with OPS 3.510. The flight path clears vertically, by at least 300 m (1000 ft), 600 m (2000 ft) in areas of mountainous terrain, all terrain and obstacles along the route within 9.3 km (5 nm) on either side of the intended track. Drift-down techniques may be used.

(3) When it is intended that the flight will be conducted in VMC with the surface in sight, the flight path permits the helicopter to continue flight from the cruising altitude to a height of 300 m (1000 ft) above a landing site where a landing can be made in accordance with OPS 3.510, without flying at any time below the appropriate minimum flight altitude, obstacles within 900m on either side of the route need to be considered.

(b) When showing compliance with paragraph (a)(2) or (a)(3) above, the operator shall ensure that:

(1) The critical power unit is assumed to fail at the most critical point along the route.

(2) Account is taken of the effects of winds on the flight path.

(3) Fuel jettisoning is planned to take place only to an extent consistent with reaching the heliport with the required fuel reserves and using a safe procedure (See AC OPS 3.500(b)(3)).

(4) Fuel jettisoning is not planned below 1000 ft above terrain.

(c) The width margins of subparagraphs (a)(1) and (a)(2) above shall be increased to 18.5 km (10 nm) if the navigational accuracy cannot be met for 95% of the total flying time (see OPS 3.240, 3.243 and 3.250.

CAR OPS-3.510 Landing

(a) The operator shall ensure that:

(1) The landing mass of the helicopter at the estimated time of landing does not exceed the maximum mass specified in the Helicopter Flight Manual for the procedure to be used (see AC OPS 3.490 & 3.510).

(2) in the event of the critical power unit failure being recognised at any point at or before the LDP, it is possible either to land and stop within the FATO, or to perform a balked landing and clear all obstacles in the flight path by a vertical margin of 10.7 m (35 ft) (see AC OPS 3.480(a)(32)). Only obstacles as specified in OPS 3.477 have to be considered;

(3) in the event of the critical power-unit failure being recognised at any point at or after the LDP, it is possible to clear all obstacles in the approach path; and

(4) in the event of the critical power-unit failure being recognised at any point at or after the LDP, it is possible to land and stop within the FATO.

(b) When showing compliance with subparagraph (a) above, account shall be taken of the appropriate parameters of OPS 3.475(c) for the estimated time of landing at the destination heliport, or any alternate if required.

(c) That part of the landing from the LDP to touchdown shall be conducted in sight of the surface.

AC OPS 3.490(d) Obstacle Clearance in the Back-up Area

(See OPS 3.490(d))

The requirement in OPS 3.490(d) has been established in order to take into account the following factors: In the back-up; the pilot has few visual cues and has to rely upon the altimeter and sight picture through the front window (if flight path guidance is not provided) to achieve an accurate rearward flight path.

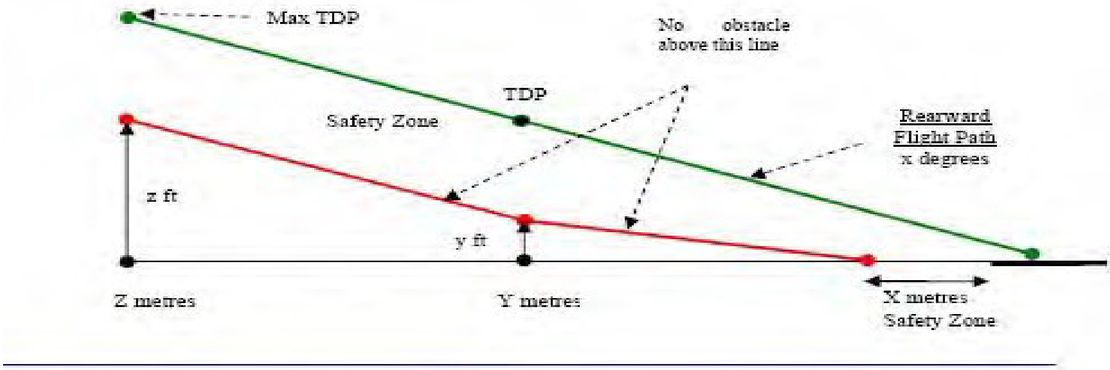
In the rejected take-off; the pilot has to be able to manage the descent against a varying forward speed whilst still ensuring an adequate clearance from obstacles until the helicopter gets in close proximity for landing on the FATO.

In the continued take-off; the pilot has to be able to accelerate to Vtoss whilst ensuring an adequate clearance from obstacles. The requirements of OPS 3.490(d) may be achieved by establishing that, in the backup area:

(a) no obstacles are located within the safety zone below the rearward flight path when described in the helicopter flight manual (see figure 1); (in the absence of such data in the helicopter flight manual, the operator should contact the manufacturer in order to define a safety zone); or

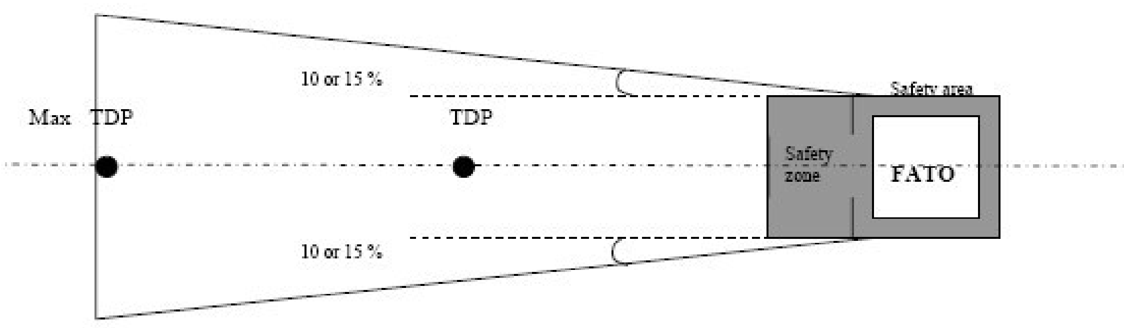
(b) during the backup, the rejected take-off and the continued take-off manoeuvres, obstacle clearance has been demonstrated by a means acceptable to the authority.

Figure 1 – rearward flight path



An obstacle, in the backup area, is considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than half of the minimum FATO (or the equivalent term used in the Flight Manual) width defined in the Helicopter Flight Manual (or, when no width is defined 0.75 D), plus 0.25 times D (or 3m, whichever is greater); plus 0.10 for VFR day, or 0.15 for VFR night, of the distance travelled from the back of the FATO. (see figure 2).

Figure 2 – Obstacle accountability



AC OPS 3.490 & 3.510 Application for alternative take-off and landing procedures

(a) Discussion

A manufacturer's Category A procedure defines profiles and scheduled data for take-off, climb, performance at minimum operating speed and landing, under specific environmental conditions and masses.

Associated with these profiles and conditions are minimum operating surfaces, take-off distances, climb performance and landing distances; these are provided (usually in graphic form) with the take-off and landing masses and the Take-off Decision Point (TDP) and Landing Decision Point (LDP).

The landing surface and the height of the TDP are directly related to the ability of the helicopter – following a power-unit failure before or at TDP - to reject onto the surface under forced landing conditions. The main considerations in establishing the minimum size of the landing surface are the scatter during flight testing of the reject manoeuvre, with the remaining engine operating within approved limits, and the required usable cue environment.

Hence an elevated site with few visual cues - apart from the surface itself - would require a greater surface area in order that the helicopter can be accurately positioned during the reject manoeuvre within the specified area. This usually results in the stipulation of a larger surface for an elevated site than for a ground level site (where lateral cues may be present).

This could have the unfortunate side-effect that a heliport which is built 3m above the surface (and therefore elevated by definition) might be out of operational scope for some helicopters - even though there might be a rich visual cue environment where rejects are not problematical. The presence of elevated sites where ground level surface requirements might be more appropriate could be brought to the attention of the Authority.

It can be seen that the size of the surface is directly related to the requirement of the helicopter to complete a rejected take-off following a power-unit failure. If the helicopter has sufficient power such that a failure before or at TDP will not lead to a requirement for rejected take-off, the need for large surfaces is removed; sufficient power for the purpose of this AC is considered to be the power required for hover out-of-ground effect (HOGE) one-engine-inoperative (OEI).

Following a power-unit failure at or after the TDP, the continued take-off path provides OEI clearance from the take-off surface and the distance to reach a point from where climb performance in the first, and subsequent segments, is assured.

If HOGE OEI performance exists at the height of the TDP, it follows that the continued take-off profile, which has been defined for a helicopter with a mass such that a rejected take-off would be required following a power-unit failure at or before TDP, would provide the same, or better, obstacle clearance and the same, or less, distance to reach a point where climb performance in the first, and subsequent segments, is assured.

If the TDP is shifted upwards, provided that the HOGE OEI performance is established at the revised TDP, it will not affect the shape of the continued take-off profile but should shift the min-dip upwards by the same amount that the revised TDP has been increased - with respect to the basic TDP.

Such assertions are concerned only with the vertical or the back-up procedures and can be regarded as achievable under the following circumstances:

(1) When the procedure is flown, it is based upon a profile contained in the Helicopter Flight Manual (HFM) - with the exception of the necessity to perform a rejected take-off.

(2) The HOGE OEI performance is specified as in AC 29-2C, MG 12 for the Human External Cargo (HEC) Class D requirements.

(3) The TDP, if shifted upwards (or upwards and backward in the back-up procedure) will be the height at which the HOGE OEI performance is established.

(4) If obstacles are permitted in the back-up area they should continue to be permitted with a revised

TDP.

(b) Methods of Application:

The operator may apply to the Authority for a reduction in the size of the take-off surface under the following conditions:

Compliance with the requirements of OPS 3.490, 3.495 and 3.510 can be assured with:

(1) a procedure based upon an appropriate Category A take-off and landing profile scheduled in the HFM;

(2) a take-off or landing mass not exceeding the mass scheduled in the HFM for a HOGE OEI in compliance with HEC Class D performance requirements ensuring that:

(A) following a power-unit failure at or before TDP, there are adequate external references to ensure that the helicopter can be landed in a controlled manner; and

(B) following a power-unit failure at or after the LDP there are adequate external references to ensure that the helicopter can be landed in a controlled manner.

The operator may apply to the Authority for an upwards shift of the TDP and LDP under the following conditions:

(c) Compliance with the requirements of OPS 3.490, 3.495 and 3.510 can be assured with:

(1) a procedure based upon an appropriate Category A take-off and landing profile scheduled in the HFM;

(2) a take-off or landing mass not exceeding the mass scheduled in the HFM for a HOGE OEI in compliance with HEC Class D performance requirements ensuring that:

(A) following a power-unit failure at or after TDP compliance with the obstacle clearance requirements of OPS 490(a)(2)(iv) and OPS 3.495 can be met; and

(B) following a power-unit failure at or before the LDP the balked landing obstacle clearance requirements of OPS 3.510(a)(2) and OPS 3.495 can be met.

Alternatively, the operator may apply to the Authority for the use of the Category A ground level surface requirement for a specific elevated heliport when it can be demonstrated that the usable cue environment at that heliport would permit such a reduction.

AC OPS 3.500(b)(3) En-route - Critical Power Unit Inoperative (Fuel Jettison)

(See OPS 3.500(b)(3))

The presence of obstacles along the en-route flight path may preclude compliance with CAR OPS-3.500(a)(1) at the planned mass at the critical point along the route. In this case fuel jettison at the most critical point may be planned, provided that the procedures in AMC OPS 3.255 paragraph 3 are complied with.

SECTION 1 - SUBPART H – PERFORMANCE CLASS 2

CAR OPS-3.515 General

The operator shall ensure that helicopters operated in Performance Class 2 are certificated in Category A. (See AC to OPS 480(a)(1) and (a)(2).

CAR OPS-3.517 Operations Without an Assured Safe Forced Landing Capability (See Appendix 1 to OPS 3.517(a)

The operator shall be satisfied that operations without an assured safe forced landing capability during the take-off and landing phases are not conducted unless the operator has been granted the relevant approval by the Authority in accordance with Appendix 1 to OPS3.517(a). (See also OPS 3.470(a)(1).)

CAR OPS-3.520 Take-off

(See AMC OPS 3.520)

(See AMC OPS 3.520 & 3.535)

(a) The operator shall be satisfied that:
   (1) the take-off mass does not exceed the maximum mass specified for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical power unit inoperative and the remaining power units operating at an appropriate power rating.
   (2) for operations other than specified in OPS 3.517(a), the take-off is conducted such that a safe forced landing can be executed until the point where safe continuation of the flight is possible (see AC to Subpart H paragraph 6.2).
   (3) for operations in accordance with OPS 3.517(a) in addition to the requirements of (a)(1) above:
      (i) the take-off mass does not exceed the maximum mass specified in the Helicopter Flight Manual for an AEO OGE hover in still air with all power units operating at an appropriate power rating.
      (ii) for operations to/from a helideck;
         (A) with a helicopter that has a maximum approved passenger seating configuration (MAPSC) of more than 19; and
         (B) from 1st January 2010 any helicopter operated to/from a helideck located in a non-congested hostile environment as defined in OPS 3.480(13)(ii)(A);

         the take-off mass takes into account: the procedure; deck-edge miss; and drop down appropriate to the height of the helideck – with the critical power unit(s) inoperative and the remaining power units operating at an appropriate power rating.

(b) When showing compliance with subparagraph (a) above, account shall be taken of the appropriate parameters of OPS 3.475(c) at the heliport of departure.

(c) The part of the take-off before the requirement of OPS 3.525 is met shall be conducted in sight of the surface.

CAR OPS 3.525 Take-off Flight Path

The operator shall be satisfied that from DPATO or, as an alternative, no later than 200 ft above the take-off surface, with the critical power unit inoperative the requirements of OPS 3.495(a)(1), (2) and (b) are met.

CAR OPS 3.530 En-route - Critical power unit inoperative

The operator shall ensure that the requirement of OPS 3.500 is met.

CAR OPS 3.535 Landing

(See AC to Subpart H)

(See AMC OPS 3.520 & 3.535)

(a) The operator shall be satisfied that:

(1) The landing mass at the estimated time of landing does not exceed the maximum mass specified for a rate of climb of 150 ft/min at 300 m (1000 ft) above the level of the heliport with the critical power unit inoperative and the remaining power units operating at an appropriate power rating.

(2) If the critical power unit fails at any point in the approach path:

(i) a balked landing can be carried out meeting the requirement of OPS 3.525; or

(ii) for operations other than specified in OPS 3.517(a) the helicopter can perform a safe-forced landing.

(3) For operations in accordance with OPS 3.517(a) in addition to the requirements of (a)(1) above:

(i) The landing mass does not exceed the maximum mass specified in the Helicopter Flight Manual for an OGE hover in still air with all power units operating at an appropriate power rating.

(ii) For operations to/from a helideck;

(A) with a helicopter that has a maximum approved passenger seating configuration (MAPSC) of more than 19; and

(B) any helicopters operated to/from a helideck located in a non-congested hostile environment as defined in OPS 3.480(13)(ii)(A);

the landing mass takes into account the procedure, and drop down appropriate to the height of the helideck - with the critical power unit inoperative and the remaining power unit(s) operating at an appropriate power rating.

(b) When showing compliance with subparagraph (a) above, account shall be taken of the appropriate parameters of OPS 3.475(c) at the destination heliport or any alternate, if required.

(c) The part of the landing after which the requirement of OPS 3.525 cannot be met shall be conducted in sight of the surface.

Appendix 1 to OPS 3.517(a) Helicopter Operations Without an Assured Safe Forced Landing Capability

(See OPS 3.517(a))

(See AC-1 to Appendix 1 to OPS 3.517(a))

(See AC-2 to Appendix 1 to OPS 3.517(a))

(a) Approval:

(1) Following a risk assessment, the operator may be authorised to conduct operations without an assured safe forced landing capability during the take-off and landing phases, under an approval specifying:

(i) The type of helicopter; and

(ii) The type of operations.

(2) Such an approval will be subject to the following conditions:

(i) A set of conditions to be implemented by the operator to obtain and maintain the approval for the helicopter type;

(ii) Implementation of a Usage Monitoring System

SECTION 2 – SUBPART H – AMC/IEM— PERFORMANCE CLASS 2

AC to Subpart H Operations in Performance Class 2

(See Subpart H)

(a) INTRODUCTION

This paper describes Performance Class 2 as established in OPS 3, Subpart H. It has been produced for the purpose of:

(1) discussing the underlying philosophy of Operations in Performance Class 2;
(2) showing simple methods of compliance; and
(3) explaining how to determine - with examples and diagrams:
   (i) the take-off and landing masses;
   (ii) the length of the safe-forced-landing area;
   (iii) distances to establish obstacle clearance; and
   (iv) entry point(s) into Performance Class 1.

It discusses the derivation of Performance Class 2 from ICAO Annex 6 Part III and describes an alleviation which may be approved following a Risk Assessment.

It reproduces relevant definitions; examines the basic requirements; discusses the limits of operation; and considers the benefits of the use of Performance Class 2.

It contains examples of Performance Class 2 in specific circumstances, and explains how these examples may be generalised to provide the operators with methods of calculating landing distances and obstacle clearance.

(b) DEFINITIONS

To assist in the reading of this paper, definitions from OPS 3, Subpart F have been reproduced:

(1) **Distance DR.** DR is the horizontal distance that the helicopter has travelled from the end of the take-off distance available.
(2) **Defined point after take-off (DPATO).** The point, within the take-off and initial climb phase, before which the helicopter's ability to continue the flight safely, with the critical power unit inoperative, is not assured and a forced landing may be required.
(3) **Defined point before landing (DPBL).** The point within the approach and landing phase, after which the helicopter's ability to continue the flight safely, with the critical power unit inoperative, is not assured and a forced landing may be required.
(4) **Landing distance available (LDAH).** The length of the final approach and take-off area plus any additional area declared available and suitable for helicopters to complete the landing manoeuvre from a defined height.
(5) **Landing distance required (LDRH).** The horizontal distance required to land and come to a full stop from a point 15m (50ft) above the landing surface.
(6) **Performance Class 2.** Performance Class 2 operations are those operations such that, in the event of critical power unit failure, performance is available to enable the helicopter to safely continue the flight, except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required.
(7) **Safe forced landing.** Unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface.
(8) **Take-off distance available.** The length of the final approach and take-off area plus the length of any clearway (if provided) declared available and suitable for helicopters to complete take-off.

The following terms, which are not defined in OPS 3 Subpart F, are used in the following text:

(1) **VT.** A target speed at which to aim at the point of minimum ground clearance (min-dip) during acceleration from TDP to Vtoss.

(2) **V50.** A target speed and height utilised to establish a Flight Manual distance (in compliance with the requirement of CS 29.63) from which climb out is possible.

(3) **Vstay-up.** A colloquial term used to indicate a speed at which a descent would not result following a power unit failure. This speed is several knots lower than Vtoss at the equivalent take- off mass.

(c) WHAT DEFINES PERFORMANCE CLASS 2

Performance Class 2 can be considered as Performance Class 3 take-off or landing, and Performance Class 1 climb, cruise and descent. It comprises an All Engines Operating (AEO) obstacle clearance regime for the take-off or landing phases, and a One Engine Inoperative (OEI) obstacle clearance regime for the climb, cruise, descent, approach and missed approach phases.

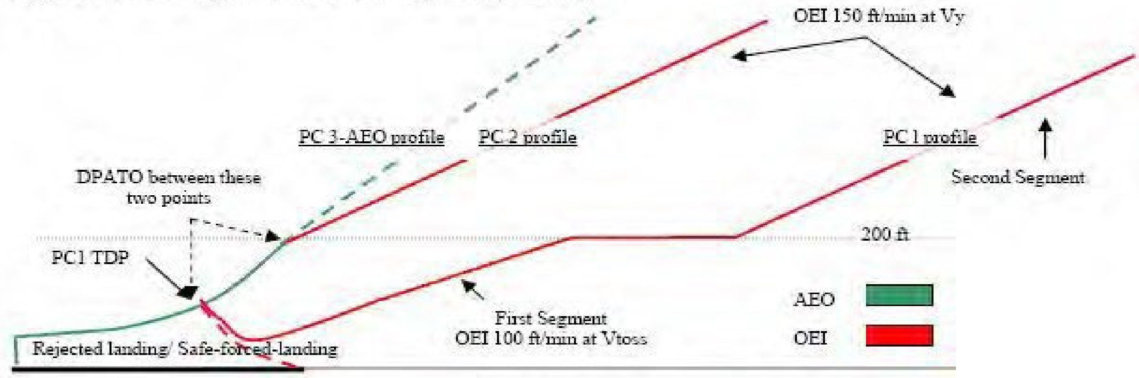
Note: For the purpose of performance calculations in OPS 3, the CS 29.67 Category A climb performance criteria is used:

- *150 ft/min at 1,000 ft (at Vy); and depending on the choice of DPATO:*
- *100 ft/min up to 200 ft (at Vtoss); at the appropriate power settings.*

(1) Comparison of obstacle clearance in all Performance Classes

Figure 2 shows the profiles of the three Performance Classes - superimposed on one diagram. Performance Class 1 (PC 1); from TDP, requires OEI obstacle clearance in all phases of flight; the construction of Category A procedures, provides for a flight path to the first climb segment, a level acceleration segment to Vy, which may be shown concurrent with the first segment), followed by the second climb segment from Vy at 200 ft (see Figure 1).

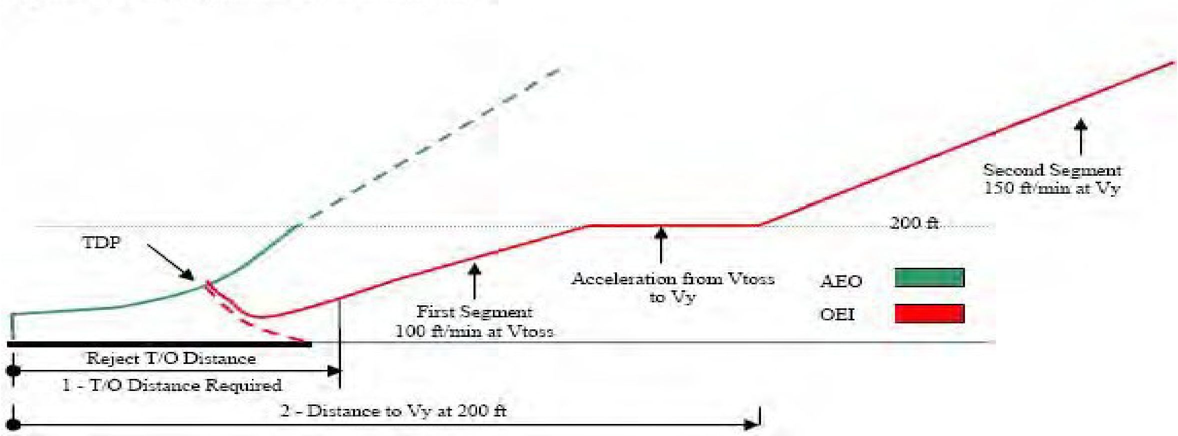
Figure 1 - All Performance Classes (a comparison)



(i) Performance Class 2 (PC 2); requires AEO obstacle clearance to DPATO and OEI from then on. The take-off mass has the PC 1 second segment climb performance at its basis therefore, at the point where Vy at 200 ft is reached, Performance Class 1 is achieved (see also Figure 3).

(ii) Performance Class 3 (PC 3); requires AEO obstacle clearance in all phases.

Figure 2 - Performance Class 1 distances



(2) Comparison of the discontinued take-off in all Performance Classes
   (i) PC 1 - requires a prepared surface on which a rejected landing can be undertaken (no damage); and
   (ii) PC 2 and 3 - require a safe-forced-landing surface (some damage can be tolerated but there must be a reasonable expectancy of no injuries to persons in the aircraft or third parties on the surface).

(d) THE DERIVATION OF PERFORMANCE CLASS 2

Subpart H - PC 2 is primarily based on the text of ICAO Annex 6 Part III Section II and its attachments which provide for the following:

(1) Obstacle clearance before DPATO; the helicopter shall be able, with all engines operating, to clear all obstacles by an adequate margin until it is in a position to comply with b. below.
(2) Obstacle clearance after DPATO; the helicopter shall be able, in the event of the critical power unit becoming inoperative at any time after reaching DPATO, to continue the take-off clearing all obstacles along the flight path by an adequate margin until it is able to comply with en-route clearances.
(3) Engine failure before DPATO; before the DPATO, failure of the critical power-unit may cause the helicopter to force land; therefore a safe-forced-landing should be possible (this is analogous to the requirement for a reject in Performance Class 1 but where some damage to the helicopter can be tolerated.)

(e) BENEFITS OF OPS 3 PERFORMANCE CLASS 2

Operations in Performance Class 2 permit advantage to be taken of an all-engines-operating (AEO) procedure for a short period during take-off and landing - whilst retaining engine failure accountability in the climb, descent and cruise. The benefits include:

(1) Ability to use (the reduced) distances scheduled for the AEO - thus permitting operations to take place at smaller heliports and allowing airspace requirements to be reduced.
(2) Ability to operate when the safe-forced-landing distance available is located outside the boundary of the heliport.
(3) Ability to operate when the take-off-distance required is located outside the boundary of the heliport. Ability to use existing Category A profiles and distances when the surface conditions are not adequate for a reject but are suitable for a safe-forced-landing (for example when the ground is waterlogged).

Additionally, following a Risk Assessment when the use of exposure is permitted by the Authority:

(1) Ability to operate when a safe-forced landing is not assured in the take-off phase.
(2) Ability to penetrate the HV curve for short periods during take-off or landing.

(f) IMPLEMENTATION OF PERFORMANCE CLASS 2 IN OPS 3

The following sections discuss the principles of the implementation of Performance Class 2.

(1) Does ICAO spell it all out?

ICAO Annex 6 does not give guidance on how DPATO should be calculated nor does it require that distances be established for the take-off. However, it does require that, up to DPATO AEO, and from DPATO OEI, obstacle clearance is established (see Figure 3 and Figure 4 which are simplified versions of the diagrams contained in Annex 6 Part III, Attachment A).

Note: Annex 8 – Airworthiness of Aircraft (Part IV, Chapter 2.2.1.3.4) requires that an AEO distance be scheduled for all helicopters operating in Performance Classes 2 & 3. Annex 6 is dependent upon the scheduling of the AEO distances, required in Annex 8, to provide data for the location of DPATO.

When showing obstacle clearance, the divergent obstacle clearance height required for IFR is as in Performance Class 1 - achieved by the application of the additional obstacle clearance of 0.01 DR (DR = the distance from the end of 'take-off-distance-available' - see the pictorial representation in Figure

4 and the definition in section 2. above).

As can also be seen from Figure 4, flight must be conducted in VFR until DPATO has been achieved (and deduced that if an engine failure occurs before DPATO, entry into IFR is not permitted (as the OEI climb gradient will not have been established)).

Figure 3 - Performance Class 2 Obstacle Clearance

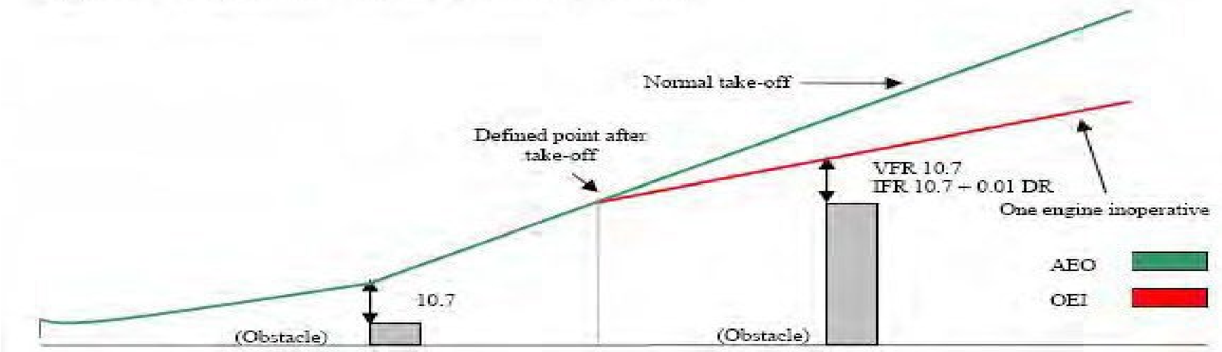
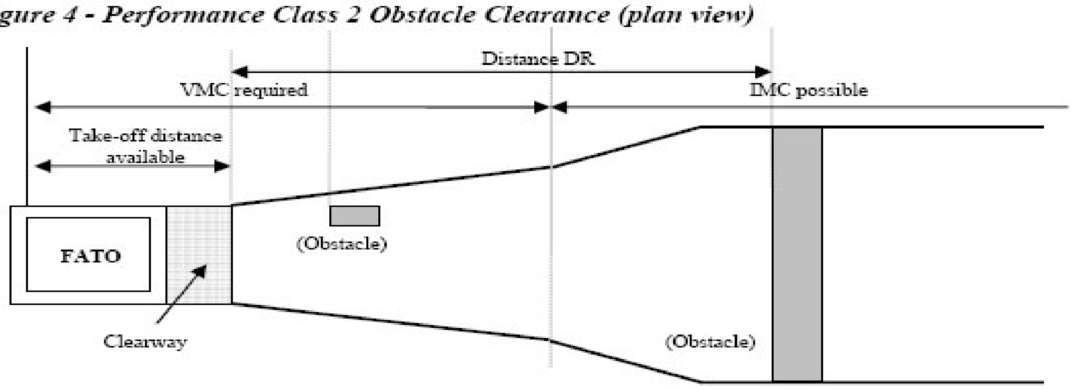


Figure 4 - Performance Class 2 Obstacle Clearance (plan view)



(2) Function of DPATO

From the preceding paragraphs it can be seen that DPATO is germane to PC 2. It can also be seen that, in view of the many aspects of DPATO, it has, potentially, to satisfy a number of requirements which are not necessarily synchronised (nor need to be).

It is clear that it is only possible to establish a single point for DPATO, satisfying the requirement of 4 b & 4 c above, when:

- accepting the TDP of a Category A procedure; or
- extending the safe-forced-landing requirement beyond required distances (if data is available to permit the calculation of the distance for a safe-forced-landing from the DPATO).

It could be argued that the essential requirement for DPATO is contained in section 4 b - OEI obstacle clearance. From careful examination of the flight path reproduced in Figure 3 above, it may be reasonably deduced that DPATO is the point at which adequate climb performance is established (examination of Category A procedures would indicate that this could be (in terms of mass, speed and height above the take-off surface) the conditions at the start of the first or second segments - or any point between.)

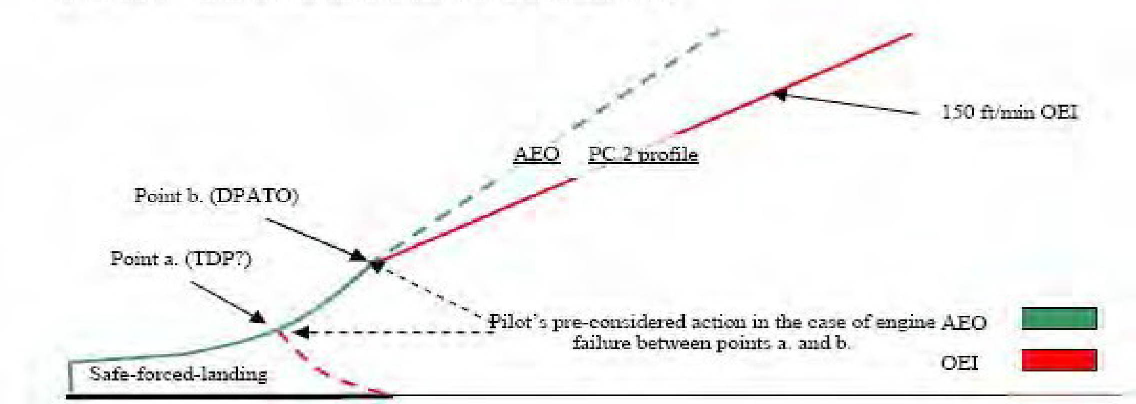
Note: The diagrams in Attachment A of ICAO Annex 6, do not appear to take account of drop down permitted under Category A procedures; similarly with helideck departures, the potential for acceleration in drop down below deck level (once the deck edge has been cleared) is also not shown. These omissions could be regarded as a simplification of the diagram, as drop down is discussed and accepted in the accompanying ICAO text.

It may reasonably be argued that, during the take-off and before reaching an appropriate climb speed (Vtoss or Vy), Vstayup will already have been achieved (where Vstayup is the ability to continue the flight and accelerate without descent shown in some Category A procedures as VT or target speed) and where, in the event of an engine failure, no landing would be required.

It is postulated that, to practically satisfy all the requirements of sections 4 a, b and c above, we do not need to define DPATO at one synchronised point; we can meet requirements separately - i.e. defining the distance for a safe-forced-landing, and then establishing the OEI obstacle clearance flight path.

As the point at which the helicopter's ability to continue the flight safely, with the critical power unit inoperative is the critical element, it is that for which DPATO is used in this text.

Figure 5 - The three elements in a PC 2 take-off



(i) The three elements from the pilot's perspective

When seen from the pilot's perspective (see Figure 5), there are three elements of the PC 2 take-off - each with associated related actions which need to be considered in the case of an engine failure:

(A) action in the event of an engine failure - up to the point where a forced-landing will be required.

(B) action in the event of an engine failure - from the point where OEI obstacle clearance is established (DPATO).

(C) pre-considered action in event of an engine failure - in the period between (A) and (B).

The action of the pilot in (A) and (A) is deterministic i.e. it remains the same for every occasion. For pre-consideration of the action at point c.; as is likely that the planned flight path will have to be abandoned (the point at which obstacle clearance using the OEI climb gradients not yet being reached) the pilot must (before take-off) have considered his options and the associated risks, and have in mind the course of action that will be pursued in the event of an engine failure during that short period. (As it is likely that any action will involve turning manoeuvres, the effect of turns on performance must be considered.)

(3) Take-off mass for Performance Class 2

As previously stated, Performance Class 2 is an AEO take-off which, from DPATO, has to meet the requirement for OEI obstacle clearance in the climb and en-route phases. Take-off mass is therefore the mass that gives at least the minimum climb performance of 150 ft/min at Vy, at 1000 ft above the take-off point, and obstacle clearance.

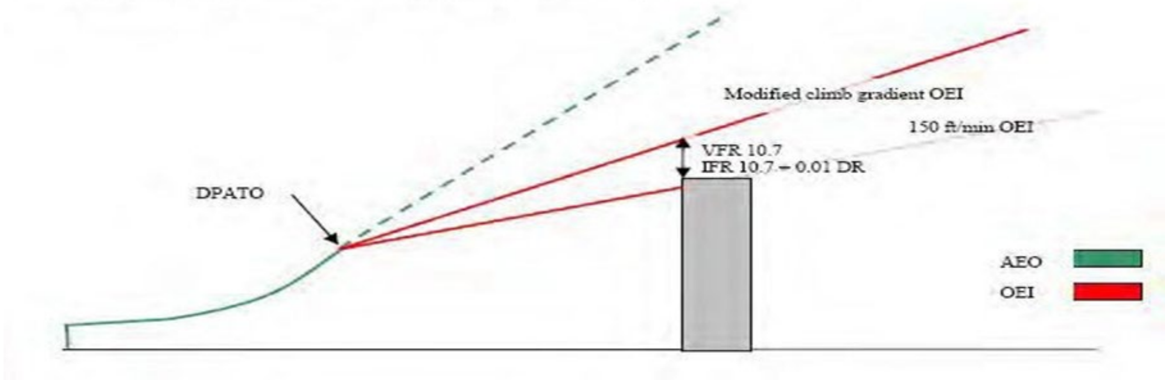
As can be seen in Figure 6 below, the take-off mass may have to be modified when it does not provide the required OEI clearance from obstacles in the take-off-flight path (exactly as in Performance Class 1). This could occur when taking off from a heliport where the flight path has to clear an obstacle such a ridge line (or line of buildings) which can neither be:

(i) flown around using VFR and see and avoid; nor

(ii) cleared using the minimum climb gradient given by the take-off mass (150 ft/min at 1,000 ft)

In this case, the take-off mass has to be modified (using data contained in the HFM) to give an appropriate climb gradient.

Figure 6 - Performance Class 2 (enhanced climb gradient)



(4) Do distances have to be calculated?

Distances do not have to be calculated if, by using pilot judgement or standard practice, it can be established that:

(i) A safe-forced-landing is possible following an engine failure (notwithstanding that there might be obstacles in the take-off path); and

(ii) Obstacles can be cleared (or avoided) - AEO in the take-off phase and OEI in the climb.

If early entry (in the sense of cloud base) into IMC is expected - an IFR departure should be planned. However, standard masses and departures can be used when described in the Operations Manual.

(5) The use of Category A data

In Category A procedures, TDP is the point at which either a rejected landing or a safe continuation of the flight, with OEI obstacle clearance, can be performed.

For PC 2 (when using Category A data), only the safe-forced-landing (reject) distance depends on the equivalent of the TDP; if an engine fails between TDP and DPATO the pilot has to decide what action is required - it is not necessary for a safe-forced-landing distance to be established from beyond the equivalent of TDP (see Figure 5 and discussion in section 6.2.1 above).

Category A procedures based on a fixed Vtoss are usually optimised either for the reduction of the rejected take-off distance, or the take-off distance. Category A procedures based on a variable Vtoss allow either a reduction in required distances (low Vtoss) or an improvement in OEI climb capability (high Vtoss). These optimisations may be beneficial in PC 2 to satisfy the dimensions of the take-off site.

In view of the different requirements for PC 2 (from PC 1), it is perfectly acceptable for the two calculations (one to establish the safe-forced-landing distance and the other to establish DPATO) to be based upon different Category A procedures. However, if this method is used, the mass resulting from the calculation cannot be more than the mass from the more limiting of the procedures.

(6) DPATO and obstacle clearance

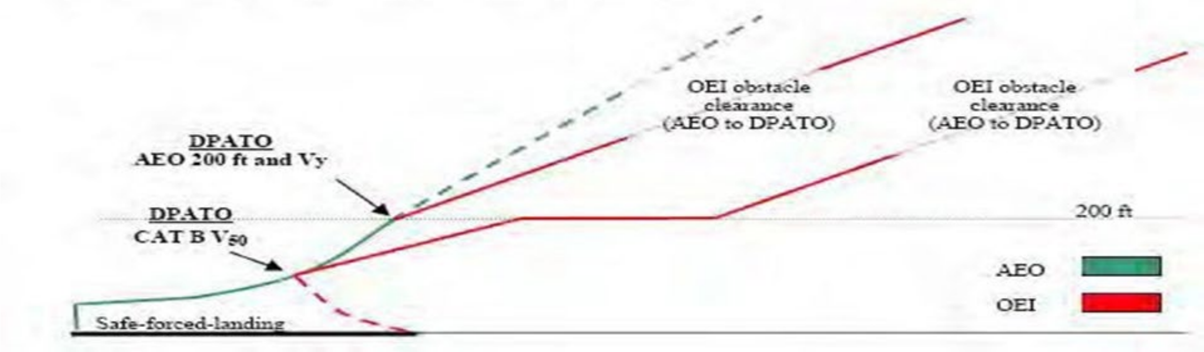
If it is necessary for OEI obstacle clearance to be established in the climb, the starting point (DPATO) for the (obstacle clearance) gradient has to be established. Once DPATO is defined, the OEI obstacle clearance is relatively easy to calculate with data from the HFM.

(i) DPATO based on AEO distance

In the simplest case; if provided, the scheduled AEO to 200 ft at Vy can be used (see Figure 7). Otherwise, and if scheduled in the HFM, the AEO distance to 50ft (V50) – determined in accordance with CS 29.63 - can be used (see Figure 7). Where this distance is used, it will be necessary to ensure that the V50 climb out speed is associated with a speed and mass for which OEI climb data is available so that, from V50, the OEI flight path can be constructed.

In the simplest case; if provided, the scheduled AEO to 200 ft at Vy can be used (see

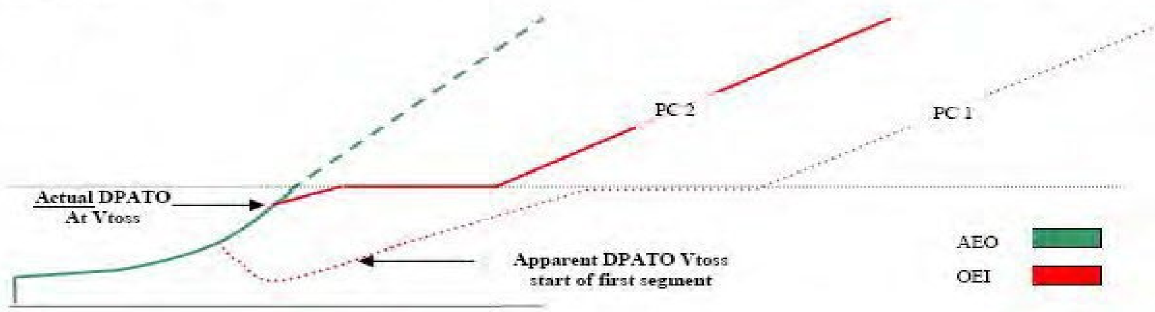
Figure 7 -Suggested AEO locations for DPATO



(ii) DPATO based on Category A distances

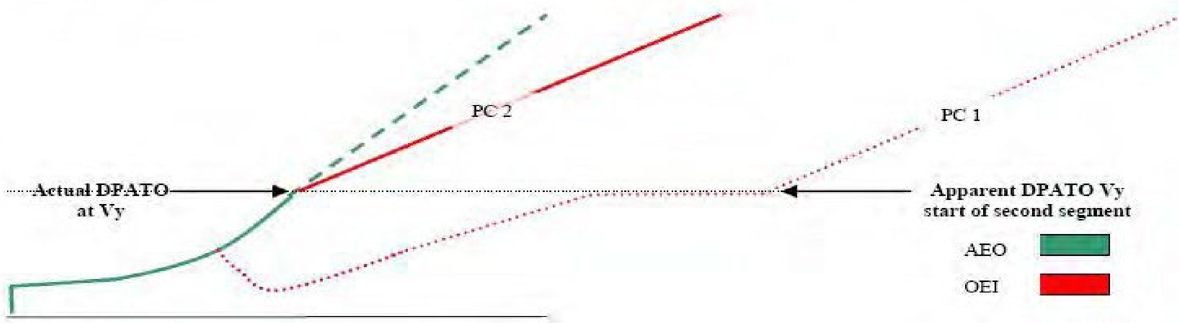
It is not necessary for specific AEO distances to be used (although for obvious reasons it is preferable); if they are not available, a flight path (with OEI obstacle clearance) can be established using Category A distances (see Figure 8 and Figure 9) - which will then be conservative.

Figure 8 - Using Cat A data; actual and apparent position of DPATO (Vtoss and start of first segment)



Note: the apparent DPATO is for planning purposes only in the case where AEO data is not available to construct the take-off flight path. The actual OEI flight path will provide better obstacle clearance than the apparent one (used to demonstrate the minimum requirement) - as seen from the firm and dashed lines in the above diagram.

Figure 9 - Using Cat A data; actual and apparent position of DPATO (Vy and start of second segment)



(iii) Use of most favourable Category A data

The use of AEO data is recommended for calculating DPATO. However, where an AEO distance is not provided in the flight manual, distance to Vy at 200 ft, from the most favourable of the Category A procedures, can be used to construct a flight path (provided it can be demonstrated that AEO distance to 200 ft at Vy is always closer to the take-off point than the CAT A OEI flight path).

In order to satisfy the requirement of OPS 3.525, the last point from where the start of OEI obstacle clearance can be shown is at 200 ft.

(7) The calculation of DPATO - a summary

DPATO should be defined in terms of speed and height above the take-off surface and should be selected such that HFM data (or equivalent data) is available to establish the distance from the start of the take-off up to the DPATO (conservatively if necessary).

(i) First method

DPATO is selected as the HFM Category B take-off distance (V50 speed or any other take-off distance scheduled in accordance with CS 29.63) provided that within the distance the helicopter can achieve:

(A) One of the Vtoss values (or the unique Vtoss value if is not variable) provided in the HFM, selected so as to assure a climb capability according to Cat A criteria; or

(B) Vy.

Compliance with OPS 3.525 would be shown from V50 (or the scheduled Category B take-off distance).

(ii) Second method

DPATO is selected as equivalent to the TDP of a Category A clear area take-off procedure conducted in the same conditions.

Compliance with OPS 3.525 would be shown from the point at which Vtoss, a height of at least 35 ft above the take-off surface and a positive climb gradient are achieved (which is the Category A clear area take-off distance).

Safe-forced-landing areas should be available from the start of the take-off, to a distance equal to the Category A "clear area" rejected take-off distance.

(iii) Third method

As an alternative; DPATO could be selected such that Helicopter Flight Manual one engine inoperative (OEI) data is available to establish a flight path initiated with a climb at that speed. This speed should then be:

(A) One of the Vtoss values (or the unique Vtoss value if is not variable) provided in the Helicopter Flight Manual, selected so as to assure a climb capability according to Category A criteria; or

(B) Vy.

The height of the DPATO should be at least 35 ft and can be selected up to 200 ft. Compliance with OPS 3.525 would be shown from the selected height.

(8) Safe-forced-landing distance

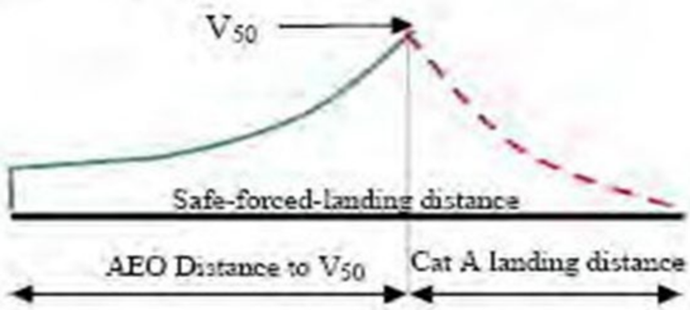
Except as provided in 6.7.2 above, the establishment of the safe-forced-landing distance could be problematical as is not likely that PC 2 specific data will be available in the HFM.

By definition, the Category A reject distance may be used when the surface is not suitable for a reject, but may be satisfactory for a safe-force-landing (for example where the surface is flooded or is covered with vegetation).

Any Category A (or other accepted) data may be used to establish the distance – however, once established it remains valid only if the Category A mass (or the mass from the accepted data) is used and the Category A (or accepted) AEO profile to the TDP is flown. In view of these constraints, the likeliest Category A procedures are the clear area or the short field (restricted area/site) procedures.

From Figure 10, it can be seen that if the Category B V50 procedure is used to establish DPATO, the combination of the distance to 50 ft and the Category A 'clear area' landing distance, required by CS 29.81 (the horizontal distance required to land and come to a complete stop from a point 50 ft above the landing surface), will give a good indication of the maximum safe-forced-landing distance required (see also the discussion on Vstayup above).

Figure 10 - Category B (V_{50}) safe-forced-landing distance



(9) Performance Class 2 landing

For other than PC 2 operations to elevated heliport/helidecks (see the discussion in section 7.4.1 below), the principles for the landing case are much simpler. As the performance requirement for PC 1 and PC 2 landings are virtually identical, the condition of the landing surface is the main issue. If the engine fails at any time during the approach, the helicopter must be able either: to perform a go-around meeting the requirements of OPS 3.525; or perform a safe-forced-landing on the surface. In view of this, and if using PC 1 data, the LDP should not be lower that the corresponding TDP (particularly in the case of a variable TDP).

The landing mass will be identical to the take-off mass for the same site (with consideration for any reduction due to obstacle clearance - as shown in Figure 6 above).

In the case of a balked landing (i.e. the landing site becomes blocked or unavailable during the approach); the full requirement for take-off obstacle clearance must be met.

(g) OPERATIONS IN PERFORMANCE CLASS 2 WITH EXPOSURE

OPS 3 offers an opportunity to discount the requirement for an assured safe-forced-landing area in the take-off or landing phase - subject to an approval from the Authority. The following sections deals with this option:

(1) Limit of Exposure

As stated above, Performance Class 2 has to ensure AEO obstacle clearance to DPATO and OEI obstacle clearance from that point. This does not change with the application of exposure.

It can therefore be stated that operations with exposure are concerned only with alleviation from the requirement for the provision of a safe-forced-landing.

The absolute limit of exposure is 200 ft - from which point OEI obstacle clearance must be shown.

(2) The principle of Risk Assessment

ICAO Annex 6 Part III Chapter 3.1.2 states that:

(i) Performance Class 3 helicopters shall only be operated in conditions of weather and light, and over such routes and diversions there from, that permit a safe-forced-landing to be executed in the event of engine failure. The conditions of this paragraph apply also to performance Class 2 helicopters prior to the defined point after take-off and after the defined point before landing.

The ICAO Helicopter and Tilt-rotor Study Group, is engaged in an ongoing process to amend Chapter 3 to take account of current practices – following this process the proposed text is likely to be:

(i) In conditions where the safe continuation of flight is not ensured in the event of a critical power unit failure, helicopter operations shall be conducted in a manner that gives appropriate consideration for achieving a safe-forced-landing.

Although a safe-forced-landing may no longer be the (absolute) Standard, it is considered that Risk Assessment is obligatory to satisfy the amended requirement for 'appropriate consideration'.

Risk Assessment used in OPS 3 for fulfilment of this proposed Standard is consistent with principles described in 'AS/NZS 4360:1999'.

Note: terms used in this text and defined in the AS/NZS Standard are shown in Sentence Case e.g. Risk Assessment or Risk Reduction.

(3) The application of Risk Assessment to OPS 3 Performance Class 2

Under circumstances where no risk attributable to engine failure (beyond that inherent in the safe-forced landing) is present, operations in Performance Class 2 may be conducted in accordance with the non-alleviated requirements contained above - and a safe-forced-landing will be possible.

Under circumstances where such risk would be present i.e.: operations to an elevated heliport (deck edge strike); or, when permitted, operations from a site where a safe-forced-landing cannot be accomplished because the surface is inadequate; or where there is penetration into the HV curve for a short period during take-off or landing (a limitation in CS 29 HFMs), operations have to be conducted under a specific approval. Provided such operations are Risk Assessed and can be conducted to an established safety target – they may be approved.

(i) The elements of the Risk Management. The approval process consists of an operational Risk Assessment and the application of four principles: a safety target; a helicopter reliability assessment; continuing airworthiness; and mitigating procedures.

(ii) The safety target. The main element of the JAA Risk Assessment when exposure was initially introduced into JAR-OPS 3 (NPA OPS-8), was the assumption that turbine engines in helicopters would have failure rates of about 1:100 000 per flying hour; which would permit (against the agreed safety target of 5 x 10-8 per event) an exposure of about 9 seconds for twins during the take-off or landing event. (When choosing this target it was assumed that the majority of current well maintained turbine powered helicopters would be capable of meeting the event target - it therefore represents the Residual Risk)

Note: Residual Risk is considered to be the risk that remains when all mitigating procedures airworthiness and operational - are applied (see sections 7.3.4 and 7.3.5 below).

(iii) The reliability assessment. The JAA reliability assessment was initiated to test the hypothesis (stated in 7.3.2 above) that the majority of turbine powered types would be able to meet the safety target. This hypothesis could only be confirmed by an examination of the manufacturers' power-loss data.

(iv) Mitigating procedures (airworthiness)

Mitigating procedures consist of a number of elements: the fulfilment of all manufacturers' safety modifications; a comprehensive reporting system (both failures and usage data); and the implementation of a Usage Monitoring System (UMS). Each of these elements is to ensure that engines, once shown to be sufficiently reliable to meet the safety target, will sustain such reliability (or improve upon it).

The monitoring system is felt to be particularly important as it had already been demonstrated that when such systems are in place it inculcates a more considered approach to operations. In addition the elimination of 'hot starts', prevented by the UMS, itself minimises the incidents of turbine burst failures.

(v) Mitigating procedures (operations)

Operational and training procedures, to mitigate the risk - or minimise the consequences - are required of the operator. Such procedures are intended to minimise risk by ensuring that: the helicopter is operated within the exposed region for the minimum time; and simple but effective procedures are followed to minimise the consequence should an engine failure occur.

(4) Operation with Exposure - the alleviation and the requirement

When operating with exposure, there is alleviation from the requirement to establish a safe-forced-landing area (which extends to landing as well as take-off); however, the requirement for obstacle clearance AEO in the take-off and from DPATO OEI in the climb and en-route phases remains (both for take-off and landing).

The take-off mass is obtained from the more limiting of the following:

- the climb performance of 150 ft/min at 1000 ft above the take-off point; or
- obstacle clearance (in accordance with 6.3 above); or
- AEO hover out of ground effect (HOGE) performance at the appropriate power setting. (AEO HOGE is required to ensure acceleration when (near) vertical dynamic take-off techniques are being used. Additionally for elevated heliports/helidecks, it ensures a power reserve to offset ground cushion dissipation; and ensures that, during the landing manoeuvre, a stabilised HOGE is available - should it be required.)

(i) Operations to elevated heliport/helidecks

PC 2 operations to elevated heliports and helidecks are a specific case of operations with exposure. In these operations, the alleviation covers the possibility of:

- a deck-edge strike if the engine fails early in the take-off or late in the landing; and
- penetration into the HV Curve during take-off and landing; and
- forced landing with obstacles on the surface (hostile water conditions) below the elevated heliport (helideck). The take-of mass is as stated above and relevant techniques are as described in AC OPS 3.520(a)(3) and 3.535(a)(3)

Note: It is unlikely that the DPATO will have to be calculated with operations to helidecks (due to the absence of obstacles in the take-off path).

(ii) Additional requirements for operations to Helidecks in a Hostile Environment

For a number of reasons (e.g. the deck size, and the helideck environment – including obstacles and wind vectors), it was not anticipated that operations in PC 1 would be technically feasible or economically justifiable by the projected EASA deadline of 2010 (OEI HOGE could have provided a method of compliance but this would have resulted in a severe and unwarranted restriction on payload/range).

However, due to the severe consequences of an engine failure to helicopters involved in take-off and landings to helidecks located in hostile sea areas (such as the North Sea or the North Atlantic), a policy of Risk Reduction is called for. As a result, enhanced Class 2 take-off and landing masses together with techniques that provide a high confidence of safety due to: deck-edge avoidance; and, drop-down that provides continued flight clear of the sea, are seen as practical measures.

For helicopters which have a Category A elevated helideck procedure, certification is satisfied by demonstrating a procedure and adjusted masses (adjusted for wind as well as temperature and pressure) which assure a 15ft deck edge clearance on take-off and landing. It is therefore recommended that manufacturers, when providing enhanced PC2 procedures, use the provision of this deck-edge clearance as their benchmark.

As the height of the helideck above the sea is a variable, drop down has to be calculated; once clear of the helideck, a helicopter operating in PC1 would be expected to meet the 35ft obstacle clearance. Under circumstances other than open sea areas and with less complex environmental conditions, this would not present difficulties. As the provision of drop down takes no account of operational circumstances, standard drop down graphs for enhanced PC2 similar to those in existence for Category A procedures are anticipated.

Under conditions of offshore operations, calculation of drop down is not a trivial matter the following examples indicate some of the problems which might be encountered in hostile environments:

- Occasions when tide is not taken into account and the sea is running irregularly - the level of the obstacle (i.e. - the sea) is indefinable making a true calculation of drop down impossible.
- Occasions when it would not be possible - for operational reasons - for the approach and departure paths to be clear of obstacles - the 'standard' calculation of drop-down could not be applied.

Under these circumstances, practicality indicates that drop-down should be based upon the height of the deck AMSL and the 35ft clearance should be applied.

There are however, other and more complex issues which will also affect the deck-edge clearance and drop down calculations:

- When operating to moving decks on vessels, a recommended landing or take-off profile might not be possible because the helicopter might have to hover alongside in order that the rise and fall of the ship is mentally mapped; or, on take-off re-landing in the case of an engine failure might not be an option.

Under these circumstances, the Commander might adjust the profiles to address a hazard more serious or more likely than that presented by an engine failure.

It is because of these and other (unforeseen) circumstances that a prescriptive requirement is not used. However, the target remains a 15ft deck-edge clearance and a 35ft obstacle clearance and data should be provided such that, where practically possible, these clearances can be planned.

As accident/incident history indicates that the main hazard is collision with obstacles on the helideck due to human error, simple and reproducible take-off and landing procedures are recommended.

In view of the reasons stated above, the future requirement for PC 1 is replaced by the new requirement that the take-off mass takes into account: the procedure; deck-edge miss; and drop down appropriate to the height of the helideck. This will require calculation of take-off mass from information produced by manufacturers reflecting these elements. It is expected that such information will be produced by performance modelling/simulation using a model validated through limited flight testing.

(iii) Operations to Helidecks for Helicopters with a MAPSC of more than 19

The original requirement for operations of helicopters with a MAPSC of more than 19 was PC 1 (as set out in OPS 3.470(a)(2)). However, when operating to helidecks, the problems enumerated in 7.4.2 above are equally applicable to these helicopters. In view of this, but taking into account that increased numbers are (potentially) being carried, such operations are permitted in PC 2 (OPS 3.470(a)(2)) but, in all helideck environments (both hostile and non-hostile), have to satisfy, the additional requirements, set out in 7.4.2 above.

AC-1 to Appendix 1 to OPS 3.517(a) Helicopter Operations Without an Assured Safe Forced Landing Capability

(a) As part of the risk assessment prior to granting an approval under Appendix 1 to OPS 3.517(a), the operator should provide appropriate powerplant reliability statistics available for the helicopter type and the engine type.

(b) Except in the case of new engines, such data should show sudden power loss from the set of in-flight shutdown (IFSD) events not exceeding 1 per 100,000 engine hours in a 5 year moving window. However, a rate in excess of this value, but not exceeding 3 per 100,000 engine hours, may be accepted by the Authority after an assessment showing an improving trend.

(c) New engines should be assessed on a case-by-case basis.

(d) After the initial assessment, updated statistics should be periodically reassessed; any adverse sustained trend will require an immediate evaluation to be accomplished by the operator in consultation with the Authority and the manufacturers concerned. The evaluation may result in corrective action or operational restrictions being applied.

(e) The purpose of this paragraph is to provide guidance on how the in-service power plant sudden power loss rate is determined.

(1) Share of roles between the helicopter and engine Type Certificate Holders (TCH).

(i) The provision of documents establishing the in-service sudden power loss rate for the helicopter/engine installation; the interface with the operational Authority of the State of Design should be the Engine TCH or the Helicopter TCH depending on the way they share the corresponding analysis work.

(ii) The Engine TCH should provide the Helicopter TCH with a document including: the list of in-service power loss events, the applicability factor for each event (if used), and the assumptions made on the efficiency of any corrective actions implemented (if used);

(iii) The Engine or Helicopter TCH should provide the operational Authority of the State of Design or, where this Authority does not take responsibility, the operational Authority of the State of the Operator, with a document that details the calculation results - taking into account: the events caused by the engine and the events caused by the engine installation; the applicability factor for each event (if used), the assumptions made on the efficiency of any corrective actions implemented on the engine and on the helicopter (if used); and the calculation of the powerplant power loss rate,

(2) Documentation The following documentation should be updated every year.

(i) The document with detailed methodology and calculation as distributed to the Authority of the State of Design.

(ii) A summary document with results of computation as made available on request to any operational Authority.

(iii) A Service Letter establishing the eligibility for such operation and defining the corresponding required configuration as provided to the operators.

(3) Definition of the “sudden in-service power loss”. The sudden in-service power loss is an engine power loss:

(i) larger than 30 % of the take-off power; and

(ii) occurring during operation; and

(iii) without the occurrence of an early intelligible warning to inform and give sufficient time for the pilot to take any appropriate action.

(4) Data base documentation.

Each power loss event should be documented, by the engine and/or helicopter TCH’s, as follows:

(i) incident report number;

(ii) engine type;

(iii) engine serial number;

(iv) helicopter serial number;

(v) date;

(vi) event type (demanded IFSD, un-demanded IFSD);

(vii) presumed cause;

(viii) applicability factor when used

(ix) reference and assumed efficiency of the corrective actions that will have to be applied (if any);

(5) Counting methodology.

Various methodologies for counting engine power loss rate have been accepted by Authorities. The following is an example of one of these methodologies:

(i) The events resulting from:

(A) unknown causes (wreckage not found or totally destroyed, undocumented or unproven statements); or

(B) where the engine or the elements of the engine installation have not been investigated (for example when the engine has not been returned by the customer); or

(C) an unsuitable or non representative use (operation or maintenance) of the helicopter or the engine are not counted as engine in-service sudden power loss and the applicability factor is 0%.

(ii) The events caused by:

(A) the engine or the engine installation; or

(B) the engine or helicopter maintenance, when the applied maintenance was compliant with the Maintenance Manuals are counted as engine in-service sudden power loss and the applicability factor is 100%.

(iii) For events where the engine or an element of the engine installation has been submitted to investigation which did not allow to define a presumed cause the applicability factor is 50 %.

(6) Efficiency of corrective actions.

The corrective actions made by the engine and helicopter manufacturers on the definition or maintenance of the engine or its installation could be defined as mandatory for specific OPS 3 operations. In this case the associated reliability improvement could be considered as mitigating factor for the event. A factor defining the efficiency of the corrective action could be applied to the applicability factor of the concerned event.

(7) Method of calculation of the powerplant power loss rate.

The detailed method of calculation of the powerplant power loss rate should be documented by engine or helicopter TCH and accepted by the relevant Authority.

AC-2 to Appendix 1 to OPS 3.517(a) Helicopter Operations Without an Assured Safe Forced Landing Capability

To obtain an approval under Appendix 1 to OPS 3.517(a), the operator conducting operations without an assured safe forced landing capability should implement the following:

(a) Attain and then maintain the helicopter/engine modification standard defined by the manufacturer that has been designated to enhance reliability during the take-off and landing phases.

(b) Conduct the preventive maintenance actions recommended by the helicopter or engine manufacturer as follows:

(1) Engine oil spectrometric and debris analysis - as appropriate;

(2) Engine trend monitoring, based on available power assurance checks;

(3) Engine vibration analysis (plus any other vibration monitoring systems where fitted).

(4) Oil consumption monitoring.

(c) The Usage Monitoring System should fulfil at least the following:

(1) Recording of the following data:

(i) Date and time of recording, or a reliable means of establishing these parameters;

(ii) Amount of flight hours recorded during the day plus total flight time;

(iii) N1 (gas producer RPM) cycle count;

(iv) N2 (power turbine RPM) cycle count (if the engine features a free turbine);
(v) Turbine temperature exceedance: value, duration;
(vi) Power-shaft torque exceedance: value, duration (if a torque sensor is fitted);
(vii) Engine shafts speed exceedance: value, duration;

(2) Data storage of the above parameters, if applicable, covering the maximum flight time in a day, and not less than 5 flight hours, with an appropriate sampling interval for each parameter.
(3) The system should include a comprehensive self-test function with a malfunction indicator and a detection of power-off or sensor input disconnection.
(4) A means should be available for downloading and analysis of the recorded parameters. Frequency of downloading should be sufficient to ensure data is not lost through over-writing.
(5) The analysis of parameters gathered by the usage monitoring system, the frequency of such analysis and subsequent maintenance actions should be described in the maintenance documentation.
(6) The data should be stored in an acceptable form and accessible to the Authority, for at least 24 months.

(d) Include take-off and landing procedures in the operations manual, where they do not already exist in the Helicopter Flight Manual.
(e) Establish training for flight crew which should include the discussion, demonstration, use and practice of the techniques necessary to minimise the risks;
(f) Report to the manufacturer any loss of power control, engine shutdown (precautionary or otherwise) or power unit failure for any cause (excluding simulation of power unit failure during training). The content of each report should provide:

(1) Date and time;
(2) Operator (and Maintenance organisations where relevant);
(3) Type of helicopter and description of operations;
(4) Registration and serial number of airframe;
(5) Engine type and serial number;
(6) Power unit modification standard where relevant to failure;
(7) Engine position;
(8) Symptoms leading up to the event.
(9) Circumstances of power unit failure including phase of flight or ground operation;
(10) Consequences of the event;
(11) Weather/environmental conditions;
(12) Reason for power unit failure – if known;
(13) In case of an In Flight Shut Down (IFSD), nature of the IFSD (Demanded/Un-demanded);
(14) Procedure applied and any comment regarding engine restart potential;
(15) Engine hours and cycles (from new and last overhaul);
(16) Airframe flight hours;
(17) Rectification actions applied including, if any, component changes with part number and serial number of the removed equipment; and
(18) Any other relevant information

AC OPS 3.520(a)(3) Procedure for Continued Operations to Helidecks
(See OPS 3.520(a)(3) and 3.535(a)(3))

(a) Factors to be considered when taking off from or landing on a helideck

(1) In order to take account of the considerable number of variables associated with the helideck environment, each take-off and landing may require a slightly different profile. Factors such as

helicopter mass and centre of gravity, wind velocity, turbulence, deck size, deck elevation and orientation, obstructions, power margins, platform gas turbine exhaust plumes etc., will influence both the take-off and landing. In particular, for the landing, additional considerations such as the need for a clear go-around flight path, visibility and cloud base etc., will affect the Commander's decision on the choice of landing profile. Profiles may be modified, taking account of the relevant factors noted above and the characteristics of individual helicopter types.

(b) Terminology

(1) See OPS 3.480 as appropriate.

(c) Performance

(1) To perform the following take-off and landing profiles, adequate all engines operating (AEO) hover performance at the helideck is required. In order to provide a minimum level of performance, data (derived from the Flight Manual AEO out of ground effect (OGE), with wind accountability) should be used to provide the maximum take-off or landing mass. Where a helideck is affected by downdrafts or turbulence or hot gases, or where the take-off or landing profile is obstructed, or the approach or takeoff cannot be made into wind, it may be necessary to decrease this take-off or landing mass by using a suitable calculation method recommended by the manufacturer. The helicopter mass should not exceed that required by OPS 3.520(a)(1) or OPS 3.535(a)(1).

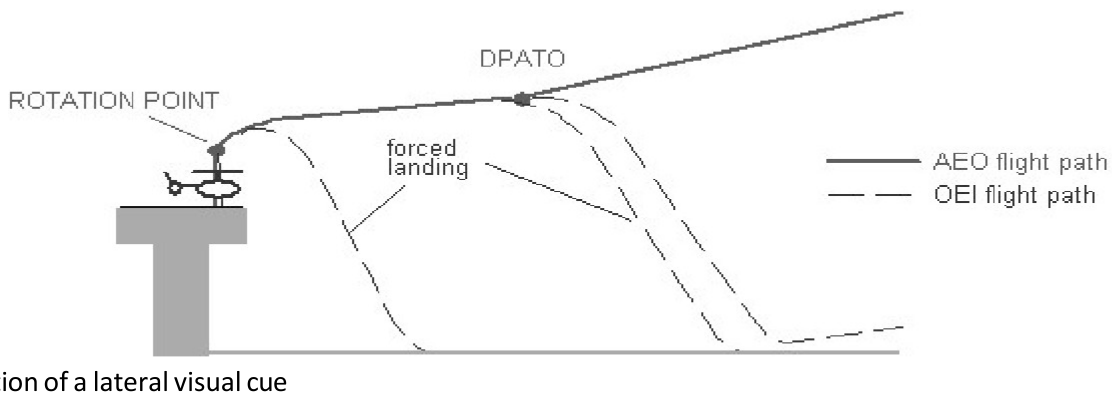
Note 1: For helicopter types no longer supported by the manufacturer, data may be established by the operator, provided they are acceptable to the Authority.

(d) Take-off profile

(1) The take-off should be performed in a dynamic manner ensuring that the helicopter continuously moves vertically from the hover to the Rotation Point (RP) and thence into forward flight. If the manoeuvre is too dynamic then there is an increased risk of losing spatial awareness (through loss of visual cues) in the event of a rejected take-off, particularly at night.

(2) If the transition to forward flight is too slow, the helicopter is exposed to an increased risk of contacting the deck edge in the event of an engine failure at or just after the point of cyclic input (RP).

(3) It has been found that the climb to RP is best made between 110% and 120% of the power required in the hover. This power offers a rate of climb which assists with deck-edge clearance following power unit failure at RP, whilst minimising ballooning following a failure before RP. Individual types will require selection of different values within this range.



(e) Selection of a lateral visual cue

(1) In order to obtain the maximum performance in the event of an engine failure being recognised at or just after RP, the RP must be at its optimum value, consistent with maintaining the necessary visual cues. If an engine failure is recognised just before RP, the helicopter, if operating at a low mass, may 'balloon' a significant height before the reject action has any effect. It is, therefore, important that the Pilot Flying selects a lateral visual marker and maintains it until the

RP is achieved, particularly on decks with few visual cues. In the event of a rejected take-off, the lateral marker will be a vital visual cue in assisting the pilot to carry out a successful landing.

(f) Selection of the rotation point

(1) The optimum RP should be selected to ensure that the take-off path will continue upwards and away from the deck with All Engines Operating (AEO), but minimising the possibility of hitting the deck edge due to the height loss in the event of an engine failure at or just after RP.

(2) The optimum RP may vary from type to type. Lowering the RP will result in a reduced deck edge clearance in the event of an engine failure being recognised at or just after RP. Raising the RP will result in possible loss of visual cues, or a hard landing in the event of an engine failure just prior to RP.

(g) Pilot reaction times

(1) Pilot reaction time is an important factor affecting deck edge clearance in the event of an engine failure prior to or at RP. Simulation has shown that a delay of one second can result in a loss of up to 15 ft in deck edge clearance.

(h) Variation of wind speed

(1) Relative wind is an important parameter in the achieved take-off path following an engine failure; wherever practicable, take-off should be made into wind. Simulation has shown that a 10 knot wind can give an extra 5 ft deck edge clearance compared to a zero wind condition.

(i) Position of the helicopter relative to the deck edge

(1) It is important to position the helicopter as close to the deck edge (including safety nets) as possible whilst maintaining sufficient visual cues, particularly a lateral marker.

(2) The ideal position is normally achieved when the rotor tips are positioned at the forward deck edge. This position minimises the risk of striking the deck edge following recognition of an engine failure at or just after RP. Any take-off heading which causes the helicopter to fly over obstructions below and beyond the deck edge should be avoided if possible. Therefore, the final take-off heading and position will be a compromise between the take-off path for least obstructions, relative wind, turbulence and lateral marker cue considerations.

(j) Actions in the event of an engine failure at or just after RP

(1) Once committed to the continued take-off, it is important, in the event of an engine failure, to rotate the aircraft to the optimum attitude in order to give the best chance of missing the deck edge. The optimum pitch rates and absolute pitch attitudes, should be detailed in the profile for the specific type.

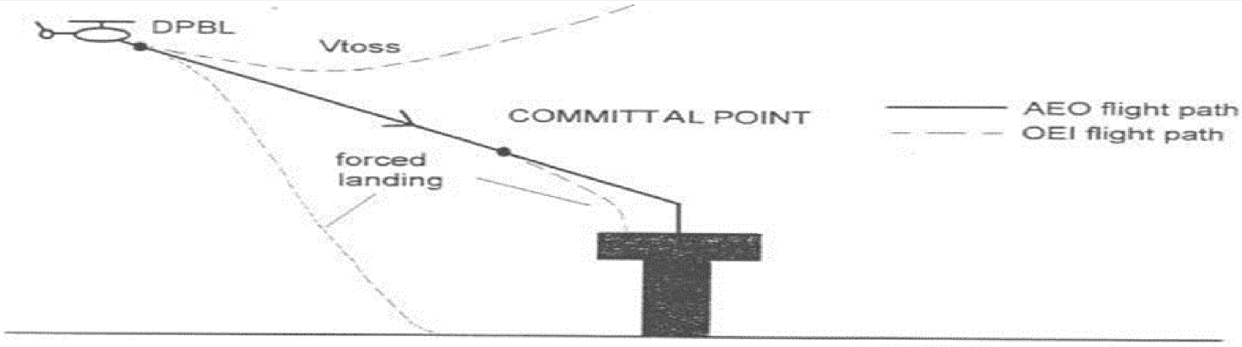
(k) Take-off from helidecks which have significant movement

(1) This technique should be used when the helideck movement and any other factors, e.g. insufficient visual cues, makes a successful rejected take-off unlikely. Weight should be reduced to permit an improved one engine inoperative capability, as necessary.

(2) The optimum take-off moment is when the helideck is level and at its highest point, e.g. horizontal on top of the swell. Collective pitch should be applied positively and sufficiently to make an immediate transition to climbing forward flight. Because of the lack of a hover, the take- off profile should be planned and briefed prior to lift off from the deck.

(l) Standard landing profile

(1) The approach should be commenced into wind to a point outboard of the helideck. Rotor tip clearance from the helideck edge should be maintained until the aircraft approaches this position at the requisite height (type dependent) with approximately 10 kts of ground-speed and a minimal rate of descent. The aircraft is then flown on a flight path to pass over the deck edge and into a hover over the safe landing area.



(m) Offset landing profile

(1) If the normal landing profile is impracticable due to obstructions and the prevailing wind velocity, the offset procedure may be used. This should involve flying to a hover position, approximately 90° offset from the landing point, at the appropriate height and maintaining rotor tip clearance from the deck edge. The helicopter should then be flown slowly but positively sideways and down to position in a low hover over the landing point. Normally, CP will be the point at which helicopter begins to transition over the helideck edge.

(n) Training

(1) These techniques should be covered in the training required by OPS 3, Subpart N.

AMC OPS 3.520 & 3.535 Take-off and landing

(See OPS 3.520 and OPS 3.535)

(a) This AMC describes three types of operation to/from helidecks and elevated heliports by helicopters operating in Performance Class 2.

(b) In two cases of take-off and landing, exposure time is used. During the exposure time (which is only approved for use when complying with OPS 3.517(a)) the probability of a power unit failure is regarded as extremely remote. If a power unit failure (engine failure) occurs during the exposure time a safe force landing may not be possible.

(c) Take Off - Non-Hostile Environment (without an approval to operate with an exposure time) OPS 3.520(a)(2).

(1) Figure 1 shows a typical take-off profile for Performance Class 2 operations from a helideck or an elevated heliport in a non-hostile environment.

(2) If an engine failure occurs during the climb to the rotation point, compliance with 3.520(a)(2) will enable a safe landing or a safe forced landing on the deck.

(3) If an engine failure occurs between the rotation point and the DPATO, compliance with 3.520(a)(2) will enable a safe forced landing on the surface, clearing the deck edge.

(4) At or after the DPATO, the OEI flight path should clear all obstacles by the margins specified in OPS 3.525.

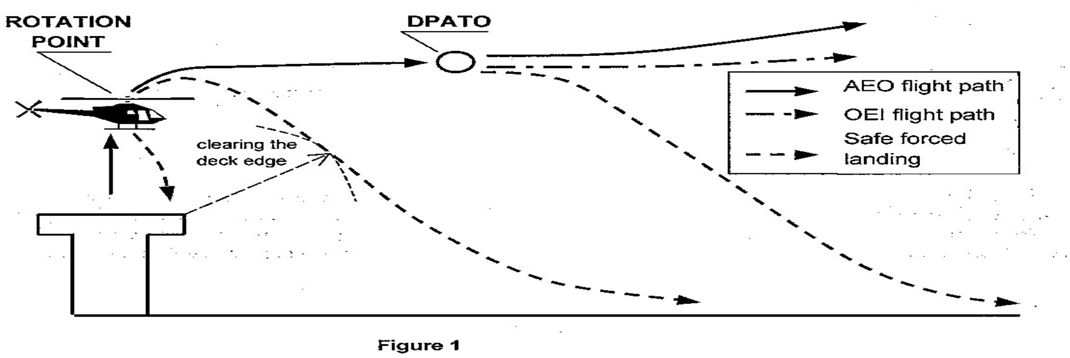


Figure 1

(d) Take Off - Non-Hostile Environment (with exposure time) OPS 3.520(a)(3)

(1) Figure 2 shows a typical take-off profile for Performance Class 2 operations from a helideck or an elevated heliport in a non-hostile environment (with exposure time).

(2) If an engine failure occurs after the exposure time and before DPATO, compliance with 3.520(a)(3) will enable a safe force landing on the surface.

(3) At or after the DPATO, the OEI flight path should clear all obstacles by the margins specified in OPS 3.525.

Note: an engine failure outside of exposure time should result in a safe-forced- landing or safe continuation of the flight.

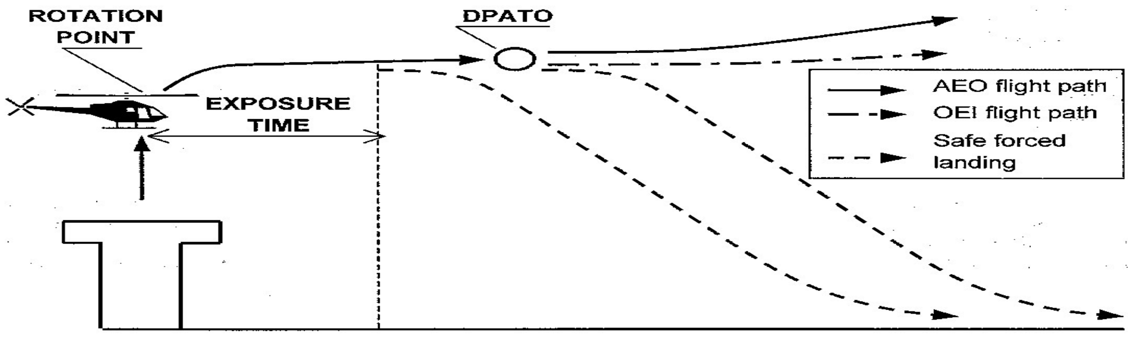


Figure 2

(e) Take Off - Non-Congested Hostile Environment (with exposure time) OPS 3.520(a)(4)

(1) Figure 3 shows a typical take off profile for Performance Class 2 operations from a helideck or an elevated heliport in a non-congested hostile environment (with exposure time).

(2) If an engine failure occurs after the exposure time the helicopter is capable of continuing the flight.

(3) At or after the DPATO, the OEI flight path should clear all obstacles by the margins specified in OPS 3.525.

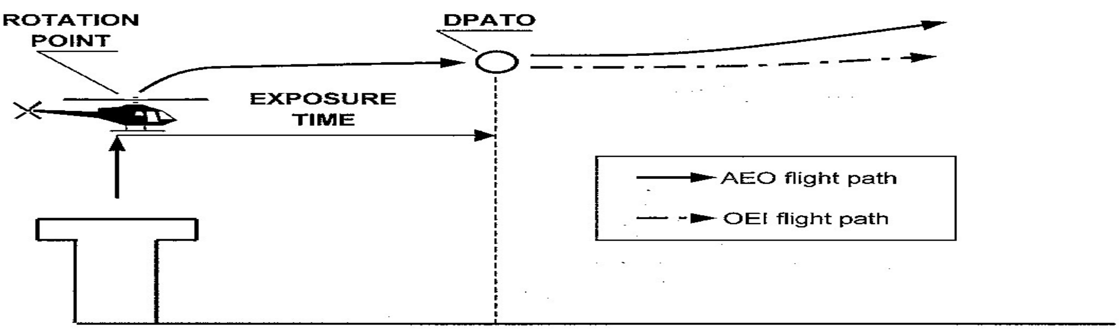


Figure 3

(f) Landing - Non-Hostile Environment (without an approval to operate with an exposure time) CAR OPS-3.535(a)(2)

(1) Figure 4 shows a typical landing profile for Performance Class 2 operations to a helideck or an elevated heliport in a non-hostile environment.

(2) The DPBL is defined as a “window” in terms of airspeed, rate of descent, and height above the landing surface. If an engine failure occurs before the DPBL, the pilot may elect to land or to execute a balked landing.

(3) In the event of an engine failure being recognised after the DPBL and before the committal point, compliance with 3.535(a)(2) will enable a safe force landing on the surface.

(4) In the event of an engine failure at or after the committed point, compliance with 3.535(a)(2) will enable a safe force landing on the deck.

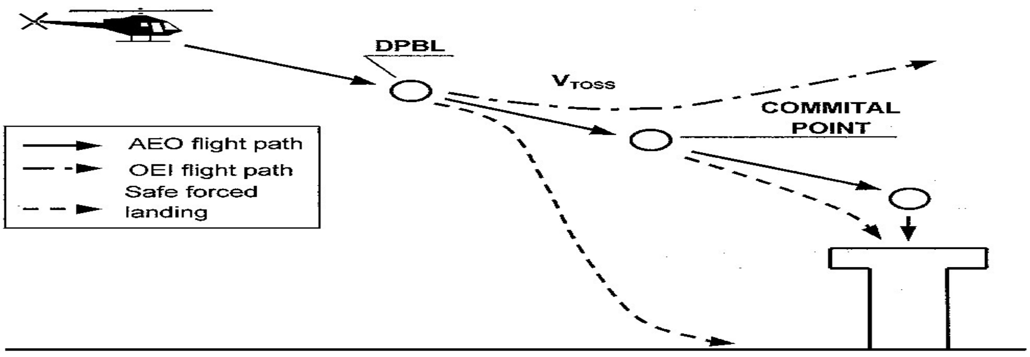


Figure 4

(g) Landing - Non-Hostile Environment (with exposure time) OPS 3.535(a)(3)

(1) Figure 5 shows a typical landing profile for Performance Class 2 operations to a helideck or an elevated heliport in a non-hostile environment (with exposure time).

(2) The DPBL is defined as a “window” in terms of airspeed, rate of descent, and height above the landing surface. If an engine failure occurs before the DPBL, the pilot may elect to land or to execute a balked landing.

(3) In the event of an engine failure being recognised before the exposure time compliance with 3.535(a)(3) will enable a safe force landing on the surface.

(4) In the event of an engine failure after the exposure time, compliance with 3.535(a)(3) will enable a safe force landing on the deck.

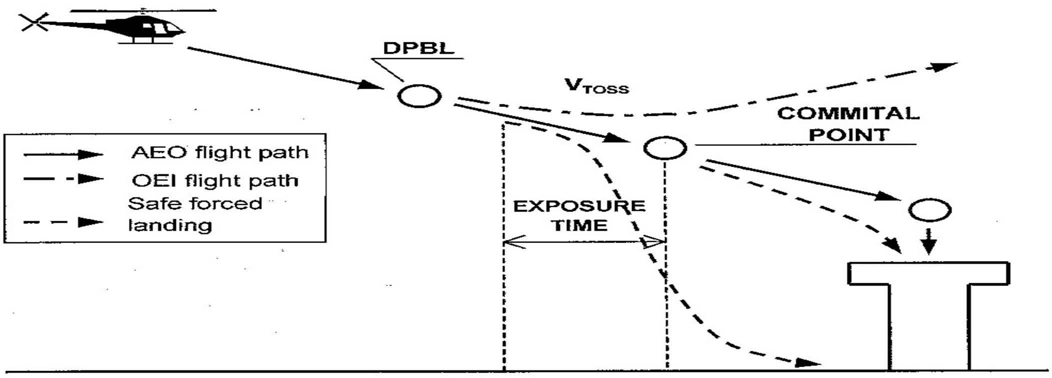


Figure 5

(h) Landing - Non-Congested Hostile Environment (with exposure time) OPS 3.535(a)(4)

(1) Figure 6 shows a typical landing profile for Performance Class 2 operations to a helideck or an elevated heliport in a non-congested hostile environment (with exposure time).

(2) In the event of an engine failure at any point during the approach and landing phase up to the start of exposure time, compliance with OPS 3.535(a)(4) will enable the helicopter, after clearing all obstacles under the flight path, to continue the flight.

(3) In the event of an engine failure after the exposure time, compliance with 3.535(a)(4) will enable a safe force landing on the deck.

SECTION 1 – SUBPART I – PERFORMANCE CLASS 3

CAR OPS-3.540 General

(a) The operator shall ensure that:
   (1) Helicopters operated in Performance Class 3 are certificated in either Category A or B (see also AC OPS 3.480(a)(1) and (a)(2)).
   (2) Operations are only conducted from/to those heliports and over such routes, areas and diversions contained in a non-hostile environment, except for the take-off and landing phase as provided in (b) below.

(b) The operator may conduct operations to/ from a heliport located outside a congested hostile environment, without an assured safe forced landing capability during the take-off and landing phases (see AC OPS 3.540(b)):
   (1) during take-off; before reaching Vy or 200 ft above the take-off surface; or
   (2) during landing; below 200 ft above the landing surface;
   provided the operator has been granted a relevant approval by the Authority in accordance with Appendix 1 to OPS 3.517(a).

(c) Unless the helicopter meets the requirements of OPS 3.541, the operator shall ensure that operations are not conducted:
   (1) in IMC;
   (2) out of sight of the surface;
   (3) at night;
   (4) when the ceiling is less than 600 ft; or
   (5) when the visibility is less than 800m.

CAR OPS 3.541 Operations of Helicopters In Performance Class 3 In IMC

(See AMC OPS 3.541)
(See AC OPS 3.541)

(a) Operations in performance Class 3 in IMC shall be conducted only over a surface environment acceptable to the competent authority of the State over which the operations are performed.

(b) In approving operations by helicopters operating in performance Class 3 in IMC, the Authority, as the State of the Operator, shall ensure that the helicopter is certificated for flight under IFR and that the overall level of safety is provided by:
   (1) the reliability of the engines;
   (2) the operator's maintenance procedures, operating practices and crew training programmes; and
   (3) equipment and other requirements provided in accordance with AMC OPS 3.541.

(c) Operators of helicopters operating in performance Class 3 in IMC shall have a programme for engine trend monitoring and shall utilise the engine and helicopter manufacturers' recommended instruments, systems and operational/ maintenance procedures to monitor the engines.

(d) In order to minimize the occurrence of mechanical failures, helicopters operating in IMC in performance Class 3 should utilize vibration health monitoring for the tail-rotor drive system.

CAR OPS-3.545 Take-off

The operator shall ensure that:

(a) The take-off mass does not exceed the maximum take-off mass specified for a hover in ground effect with all power units operating at take-off power. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass shall not exceed the maximum take-off mass specified for a hover out of ground effect with all power units operating at takeoff power.

(b) in the event of a power unit failure, the helicopter is able to perform a safe forced landing, except when operated in accordance with the alleviation contained in sub-paragraph 3.540(b).

CAR OPS-3.550 En-route

The operator shall ensure that:

(a) The helicopter is able, with all power units operating within the maximum continuous power conditions specified, to continue along its intended route or to a planned diversion without flying at any point below the appropriate minimum flight altitude; and

(b) in the event of a power unit failure, the helicopter is able to perform a safe forced landing.

CAR OPS-3.555 Landing

The operator shall ensure that:

(a) The landing mass of the helicopter at the estimated time of landing does not exceed the maximum landing mass specified for a hover in ground effect, with all power units operating at take-off power. If conditions are such that a hover in ground effect is not likely to be established, the landing mass shall not exceed the maximum landing mass specified for a hover out of ground effect with all power units operating at take-off power.

(b) in the event of a power unit failure, the helicopter is able to perform a safe forced landing, except when operated in accordance with the alleviation contained in sub-paragraph 3.540(b).

AC OPS 3.540(b) The Take-off and Landing Phases (Performance Class 3)

(See OPS 3.540(b))

(a) To understand the use of ground level exposure in Performance Class 3, it is important first to be aware of the logic behind the use of 'take-off and landing phases'; once this is clear, it is easier to appreciate the aspects and limits of the use of ground level exposure. This AC shows the derivation of the term from the ICAO definition of the 'en-route phase' and then gives practical examples of the use, and limitations on the use, of ground level exposure in OPS 3.540(b).

(b) The take-off phase in Performance Class 1 and Performance Class 2 may be considered to be bounded by 'the specified point in the take-off' from which the Take-off Flight Path begins.

  (1) In Performance Class 1 this specified point is defined as "the end of the Take-off Distance Required".

  (2) In Performance Class 2 this specified point is defined as "DPATO or, as an alternative, no later than 200 ft above the take-off surface".

  (3) There is no simple equivalent point for bounding of the landing in Performance Class 1 & 2.

(c) Take-off Flight Path is not used in Performance Class 3 and, consequently, the term 'take-off and landing phases' is used to bound the limit of exposure. For the purpose of Performance Class 3, the take-off and landing phases are considered to be bounded by:

  (1) for the take-off no later than Vy or 200 ft above the take-off surface; and

  (2) for the landing 200 ft above the landing surface.

Note: in ICAO Annex 6 Part III, En- route phase is defined as being "That part of the flight from the end of the take-off and initial climb phase to the commencement of the approach and landing phase. " The use of take-off and landing phase in this text is used to distinguish the take-off from the initial climb, and the landing from the approach: they are considered to be complimentary and not contradictory.

(d) Ground level exposure – and exposure for elevated heliports/helidecks in a non-hostile environment – is permitted for operations under an approval in accordance with Appendix 1 to OPS 3.517(a). Exposure in this case is limited to the 'take-off and landing phases'. What is the practical effect of this bounding of exposure? Consider a couple of examples:

A clearing: The operator may consider a take-off/landing in a clearing when there is sufficient power, with all engines operating, to clear all obstacles in the take-off path by an adequate margin (this, in ICAO, is meant to indicate 35 ft). Thus, the clearing may be bounded by bushes, fences, wires and, in the extreme, by power lines, high trees etc. Once the obstacle has been cleared – by using a steep or a vertical climb (which itself may infringe the HV diagram) - the helicopter reaches Vy or 200 ft, and from that point a safe forced landing must be possible. The effect is that whilst operation to a clearing is possible, operation to a clearing in the middle of a forest is not (except when operated in accordance with Appendix 1 to OPS 3.005(e)).

A heliport surrounded by rocks: the same applies when operating to a landing site that is surrounded by rocky ground. Once Vy or 200ft has been reached, a safe forced landing must be possible.

An elevated heliport/helideck: when operating to an elevated heliport/helideck in Performance Class 3, exposure is considered to be twofold: firstly, to a deck-edge strike if the engine fails after the decision to transition has been taken; and secondly, to operations in the HV diagram due to the height of the heliport/helideck. Once the take-off surface has been cleared and the helicopter has reached the knee of the HV diagram, the helicopter should be capable of making a safe forced landing.

(e) Operation in accordance with OPS 3.540(b) does not permit excursions into a hostile environment per se and is specifically concerned with the absence of space to abort the take-off or landing when the take-off and landing space are limited; or when operating in the HV diagram.

(f) Specifically, the use of this exception to the requirement for a safe forced landing (during take-off or landing) does not permit semi-continuous operations over a hostile environment such as a forest or hostile sea area. It can therefore be seen as a limited alleviation from OPS 3.540(a)(2) which states that: "operations are only conducted to/from those heliports and over such routes, areas and diversions contained in a non-hostile environment"

AMC to OPS 3.541 Operations of Helicopters in Performance Class 3 in IMC

(See OPS 3.541)

Airworthiness and operations requirements must satisfy the following**:**

(a) Engine Reliability

(1) Attaining and maintaining approval for engines used by helicopters operating in performance Class 3 in IMC:

(i) In order to attain initial approval for existing in-service engine types, reliability shall be shown to have a nominal power loss rate of less than 1 per 100 000 engine hours based on a risk management process.

Note: Power loss in this context is defined as any significant loss of power, the cause of which may be traced to engine or engine component, design, maintenance or installation, including design or installation of the fuel ancillary or engine control systems. (See AC OPS 3.541)

(ii) In order to attain initial approval for new engine types, the State of Design shall assess engine models for acceptance for operations in performance Class 3 in IMC on a case-by-case basis.

(iii) In order to maintain approval, the State of Design shall, through the continuing airworthiness process, ensure that engine reliability remains consistent with the intent of the Standard contained in para 1.1.1.

(2) The operator shall be responsible for a programme for ongoing engine trend monitoring.

(3) To minimize the probability of in-flight engine failure, the engine shall be equipped with:

(i) for turbine engines: a re-ignition system that activates automatically or a manually selectable continuous ignition system unless the engine certification has determined that such a system is not required, taking into consideration the likely environmental conditions in which the engine is to be operated;

(ii) a magnetic particle detection or equivalent system that monitors the engine, accessories gearbox, and reduction gearbox, and which includes a flight deck caution indication; and

(iii) a means that would permit continuing operation of the engine through a sufficient power range to safely complete the flight in the event of any reasonably probable failure of the fuel control unit.

(b) Systems and Equipment

Helicopters operating in performance Class 3 in IMC shall be equipped with the following systems and equipment intended to ensure continued safe flight or to assist in achieving a safe forced landing after an engine failure, under all allowable operating conditions:

(1) electrical loads of all required instruments and equipment necessary for safe emergency operations of the helicopter for at least one hour; and

(2) an emergency electrical supply system of sufficient capacity and endurance, following loss of all normally generated either two separate electrical generating systems, each one capable of supplying all probable combinations of continuous in-flight electrical loads for instruments, equipment and systems required in IMC; or a primary electrical source and a standby battery or other alternate source of electric power that is capable of supplying 150 per cent of power to, as a minimum:

Note: If a battery is used to satisfy the requirement for a second power source (see 2 a) above), an additional electrical power supply may not be required.

(i) maintain the operation of all essential flight instruments, communication and navigation systems during a descent from the maximum certificated altitude in an autorotational configuration to the completion of a landing;
(ii) maintain the operation of the stabilisation system, if applicable;
(iii) lower the landing gear, if applicable;
(iv) where required, provide power to one pitot heater, which must serve an airspeed indicator clearly visible to the pilot;
(v) provide for the operation of the landing light;
(vi) provide for one engine restart, if applicable; and
(vii) provide for the operation of the radio altimeter;

(3) a radio altimeter;
(4) an autopilot if intended as a substitute for a second pilot. In these cases, the Authority, as the State of Operator, shall ensure the operator's approval clearly states any conditions or limitations on its use;
(5) a means to provide for at least one attempt at engine re-start;
(6) an area navigation system approved for use in IFR, capable of being used to locate suitable landing areas in the event of an emergency;
(7) a landing light that is independent of retractable landing gear and is capable of adequately illuminating the touchdown area in a night forced landing; and
(8) an engine fire warning system.

(c) Minimum Serviceability Requirements — Operating Equipment
The Authority shall specify the minimum serviceability requirements for operating equipment in helicopters operating in performance Class 3 in IMC.

(d) Operations Manual Information
The operations manual shall include limitations, procedures, approval status and other information relevant to operations in performance Class 3 in IMC.

(e) Event Reporting
(1) The operator approved to conduct operations by helicopters in performance Class 3 in IMC shall report all significant failures, malfunctions or defects to the Authority who in turn shall notify the State of Design.
(2) The Authority shall monitor operations in performance Class 3 in IMC so as to be able to take any actions necessary to ensure that the intended safety level is maintained. The Authority shall notify major events or trends of particular concern to the appropriate type certificate holder and the State of Design.

(f) Operator Planning
Operator route planning shall take account of all relevant information in the assessment of intended routes or areas of operations, including the following:
(1) the nature of the terrain to be overflown, including the potential for carrying out a safe forced landing in the event of an engine failure or major malfunction;
(2) weather information, including seasonal and other adverse meteorological influences that may affect the flight; and
(3) other criteria and limitations as specified by the Authority.

(g) Flight Crew Experience, Training and Checking
(1) The Authority shall prescribe the minimum flight crew experience for helicopters operating in performance Class 3 in IMC.
(2) The operator's flight crew training and checking programme shall be appropriate to operations

in performance Class 3 in IMC, covering normal, abnormal and emergency procedures and, in particular, detection of engine failure including descent to a forced landing in IMC and, for single engine helicopters, entry into a stabilised autorotation.

(h) Operator Certification or Validation
The operator shall demonstrate the ability to conduct operations in performance Class 3 in IMC through a certification and approval process specified by the Authority.

AC OPS 3.541 Operations of Helicopters in Performance Class 3 in IMC
(See OPS 3.541)
(See AMC OPS 3.541)

(a) Purpose and Scope
The purpose of this attachment is to give additional guidance on the airworthiness and operational requirements of AMC OPS 3.541, which have been designed to meet the overall level of safety intended for approved operations in performance Class 3 in IMC.

(b) Engine Reliability

(1) The power loss rate required to meet OPS 3.541 and AMC OPS 3.541, paragraph 1 should be established based on data from commercial air transport operations supplemented by suitable data from other operations in similar theatres of operations. Service experience is needed on which to base the judgement, and this should include a number of hours, acceptable to the State of Design, on the actual helicopter/engine combination unless additional testing has been carried out or experience on sufficiently similar variants of the engine is available.

(2) In assessing engine reliability, evidence should be derived from a world fleet database covering as large a sample as possible of operations considered to be representative, compiled by the appropriate type certificate holders and reviewed by the States of Design. Since flight hour reporting is not mandatory for many types of operators, appropriate statistical estimates may be used to develop the engine reliability data. Data for individual operators approved for these operations including trend monitoring and event reports should also be monitored and reviewed by the Authority to ensure that there is no indication that the operator's experience is unsatisfactory.

(i) Engine trend monitoring should include the following:
- an oil consumption monitoring programme based on the manufacturer's recommendations; and
- an engine condition monitoring programme describing the parameters to be monitored, the method of data collection and the corrective action process; this should be based on the manufacturer's recommendations. The monitoring is intended to detect engine deterioration at an early stage to allow for corrective action before safe operation is affected.

(ii) A reliability programme should be established covering the engine and associated systems. The engine programme should include engine hours flown in the period and the power loss rate for all causes established on an appropriate statistical basis. The event reporting process should cover all items relevant to the ability to operate safely in IMC. The data should be available for use by the type certificate holder and the State of Design so as to establish that the intended reliability levels are being achieved. Any sustained adverse trend should result in an immediate evaluation by the operator in consultation with the State(s) of Design and type certificate holders with a view to determining actions to restore the intended safety level.

Note: The actual period selected should reflect the global utilisation and the relevance of the *experience included (e.g. early data may not be relevant due to subsequent mandatory modifications which affected the power loss rate). After the introduction of a new engine variant and while global utilization is relatively low, the total available experience may have to be used to try to achieve a statistically meaningful average.*

(3) Power loss rate should be determined as a moving average over an appropriate period. Power loss rate, rather than in-flight shutdown rate, has been used as it is considered to be more appropriate for a helicopter operating in performance Class 3. If a failure occurs on a helicopter operating in performance Class 1 or 2 that causes a major, but not total, loss of power on one engine, it is likely that the engine will be shut down since positive engine-out performance is still available, whereas on a helicopter operating in performance Class 3 it may well be decided to make use of the residual power to stretch the glide distance.

(c) Operations Manual

The operations manual should include all necessary information relevant to operations by helicopters operating in performance Class 3 in IMC. This should include all of the additional equipment, procedures and training required for such operations, route and/or area of operation and likely landing area (including planning and operating minima).

(d) Operator Certification or Validation

The operator certification or validation process specified by the State of the Operator should ensure the adequacy of the operator’s procedures for normal, abnormal and emergency operations, including actions following engine, systems or equipment failures. In addition to the normal requirements for operator certification or validation, the following items should be addressed in relation to operations by helicopters operating in performance Class 3 in IMC:

(1) confirmation of the achieved engine reliability of the helicopter engine combination (see AMC OPS-3.541, paragraph 1);

(2) specific and appropriate training and checking procedures as described in AMC OPS-3.541, paragraph 7;

(3) a maintenance programme which is extended to address the equipment and systems referred to in AMC OPS-3.541, paragraph 2;

(4) an MEL modified to address the equipment and systems necessary for operations in IMC;

(5) planning and operating minima appropriate to operations in IMC;

(6) departure and arrival procedures and any route/area limitations;

(7) pilot qualifications and experience; and

(8) the operations manual, including limitations, emergency procedures, routes or areas of operation, the MEL and normal procedures related to the equipment referred to in AMC OPS 3.541, paragraph 2.

(e) Operational Approval and Maintenance Programme Requirements

(1) Approval to undertake operations by helicopters in performance Class 3 in IMC specified in an air operator certificate or equivalent document should include the particular airframe/engine combinations, including the current type design standard for such operations, the specific helicopters approved, and the areas or routes of such operations.

(2) The operator’s maintenance management exposition should include a statement of certification of the additional equipment required, and of the maintenance and reliability programme for such equipment, including the engine.

SECTION 1 - SUBPART J – MASS AND BALANCE

CAR OPS-3.605 General

(See Appendix 1 to CAR OPS-3.605)(AMC to Appendix 1 to CAR OPS-3.605(a)(4)(iii)) (See IEM to Appendix 1 CAR OPS-3.605) (See IEM OPS-3.605(e))
(See AC OPS-3.605)
(See IEM OPS-3.620(g)) (See Appendix 1 to CAR OPS-3.625)

(a) An operator shall ensure that during any phase of operation, the loading, mass and centre of gravity of the Helicopter complies with the limitations specified in the approved Helicopter Flight Manual, or the Operations Manual if more restrictive.

(b) An operator must establish the mass and the centre of gravity of any Helicopter by actual weighing prior to initial entry into service and thereafter at intervals of four (4) years if individual Helicopter masses are used and nine (9) years if fleet masses are used. The accumulated effects of modifications and repairs on the mass and balance must be accounted for and properly documented. Furthermore, Helicopters must be reweighed if the effect of modifications on the mass and balance is not accurately known.

(c) An operator must determine the mass of all operating items and crew members included in the Helicopter dry operating mass by weighing or by using standard masses. The influence of their position on the Helicopter centre of gravity must be determined.

(d) An operator must establish the mass of the traffic load, including any ballast, by actual weighing or determine the mass of the traffic load in accordance with standard passenger and baggage masses as specified in CAR OPS-3.620.

(e) An operator must determine the mass of the fuel load by using the actual density or, if not known, the density calculated in accordance with a method specified in the Operations Manual. (See IEM OPS-3.605(e)).

CAR OPS-3.607 Terminology

(a) ***Dry Operating Mass.*** The total mass of the Helicopter ready for a specific type of operation excluding all usable fuel and traffic load. This mass includes items such as:
    (1) Crew and crew baggage;
    (2) Catering and removable passenger service equipment; and
    (3) Potable water and lavatory chemicals.

(b) ***Maximum Zero Fuel Mass.*** The maximum permissible mass of a Helicopter with no usable fuel. The mass of the fuel contained in particular tanks must be included in the zero fuel mass when it is explicitly mentioned in the Helicopter Flight Manual limitations.

(c) ***Maximum Structural Landing Mass.*** The maximum permissible total Helicopter mass upon landing under normal circumstances.

(d) ***Maximum Structural Take Off Mass.*** The maximum permissible total Helicopter mass at the start of the take-off run.

(e) ***Passenger classification.***
    (1) Adults, male and female, are defined as persons of an age of 12 years and above.
    (2) Children are defined as persons of an age of two years and above but who are less than 12 years of age.
    (3) Infants are defined as persons who are less than 2 years of age.

(f) ***Traffic Load.*** The total mass of passengers, baggage and cargo, including any non-revenue load.

CAR OPS-3.610 Loading, mass and balance

An operator shall specify, in the Operations Manual, the principles and methods involved in the loading and in the mass and balance system that meet the requirements of CAR OPS-3.605. This system must cover all types of intended operations.

CAR OPS-3.615 Mass values for crew

(a) An operator shall use the following mass values to determine the dry operating mass:
   (1) Actual masses including any crew baggage; or
   (2) Standard masses, including hand baggage, of 85 kg for flight crewmembers and 75 kg for cabin crewmembers; or
   (3) Other standard masses acceptable to the Authority.

(b) An operator must correct the dry operating mass to account for any additional baggage. The position of this additional baggage must be accounted for when establishing the centre of gravity of the Helicopter.

CAR OPS-3.620 Mass values for passengers and baggage

(See AMC OPS-3.620(a), IEM OPS-3.620(d)(2) & IEM OPS-3.620(g))
(See IEM OPS-3.620(h) & (i)); (See Appendix 1 to CAR OPS-3.620(g))
(See AMC to Appendix 1 CAR OPS-3.620(g)) (See IEM to Appendix 1 CAR OPS-3.620(g))

(a) An operator shall compute the mass of passengers and checked baggage using either the actual weighed mass of each person and the actual weighed mass of baggage or the standard mass values specified in Tables 1 to 2 below except where the number of passenger seats available is less than 6. In such cases passenger mass may be established by use of a verbal statement by or on behalf of each passenger and adding to it a pre-determined constant to account for hand baggage and clothing (See AMC OPS-3.620(a)). The procedure specifying when to select actual or standard masses and the procedure to be followed when using verbal statements must be included in the Operations Manual.

(b) If determining the actual mass by weighing, an operator must ensure that passengers' personal belongings and hand baggage are included. Such weighing must be conducted immediately prior to boarding and at an adjacent location.

(c) If determining the mass of passengers using standard mass values, the standard mass values in Tables 1 and 3 below which include hand baggage and the mass of any infant below 2 years of age carried by an adult on one passenger seat, must be used. Infants occupying separate passenger seats must be considered as children for the purpose of this sub-paragraph.

(d) Where the total number of passenger seats available on a helicopter is 20 or more, the standard masses of male and female in Table 1 are applicable. As an alternative, in cases where the total number of passenger seats available is 30 or more, the 'All Adult' mass values in Table 1 are applicable.

Table 1.

Passenger seats:	20 and more		30 and more
	Male	**Female**	**All adult**
All flights	82 kg	64 kg	78 kg
Children	35 kg	35 kg	35 kg
Hand baggage (where applicable)	6 kg		
Survival suit (where applicable)	3 kg		

(e) Where the total number of passenger seats available on a helicopter less than twenty 20 (10 – 19; 6 – 9; and 1 – 5) inclusive the standard masses in Table 2 are applicable.

Table 2.

Passenger seats	1 – 5	6 – 9	10 – 19
Male	104 kg	96 kg	92 kg
Female	86 kg	78 kg	74 kg
Children	35 kg	35 kg	35 kg
Hand baggage (where applicable)	6 kg		
Survival suit (where applicable)	3 kg		

(f) Where the total number of passenger seats available on the helicopter is 20 or more the standard mass value for each piece of checked baggage is 13 kg. For helicopters with 19 passenger seats or less the actual mass of checked baggage, determined by weighing, must be used.

(g) If an operator wishes to use standard mass values other than those contained in Tables 1 to 2 above, he must advise the Authority of his reasons and gain its approval in advance. He must also submit for approval a detailed weighing survey plan and apply the statistical analysis method given in Appendix 1 to CAR OPS-3.620(g). After verification and approval by the Authority of the results of the weighing survey, the revised standard mass values are only applicable to that operator. The revised standard mass values can only be used in circumstances consistent with those under which the survey was conducted. Where revised standard masses exceed those in Tables 1–2, then such higher values must be used. (See IEM OPS-3.620(g)).

(h) On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, the operator must determine the actual mass of such passengers by weighing or by adding an adequate mass increment. (See AMC OPS 3.620(h) & (i).)

(i) If standard mass values for checked baggage are used and a significant number of passengers check in baggage that is expected to exceed the standard baggage mass, the operator must determine the actual mass of such baggage by weighing or by adding an adequate mass increment. (See AMC OPS 3.620(h) & (i).)

(j) The operator shall ensure that a commander is advised when a non-standard method has been used for determining the mass of the load and that this method is stated in the mass and balance documentation.

CAR OPS-3.625 Mass and balance documentation

(See Appendix 1 to CAR OPS-3.625, AMC to Appendix 1 to CAR OPS-3.625(a) & GM Appendix 1 to CAR OPS-3.625(a))

(a) An operator shall establish mass and balance documentation prior to each flight specifying the load and its distribution. The mass and balance documentation must enable the commander to determine that the load and its distribution is such that the mass and balance limits of the Helicopter are not exceeded. The person preparing the mass and balance documentation must be named on the document. The person supervising the loading of the Helicopter must confirm by signature that the load and its distribution are in accordance with the mass and balance documentation. This document must be acceptable to the commander; his acceptance being indicated by countersignature or equivalent. (See also CAR OPS-3.1055(a)(12)).

(b) An operator must specify procedures for Last Minute Changes to the load.

(c) Subject to the approval of the Authority, an operator may use an alternative to the procedures required by paragraphs (a) and (b) above.

Appendix 1 to CAR OPS- 3.605 Mass and Balance - General

(See CAR OPS 3.605)

(a) *Determination of the dry operating mass of a helicopter*

(1) *Weighing of a helicopter*

(i) New helicopters are normally weighed at the factory and are eligible to be placed into operation without reweighing if the mass and balance records have been adjusted for alterations or modifications to the helicopter. Helicopters transferred from one Sultanate of Oman operator with an approved mass control programme to another Sultanate of Oman operator with an approved programme need not be weighed prior to use by the receiving operator unless more than 4 years have elapsed since the last weighing.

(ii) The individual mass and centre of gravity (CG) position of each helicopter shall be re-established periodically. The maximum interval between two weighings must be defined by the operator and must meet the requirements of OPS 3.605(b). In addition, the mass and the CG of each helicopter shall be reestablished either by:

(A) Weighing; or

(B) Calculation, if the operator is able to provide the necessary justification to prove the validity of the method of calculation chosen, whenever the cumulative changes to the dry operating mass exceed ± 0·5% of the maximum landing mass.

(2) *Weighing procedure*

(i) The weighing must be accomplished either by the manufacturer or by an approved maintenance organisation.

(ii) Normal precautions must be taken consistent with good practices such as:

(A) Checking for completeness of the helicopter and equipment;

(B) Determining that fluids are properly accounted for;

(C) Ensuring that the helicopter is clean; and

(D) Ensuring that weighing is accomplished in an enclosed building.

(iii) Any equipment used for weighing must be properly calibrated, zeroed, and used in accordance with the manufacturer's instructions. Each scale must be calibrated either by the manufacturer, by a civil department of weights and measures or by an appropriately authorised organisation within 2 years or within a time period defined by the manufacturer of the weighing equipment, whichever is less. The equipment must enable the mass of the helicopter to be established accurately (See AMC Appendix 1 to OPS 3.605, sub-paragraph (a)(2)(iii)).

(b) *Special standard masses for the traffic load*. In addition to standard masses for passengers and checked baggage, the operator can submit for approval to the Authority standard masses for other load items.

(c) *Helicopter loading*

(1) The operator must ensure that the loading of its helicopters is performed under the supervision of qualified personnel.

(2) The operator must ensure that the loading of the freight is consistent with the data used for the calculation of the helicopter mass and balance.

(3) The operator must comply with additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment, and/or the maximum seating limits.

(4) The operator must take account of in-flight changes in loading (e.g. CAT hoist operations).

(d) *Centre of gravity limits*

(1) *Operational CG envelope*. Unless seat allocation is applied and the effects of the number of passengers per seat row, of cargo in individual cargo compartments and of fuel in individual tanks

is accounted for accurately in the balance calculation, operational margins must be applied to the certificated centre of gravity envelope. In determining the CG margins, possible deviations from the assumed load distribution must be considered. If free seating is applied, the operator must introduce procedures to ensure corrective action by flight or cabin crew if extreme longitudinal seat selection occurs. The CG margins and associated operational procedures, including assumptions with regard to passenger seating, must be acceptable to the Authority. (See AMC Appendix 1 to OPS 3.605, sub-paragraph (d).)

(2) *In-flight centre of gravity*. Further to sub-paragraph (d)(1) above, the operator must show that the procedures fully account for the extreme variation in CG travel during flight caused by passenger/crew movement and fuel consumption/transfer.

Appendix 1 to CAR-OPS 3.620(h) Procedure for Establishing Revised Standard Mass Values for Passengers and Baggage

(a) *Passengers*

(1) *Weight sampling method*. The average mass of passengers and their hand baggage must be determined by weighing, taking random samples. The selection of random samples must by nature and extent be representative of the passenger volume, considering the type of operation, the frequency of flights on various routes, in/outbound flights, applicable season and seat capacity of the helicopter.

(2) *Sample size*. The survey plan must cover the weighing of at least the greatest of:

(i) A number of passengers calculated from a pilot sample, using normal statistical procedures and based on a relative confidence range (accuracy) of 1% for all adult and 2% for separate male and female average masses; and

(ii) For helicopters:

(A) With a passenger seating capacity of 40 or more, a total of 2000 passengers; or

(B) With a passenger seating capacity of less than 40, a total number of 50 x (the passenger seating capacity).

(3) *Passenger masses.* Passenger masses must include the mass of the passengers' belongings which are carried when entering the helicopter. When taking random samples of passenger masses, infants shall be weighed together with the accompanying adult (See also OPS 3.607(d) and OPS 3.620(c), (d) and (e)).

(4) *Weighing location*. The location for the weighing of passengers shall be selected as close as possible to the helicopter, at a point where a change in the passenger mass by disposing of or by acquiring more personal belongings is unlikely to occur before the passengers board the helicopter.

(5) *Weighing machine*. The weighing machine to be used for passenger weighing shall have a capacity of at least 150 kg. The mass shall be displayed at minimum graduations of 500 g. The weighing machine must be accurate to within 0·5% or 200 g whichever is the greater.

(6) *Recording of mass values*. For each flight the mass of the passengers, the corresponding passenger category (i.e. male/female/children) and the flight number must be recorded.

(b) *Checked baggage*. The statistical procedure for determining revised standard baggage mass values based on average baggage masses of the minimum required sample size is basically the same as for passengers and as specified in sub-paragraph (a)(1) (see also AMC OPS 3.620(h)). For baggage, the relative confidence range (accuracy) amounts to 1%. A minimum of 2000 pieces of checked baggage must be weighed.

(c) *Determination of revised standard mass values for passengers and checked baggage*

(1) To ensure that, in preference to the use of actual masses determined by weighing, the use of

revised standard mass values for passengers and checked baggage does not adversely affect operational safety, a statistical analysis (see AMC OPS 3.620(h)) must be carried out. Such an analysis will generate average mass values for passengers and baggage as well as other data.

(2) On helicopters with 20 or more passenger seats, these averages apply as revised standard male and female mass values.

(3) On smaller helicopters, the following increments must be added to the average passenger mass to obtain the revised standard mass values:

Number of passenger seats	Required mass increment
1 – 5 incl.	16 kg
6 – 9 incl.	8 kg
10 – 19 incl.	4 kg

Alternatively, all adult revised standard (average) mass values may be applied on helicopters with 30 or more passenger seats. Revised standard (average) checked baggage mass values are applicable to helicopters with 20 or more passenger seats.

(4) Operators have the option to submit a detailed survey plan to the Authority for approval and subsequently a deviation from the revised standard mass value provided this deviating value is determined by use of the procedure explained in this Appendix. Such deviations must be reviewed at intervals not exceeding 5 years. (See AMC to Appendix 1 to OPS 3.620(h), sub-paragraph (c)(4).)

(5) All adult revised standard mass values must be based on a male/female ratio of 80/20 in respect of all flights. If the operator wishes to obtain approval for use of a different ratio on specific routes or flights then data must be submitted to the Authority showing that the alternative male/female ratio is conservative and covers at least 84% of the actual male/female ratios on a sample of at least 100 representative flights.

(6) The average mass values found are rounded to the nearest whole number in kg. Checked baggage mass values are rounded to the nearest 0·5 kg figure, as appropriate.

Appendix to CAR OPS-3.625 Mass and Balance Documentation

(See OPS 3.625)

(See AMC Appendix 1 to OPS 3.625)

(a) *Mass and balance documentation* (1) *Contents*

(1) The mass and balance documentation must contain the following information:

(A) The helicopter registration and type;

(B) The flight identification number and date;

(C) The identity of the Commander;

(D) The identity of the person who prepared the document;

(E) The dry operating mass and the corresponding CG of the helicopter;

(F) The mass of the fuel at take-off and the mass of trip fuel;

(G) The mass of consumables other than fuel;

(H) The components of the load including passengers, baggage, freight and ballast;

(I) The Take-off Mass, Landing Mass;

(J) The load distribution;

(K) The applicable helicopter CG positions; and

(L) The limiting mass and CG values.

(2) Subject to the approval of the Authority, the operator may omit some of this Data from the mass and balance documentation.

(b) *Last Minute Change*. If any last minute change occurs after the completion of the mass and balance documentation, this must be brought to the attention of the commander and the last minute change must be entered on the mass and balance documentation. The maximum allowed change in the number of passengers or hold load acceptable as a last minute change must be specified in the Operations Manual. If this number is exceeded, new mass and balance documentation must be prepared.

(c) *Computerised systems*. Where mass and balance documentation is generated by a computerised mass and balance system, the operator must verify the integrity of the output data. He must establish a system to check that amendments of his input data are incorporated properly in the system and that the system is operating correctly on a continuous basis by verifying the output data at intervals not exceeding 6 months.

(d) *On-board mass and balance systems*. The operator must obtain the approval of the Authority if he wishes to use an on-board mass and balance computer system as a primary source for dispatch.

(e) *Datalink*. When mass and balance documentation is sent to helicopters via datalink, a copy of the final mass and balance documentation as accepted by the commander must be available on the ground.

AC OPS 3.605 Mass Values

(See OPS 3.605)

In accordance with ICAO Annex 5 and the International System of Units (SI), the actual and limiting masses of helicopters, the payload and its constituent elements, the fuel load etc., are expressed in CAR OPS-3 in units of mass (kg). However, in most approved Flight Manuals and other operational documentation, these quantities are published as weights in accordance with the common language. In the SI system, a weight is a force rather than a mass. Since the use of the term 'weight' does not cause any problem in the day-to-day handling of helicopters, its continued use in operational applications and publications is acceptable.

AMC OPS 3.605(e) Fuel Density

(See OPS 3.605(e))

(a) If the actual fuel density is not known, the operator may use the standard fuel density values specified in the Operations Manual for determining the mass of the fuel load. Such standard values should be based on current fuel density measurements for the airports or areas concerned. Typical fuel density values are:

(1)	Gasoline (piston engine fuel)	-	0·71
(2)	Jet fuel JP 1	-	0·79
(3)	Jet fuel JP 4	-	0·76
(4)	Oil	-	0·88

AMC to Appendix 1 to CAR OPS-3.605(a)(2)(iii) Accuracy of weighing equipment

(See Appendix 1 to CAR OPS-3.605, paragraph (a)(2)(iii))

(a) The mass of the Helicopter as used in establishing the dry operating mass and the centre of gravity must be established accurately. Since a certain model of weighing equipment is used for initial and periodic weighing of Helicopters of widely different mass classes, one single accuracy criterion for weighing equipment cannot be given. However, the weighing accuracy is considered satisfactory if the following accuracy criteria are met by the individual scales/cells of the weighing equipment used:

(1)	For a scale/cell load below 2,000 kg	–	an accuracy of ± 1%;
(2)	For a scale/cell load from 2,000 kg to 20,000 kg	–	an accuracy of ± 20 kg; and
(3)	(c) For a scale/cell load above 20,000 kg	–	an accuracy of ± 0·1%.

AMC to Appendix 1 to CAR OPS-3.605 Centre of gravity limits

(See Appendix 1 to CAR OPS-3.605, sub-paragraph (d))

(a) In the Certificate Limitations section of the Helicopter Flight Manual, forward and aft centre of gravity (CG) limits are specified. These limits ensure that the certification stability and control criteria are met throughout the whole flight. An operator should ensure that these limits are observed by defining operational procedures or a CG envelope which compensates for deviations and errors as listed below:

(1) Deviations of actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations.

(2) Deviations in fuel distribution in tanks from the applicable schedule.

(3) Deviations in the distribution of baggage and cargo in the various compartments as compared with the assumed load distribution as well as inaccuracies in the actual mass of baggage and cargo.

(4) Deviations in actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation. (See Note)

(5) Deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position.

(6) Deviations of the CG caused by gear and flap positions and by application of the prescribed fuel usage procedure (unless already covered by the certified limits).

(7) Deviations caused by in-flight movement of cabin crew, galley equipment and passengers.

Note: Large CG errors may occur when 'free seating' (freedom of passengers to select any seat when entering the Helicopter) is permitted. Although in most cases reasonably even longitudinal passenger seating can be expected, there is a risk of an extreme forward or aft seat selection causing very large and unacceptable CG errors (assuming that the balance calculation is done on the basis of an assumed even distribution). The largest errors may occur at a load factor of approximately 50% if all passengers are seated in either the forward or aft half of the cabin. Statistical analysis indicates that the risk of such extreme seating adversely affecting the CG is greatest on small Helicopters.

AMC OPS-3.620(a) Passenger mass established by use of a verbal statement

(See CAR OPS-3.620(a))

(a) When asking each passenger on Helicopters with less than six (6) passenger seats for his/her mass (weight), specific constants should be added to account for clothing. These constants should be determined by the operator on the basis of studies relevant to his particular routes, etc. and should not be less than 4 kg.

(b) Personnel boarding passengers on this basis should assess the passenger's stated mass and the mass of passengers' clothing to check that they are reasonable. Such personnel should have received instruction on assessing these mass values. Where necessary, the stated mass and the specific constants should be increased so as to avoid gross inaccuracies.

AMC OPS-3.620(g) Statistical evaluation of passenger and baggage mass data

See CAR OPS-3.620(g)

(a) Sample size (see also Appendix 1 to CAR OPS-3.620(g)).

(1) For calculating the required sample size, it is necessary to make an estimate of the standard deviation on the basis of standard deviations calculated for similar populations or for preliminary surveys. The precision of a sample estimate is calculated for 95% reliability or 'significance', i.e. there is a 95% probability that the true value falls within the specified confidence interval around the estimated value. This standard deviation value is also used for calculating the standard passenger mass.

(2) As a consequence, for the parameters of mass distribution, i.e. mean and standard deviation, three cases have to be distinguished:

i. μ, σ = the true values of the average passenger mass and standard deviation, which are unknown and which are to be estimated by weighing passenger samples.

ii. μ', σ = the 'a prior' estimates of the average passenger mass and the standard deviation, i.e. values resulting from an earlier survey, which are needed to determine the current sample size.

iii. x, s = the estimates for the current true values of m and s, calculated from the sample.

The sample size can then be calculated using the following formula:

$$n = \frac{(1.96 * \sigma' * 100)^2}{(e' * \mu')^2}$$

where:

n = number of passengers to be weighed (sample size)

e'r = allowed relative confidence range (accuracy) for the estimate of µ by x (see also equation in paragraph 3).

Note: The allowed relative confidence range specifies the accuracy to be achieved when estimating the true mean. For example, if it is proposed to estimate the true mean to within ± 1%, then e'r will be 1 in the above formula.

1·96 = value from the Gaussian distribution for 95% significance level of the resulting confidence interval.

(b) Calculation of average mass and standard deviation. If the sample of passengers weighed is drawn at random, then the arithmetic mean of the sample (x) is an unbiased estimate of the true average mass (µ) of the population.

(1) Arithmetic means of sample, where:

xj = mass values of individual passengers

$$X = \frac{\sum_{j=1}^{n} x_j}{n}$$

(2) Standard deviation

$$S = \sqrt{\frac{\sum_{j=1} (x_j - x)^2}{n-1}}$$

(c) Checking the accuracy of the sample mean. The accuracy (confidence range) which can be ascribed to the sample mean as an indicator of the true mean is a function of the standard deviation of the sample which has to be checked after the sample has been evaluated. This is done using the formula:

$$e_r = \frac{1{\cdot}96 * s * 100}{\sqrt{n} * \bar{x}} (\%)$$

whereby er should not exceed 1% for an al adult average mass and not exceed 2% for an average male and/or female mass. The result of this calculation gives the relative accuracy of the estimate of μ at the 95% significance level. This means that with 95% probability, the true average mass μ lies within the interval:

(d) Example of the determination of the required sample size and average passenger mass

(1) Introduction. Standard passenger mass values for mass and balance purposes require

$$\bar{x} \pm \frac{1{\cdot}96 * s}{\sqrt{n}}$$

passenger weighing programs be carried out. The following example shows the various steps required for establishing the sample size and evaluating the sample data. It is provided primarily for those who are not well versed in statistical computations. All mass figures used throughout the example are entirely fictitious.

(2) Determination of required sample size. For calculating the required sample size, estimates of the standard (average) passenger mass and the standard deviation are needed. The prior estimates from an earlier survey may be used for this purpose. If such estimates are not available, a small representative sample of about 100 passengers has to be weighed so that the required values can be calculated. The latter has been assumed for the example.

Step 1: estimated average passenger mass; and Step2: estimated standard deviation.

n	x_j (kg)
1	79·9
2	68·1
3	77·9
4	74·5
5	54·1
6	$\bar{x}$ 62·2
7	89·3
8	108·7
.	.
85	63·2
86	75·4
$\sum_{j=1}^{86}$	6 071·6

n	x_j	$(x_j - x)$	$(x_j - x)^2$
1	79·9	+9·3	86·49
2	68·1	–2·5	6·25
3	77·9	+7·3	53·29
4	74·5	+3·9	15·21
5	54·1	–16·5	272·25
6	62·2	–8·4	70·56
7	89·3	+18·7	349·69
8	108·7	+38·1	1 451·61
.	.	.	.
85	63·2	–7·4	54·76
86	75·4	–4·8	23·04
$\sum_{j=1}^{86}$	6 071·6		34 683·40

$$\mu' = \bar{x} = \frac{\sum x_j}{n} = \frac{6071{\cdot}6}{86}$$

$$= 70{\cdot}6 \text{ kg}$$

$$\sigma' = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}$$

$$\sigma' = \sqrt{\frac{34\,683{\cdot}40}{86-1}}$$

$$\sigma' = 20{\cdot}20 \text{ kg}$$

Step 3: required sample size.

The required number of passengers to be weighed should be such that the confidence range, e'r, does not exceed 1% as specified in paragraph (3).

$$n \geq \frac{(1{\cdot}96 * \sigma' * 100)^2}{(e'_r * \mu')^2}$$

$$n \geq \frac{(1{\cdot}96 * 20{\cdot}20 * 100)^2}{(1 * 70{\cdot}6)^2}$$

$$n \geq 3145$$

The result shows that at least 3,145 passengers have to be weighed to achieve the required accuracy. If e’r is chosen as 2% the result would be n ≥ 786.

Step 4: Determination of the passenger average mass

After having established the required sample size a plan for weighing the passengers is to be worked out, as specified in Appendix 1 to CAR OPS-3.620(g).

(3) Determination of the passenger average mass.

Step 1: Having collected the required number of passenger mass values, the average passenger mass can be calculated. For the purpose of this example, it has been assumed that 3,180 passengers were weighed. The sum of the individual masses amounts to 231 186·2 kg.

$$n = 3180$$

$$\sum_{i=1}^{3180} x_i = 231186 \cdot 2 \text{ kg}$$

$$\bar{x} = \frac{\sum x_i}{n} = \frac{231186 \cdot 2}{3180} \text{ kg}$$

s

$$\bar{x} = 72 \cdot 7 \text{ kg}$$

Step 2: calculation of the standard deviation.

$$\sum (x_i - \bar{x})^2 = 745\,145 \cdot 20$$

$$s = \sqrt{\frac{\sum (x_i - \bar{x})^2}{n-1}}$$

$$s = \sqrt{\frac{745\,145 \cdot 20}{3180 - 1}}$$

$$s = 15 \cdot 31 \text{ kg}$$

For calculating the standard deviation, the method shown in paragraph (4)(e) step 2 should be applied.

Step 3: calculation of the accuracy of the sample mean.

$$e_r = \frac{1 \cdot 96 * s * 100}{\sqrt{n} * \bar{x}} \%$$

$$e_r = \frac{1 \cdot 96 * 15 \cdot 31 * 100}{\sqrt{3180} * 72 \cdot 7} \%$$

$$e_r = 0 \cdot 73\%$$

Step 4: calculation of the confidence range of the sample mean.

$$\bar{x} \pm \frac{1 \cdot 96 * s}{\sqrt{n}}$$

$$\bar{x} \pm \frac{1 \cdot 96 * 15 \cdot 31}{\sqrt{3180}} \text{ kg}$$

$$72 \cdot 7 \pm 0 \cdot 5 \text{ kg}$$

The result of this calculation shows that there is a 95% probability of the actual mean for all passengers laying within the range 72.2kg to 73.2kg.

AMC to Appendix 1 to OPS 3.620(h), sub-paragraph (c)(4) Guidance on Passenger Weighing Surveys

(See Appendix 1 to OPS 3.620(h), sub-paragraph (c)(4))

(a) Operators seeking approval to use standard passenger masses differing from those prescribed in OPS 3.620, Tables 1 and 2, on similar routes or networks may pool their weighing surveys provided that: a. The Authority has given prior approval for a joint survey;

(1) The survey procedures and the subsequent statistical analysis meet the criteria of Appendix 1 to OPS 3.620(h); and

(2) In addition to the joint weighing survey results, results from individual operators participating in the joint survey should be separately indicated in order to validate the joint survey results.

AMC Appendix 1 to OPS 3.620(h) Guidance on Passenger Weighing Surveys

(See Appendix 1 to OPS 3.620(h))

(a) This AMC summarises several elements of passenger weighing surveys and provides explanatory information.

(b) Information to the Authority. The operator should advise the Authority about the intent of the passenger weighing survey, explain the survey plan in general terms and obtain prior approval to proceed (OPS 3.620(h) refers).

(c) Detailed survey plan

(1) The operator should establish and submit for approval to the Authority a detailed weighing survey plan that is fully representative of the operation, i.e. the network or route under consideration and the survey should involve the weighing of an adequate number of passengers (OPS 3.620(h)).

(2) A representative survey plan means a weighing plan specified in terms of weighing locations, dates and flight numbers giving a reasonable reflection of the operator's timetable and/or area of operation (See Appendix 1 to OPS 3.620(h), sub-paragraph (a)(1)).

(3) The minimum number of passengers to be weighed is the highest of the following (See Appendix 1 to OPS 3.620(h) sub-paragraph (a)):

(i) The number that follows from the general requirement that the sample should be representative of the total operation to which the results will be applied; this will often prove to be the overriding requirement; or

(ii) The number that follows from the statistical requirement specifying the accuracy of the resulting mean values which should be at least 2% for male and female standard masses and 1% for all adult standard masses, where applicable. The required sample size can be estimated on the basis of a pilot sample (at least 100 passengers) or from a previous survey. If analysis of the results of the survey indicates that the requirements on the accuracy of the mean values for male or female standard masses or all adult standard masses, as applicable, are not met, an additional number of representative passengers should be weighed in order to satisfy the statistical requirements.

(4) To avoid unrealistically small samples a minimum sample size of 2000 passengers (males + females) is also required, except for small helicopters where in view of the burden of the large number of flights to be weighed to cover 2000 passengers, a lesser number is considered acceptable.

(d) Execution of weighing programme

(1) At the beginning of the weighing programme it is important to note, and to account for, the data requirements of the weighing survey report (See paragraph 7 below).

(2) As far as is practicable, the weighing programme should be conducted in accordance with the specified survey plan.

(3) Passengers and all their personal belongings should be weighed as close as possible to the boarding point and the mass, as well as the associated passenger category (male/female/child), should be recorded.

(e) Analysis of results of weighing survey

(1) The data of the weighing survey should be analysed as explained in AMC OPS 3.620(h). To obtain an insight to variations per flight, per route etc. this analysis should be carried out in several stages, i.e. by flight, by route, by area, inbound/outbound, etc. Significant deviations from the weighing survey plan should be explained as well as their possible effect(s) on the results.

(f) Results of the weighing survey

(1) The results of the weighing survey should be summarised. Conclusions and any proposed deviations from published standard mass values should be justified. The results of a passenger weighing survey are average masses for passengers, including hand baggage, which may lead to proposals to adjust the standard mass values given in OPS 3.620 Tables 1, 2 and 3. As stated in Appendix 1 to OPS 3.620(h), sub-paragraph (c), these averages, rounded to the nearest whole number may, in principle, be applied as standard mass values for males and females on helicopters with 20 and more passenger seats. Because of variations in actual passenger masses, the total passenger load also varies and statistical analysis indicates that the risk of a significant overload becomes unacceptable for helicopters with less than 20 seats. This is the reason for passenger mass increments on small helicopters.

(2) The average masses of males and females differ by some 15 kg or more and because of uncertainties in the male/female ratio the variation of the total passenger load is greater if all adult standard masses are used than when using separate male and female standard masses. Statistical analysis indicates that the use of all adult standard mass values should be limited to helicopters with 30 passenger seats or more.

(3) As indicated in Appendix 1 to OPS 3.620(h), standard mass values for all adults must be based on the averages for males and females found in the sample, taking into account a reference male/female ratio of 80/20 for all flights. The operator may, based on the data from his weighing programme, or by proving a different male/female ratio, apply for approval of a different ratio on specific routes or flights.

(g) Weighing survey report

(1) The weighing survey report, reflecting the content of paragraphs 1–6 above, should be prepared in a standard format as follows:

WEIGHING SURVEY REPORT

(i) Introduction

Objective and brief description of the weighing survey

(ii) Weighing survey plan

Discussion of the selected flight number, heliports, dates, etc.

Determination of the minimum number of passengers to be weighed.

Survey plan.

(iii) Analysis and discussion of weighing survey results Significant deviations from survey plan (if any).

Variations in means and standard deviations in the network.

Discussion of the (summary of) results.

(iv) Summary of results and conclusions Main results and conclusions.

Proposed deviations from published standard mass values.

Attachment 1

Applicable summer and/or winter timetables or flight programmes.

Attachment 2

Weighing results per flight (showing individual passenger masses and sex); means and standard deviations per flight, per route, per area and for the total network.

AMC OPS-3.620(h) & (i) Adjustment of standard masses

(See CAR OPS-3.620(h) & (i))

(a) When standard mass values are used, CAR OPS 3.620 (h) and 3.620(i) require the operator to identify and adjust the passenger and checked baggage masses in cases where significant numbers of passengers or quantities of baggage are suspected of exceeding the standard values. This requirement implies that the Operations Manual should contain appropriate directives to ensure that:

(1) Check-in, operations and cabin staff and loading personnel report or take appropriate action when a flight is identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, and/or groups of passengers carrying exceptionally heavy baggage (e.g. military personnel or sports teams); and

(2) On small Helicopters, where the risks of overload and/or CG errors are the greatest, commanders pay special attention to the load and its distribution and make proper adjustments.

GM to Appendix 1 to CAR OPS-3.625 (a) Mass and balance documentation

(See Appendix 1 to CAR OPS-3.625)

The CG position need not be mentioned on the mass and balance documentation if, for example, the load distribution is in accordance with a pre-calculated balance table or if it can be shown that for the planned operations a correct balance can be ensured, whatever the real load is.

SECTION 1 – SUBPART K – INSTRUMENTS and EQUIPMENT

CAR OPS-3.630 General introduction

(See IEM OPS-3.630)

(a) A Helicopter shall be equipped with instruments which will enable the flight crew to control the flight path of the Helicopter, carry out any required procedural manoeuvres and observe the operating limitations of the Helicopter in the expected operating conditions.

(b) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in this Subpart shall be installed or carried, as appropriate, in helicopters according to the helicopter used and to the circumstances under which the flight is to be conducted. The prescribed instruments and equipment, including their installation, shall be approved or accepted by the Authority.

(c) An operator shall ensure that a flight does not commence unless the instruments and equipment required under this Subpart are:

(1) Approved, except as specified in sub-paragraph (c), and installed in accordance with the requirements applicable to them, including the minimum performance standard and the operational and airworthiness requirements; and

(2) In operable condition for the kind of operation being conducted except as provided in the MEL (CAR OPS-3.030 refers).

(3) Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the certificating authority of the State of Registry acceptable to the CAA for visual presentation, are displayed in the Helicopter.

(4) Safety and survival equipment, required by the operating rules, must be reliable, readily accessible, easily identifiable, and clearly marked to identify its method of operation.

(d) Instruments and equipment minimum performance standards are those prescribed in the applicable Technical Standard Orders (TSO) unless different performance standards are prescribed in the operational or airworthiness codes. Instruments and equipment complying with design and performance specifications other than TSO on the date of CAR OPS implementation may remain in service, or be installed, unless additional requirements are prescribed in this Subpart. Instruments and equipment that have already been approved do not need to comply with a revised TSO or a revised specification, other than TSO, unless a retroactive requirement is prescribed.

(e) The following items shall not be required to have an equipment approval:

(1) Fuses referred to in CAR OPS-3.635;

(2) Electric torches referred to in CAR OPS-3.640(a)(4);

(3) An accurate time piece referred to in CAR OPS-3.650(b) & 3.652(b);

(4) Chart holder referred to in CAR OPS-3.652(n).

(5) First-aid kits referred to in CAR OPS-3.745;

(6) Emergency medical kit referred to in CAR OPS-3.755;

(7) Megaphones referred to in CAR OPS-3.810;

(8) Survival and pyrotechnic signalling equipment referred to in CAR OPS-3.835(a) and (c); and

(9) Sea anchors and equipment for mooring, anchoring or manoeuvring seaplanes and amphibians on water referred to in CAR OPS-3.1410.

(10) Child restraint devices referred to in CAR OPS-3.730(a)(3).

(f) If equipment is to be used by one flight crew member at his station during flight, it must be readily operable from his station. When a single item of equipment is required to be operated by more than one flight crew member it must be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.

(g) Those instruments that are used by any one flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his station, with the minimum practicable deviation from the position and line of vision which he normally assumes when looking forward along the flight path. Whenever a single instrument is required in a Helicopter operated by more than one (1) flight crew member, it must be installed so that the instrument is visible from each applicable flight crew station.

(h) An operator shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless;
  (1) Approved, ensuring that the procedures including process applied and the products delivered have met acceptable standards of integrity; and
  (2) That the products are compatible with the intended function of the equipment that will use them.
  (3) Ensure continues monitoring for both process and products.

(i) An operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aircraft that require it.

(j) A helicopter shall be equipped with instruments that will enable the flight crew to control the flight path of the helicopter, carry out any required procedural manoeuvres and observe the operating limitations of the helicopter in the expected operating conditions.

CAR OPS-3.650 Day VFR operations – Flight and navigational instruments and associated equipment
(See AMC OPS 3.650/3.652) (See IEM OPS-3.650/3.652)

An operator shall not operate a Helicopter by day in accordance with Visual Flight Rules (VFR) unless it is equipped with the flight and navigational instruments and associated equipment and, where applicable, under the conditions stated in the following sub-paragraphs:

(a) A magnetic compass;
(b) An accurate timepiece showing the time in hours, minutes, and seconds;

Note: This instrument may be aircraft equipment or carried in the helicopter.

(c) A sensitive pressure altimeter calibrated in feet with a sub-scale setting, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight;
(d) An airspeed indicator calibrated in knots;
(e) A vertical speed indicator;
(f) A turn and slip indicator, or a turn co-ordinator incorporating a slip indicator;
(g) An attitude indicator;
(h) A stabilised direction indicator; and
(i) A means of indicating in the flight crew compartment the outside air temperature calibrated in degrees Celsius (See AMC OPS-3.650(i) & 3.652(i)).
(j) For flights which do not exceed 60 minutes' duration, which take off and land at the same heliport, and which remain within fifty (50) nm of that heliport, the instruments prescribed in sub- paragraphs (f), (g) and (h) above, and sub-paragraphs (k)(4), (k)(5) and (k)(6) below, may all be replaced by either a turn and slip indicator, or a turn coordinator incorporating a slip indicator, or both an attitude indicator and a slip indicator.
(k) Whenever two pilots are required the second pilot's station shall have separate instruments as follows:
  (1) A sensitive pressure altimeter calibrated in feet with a sub-scale setting calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight;
  (2) An airspeed indicator calibrated in knots;
  (3) A vertical speed indicator;
  (4) A turn and slip indicator, or a turn coordinator incorporating a slip indicator;
  (5) An attitude indicator; and
  (6) A stabilised direction indicator.
(l) In addition to the flight and navigational equipment required by sub-paragraphs (a) to (h) above, helicopters with a maximum certificated take-off mass (MCTOM) over 3 175 kg or any helicopter

operating over water when out of sight of land or when the visibility is less than 1 500m, must be equipped with the following flight instruments:
  (1) An attitude indicator; and
  (2) A gyroscopic direction indicator.

(m) Whenever duplicate instruments are required, the requirement embraces separate displays for each pilot and separate selectors or other associated equipment where appropriate;

(n) All helicopters must be equipped with means for indicating when power is not adequately supplied to the required flight instruments; and

(o) Each airspeed indicating system must be equipped with a heated pitot tube or equivalent means for preventing malfunction due to either condensation or icing for helicopters with a maximum certificated take-off mass (MCTOM) over 3 175 kg or having a maximum approved passenger seating configuration (MAPSC) of more than 9.

CAR OPS-3.652 IFR or night operations – Flight and navigational instruments and associated equipment

(See AMC OPS-3.650/3.652) (See IEM OPS-3.650/3.652)

An operator shall not operate a Helicopter in accordance with Instrument Flight Rules (IFR) or by night in accordance with Visual Flight Rules (VFR) (CAR-180.101) unless it is equipped with the flight and navigational instruments and associated equipment and, where applicable, under the conditions stated in the following sub-paragraphs:

(a) A magnetic compass;

(b) An accurate time-piece showing the time in hours, minutes and seconds;

(c) Two sensitive pressure altimeters calibrated in feet with sub-scale settings, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight. These altimeters must have counter drum-pointer or equivalent presentation. For single pilot night VFR operations one pressure altimeter may be substituted by a radio altimeter.

(d) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to either condensation or icing including a warning indication of pitot heater failure. The pitot heater failure warning indication requirement does not apply to those Helicopters with a maximum approved passenger seating configuration of nine (9) or less or a maximum certificated take-off mass of 3,175 kg or less and issued with an individual Certificate of Airworthiness prior to 1 April 1999 (See AMC OPS-3.652(d) & (k)(2));

(e) A vertical speed indicator;

(f) A turn and slip indicator;

(g) An attitude indicator;

(h) A stabilised direction indicator;

(i) A means of indicating in the flight crew compartment the outside air temperature calibrated in degrees Celsius (See AMC OPS-3.650 (i) & 3.652(i)); and

(j) A single standby attitude indicator (artificial horizon) capable of being used from either pilot's station that:
  (1) Provides reliable operation for a minimum of 30 minutes or the time required to fly to a suitable alternate landing site when operating over hostile terrain or offshore, whichever is the greater, after total failure of the normal electrical generating system, taking into account other loads on the emergency power supply and operational procedures;
  (2) Operates independently of any other attitude indicating system;
  (3) Is operative automatically after total failure of the normal electrical generating system; and
  (4) Is appropriately illuminated during all phases of operation;

(k) In complying with sub-paragraph (h) above, it must be clearly evident to the flight crew when the standby attitude indicator, required by that paragraph, is being operated by emergency power. Where the standby attitude indicator has its own dedicated power supply there shall be an associated indication clearly visible when this supply is in use.

(l) A gyroscopic direction indicator for VFR night and a magnetic gyroscopic direction indicator for IFR;

(m) A means of indicating in the flight crew compartment the outside air temperature calibrated in degrees Celsius (see AMC OPS 3.650(g) and 3.652(k)); and

(n) An alternate source of static pressure for the altimeter and airspeed and vertical speed indicators; and

(o) Whenever two pilots are required the second pilot's station shall have separate instruments as follows:

(1) A sensitive pressure altimeter calibrated in feet with a sub-scale setting, calibrated in hectopascals/millibars, adjustable for any barometric pressure setting likely to be encountered during flight which may be one of the two altimeters required by subparagraph (c) above;

(2) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to either condensation or icing including an annunciation of pitot heater failure. The pitot heater failure annunciation requirement does not apply to those helicopters with a maximum approved passenger seating configuration of 9 or less or a maximum certificated take-off mass (MCTOM) of 3 175 kg or less and issued with an individual Certificate of Airworthiness prior to 01 August 1999 (see AMC OPS 3.652(d) and (m)(2));

(3) A vertical speed indicator;

(4) A slip indicator;

(5) An attitude indicator; and

(6) A gyroscopic direction indicator for VFR night & a magnetic gyroscopic direction indicator for IFR.

(p) For IFR operations, a chart holder in an easily readable position which can be illuminated for night operations.

(q) Whenever duplicate instruments are required, the requirement embraces separate displays for each pilot and separate selectors or other associated equipment where appropriate; and

(r) All helicopters must be equipped with means for indicating when power is not adequately supplied to the required flight instruments.

(s) Where helicopters are equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of a helicopter shall be approved by the Authority.

(t) In approving the operational use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the Authority shall ensure that:

(1) the equipment meets the appropriate airworthiness certification requirements;

(2) the operator has carried out a safety risk assessment of the operations supported by the automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS;

(3) the operator has established and documented the procedures for the use of, and training requirements for, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.

CAR OPS-3.653 GNSS

(See AMC OPS 3.653)

An operator shall not operate a Helicopter under IFR unless it is equipped with GNSS equipment having the capabilities set out in AMC OPS 3.653 GNSS.

CAR OPS-3.655 Additional equipment for single pilot operation under IFR

An operator shall not conduct single pilot IFR operations unless the Helicopter is equipped with an autopilot with at least altitude hold and heading mode. except for helicopters with a maximum approved passenger seating configuration (MAPSC) of 6 or less first certificated for single pilot IMC operations on or before 01 January 1979.

CAR OPS-3.660 Altitude alerting system

(a) An operator shall not operate a turbine propeller powered Helicopter with a maximum certificated take-off mass in excess of 5700 kg or having a maximum approved passenger seating configuration of more than nine (9) seats or a turbojet powered Helicopter unless it is equipped with an altitude alerting system capable of:
   (1) Alerting the flight crew upon approaching a preselected altitude; and
   (2) Alerting the flight crew by at least an aural signal, when deviating from a preselected altitude, except for Helicopters with a maximum certificated take-off mass of 5700 kg or less having a maximum approved passenger seating configuration of more than nine (9) and first issued with an individual certificate of airworthiness before 1 April 1972.

CAR OPS-3.665 Ground proximity warning system (GPWS) and terrain awareness warning system (TAWS)

(a) An operator shall not operate a turbine powered Helicopter having a maximum certificated take-off mass in excess of 5700 kg or a maximum approved passenger seating configuration of more than nine (9) unless it is equipped with a ground proximity warning system that includes a predictive terrain hazard warning function (terrain awareness and warning system — TAWS).
(b) The ground proximity warning system (GPWS) must automatically provide, by means of aural signals, which may be supplemented by visual signals, timely and distinctive warning to the flight crew of sink rate, ground proximity, altitude loss after take-off or go-around, incorrect landing configuration and downward glide slope deviation.
(c) The terrain awareness and warning system (TAWS) must automatically provide the flight crew, by means of visual and aural signals and a terrain awareness display, with sufficient alerting time to prevent controlled flight into terrain events, and provided a forward-looking capability and terrain clearance floor.
(d) The operator shall implement database management procedures that ensure the timely distribution and update of current terrain and obstacle data to the ground proximity warning system.
(e) All turbine-engine Helicopters of a maximum certificated take-off mass of 5700 kg or less and authorized to carry more than five (5) but not more than nine (9) passengers for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a ground proximity warning system which has:
   (1) Warning on excessive descent rate;
   (2) Excessive terrain closure rate;
   (3) Warning on excessive altitude loss after take-off or go-around;
   (4) Warning of unsafe terrain clearance while not in the landing configuration;
      i. gear not locked down;
      ii. flaps not in the landing position;
   (5) excessive descent below the instrument glide path; and
   (6) Forward looking terrain avoidance function.

CAR OPS-3.668 Airborne Collision Avoidance System (ACAS)

(a) An operator shall not operate a turbine powered Helicopter having a maximum certificated takeoff mass in excess of 5700 kg or a maximum approved passenger seating configuration of more than nineteen (19) unless it is equipped with an airborne collision avoidance system with a minimum performance level of at least ACAS (version 7.1 or later).
(b) The minimum performance level for ACAS shall operate in accordance with ICAO Annex 10, Volume IV, Chapter 4.

Note: Compliance with this requirement can be achieved through the implementation of TCAS II version 7.1 or later equivalent.

(c) No Foreign Operator shall not operate a turbine powered Helicopter with a maximum certificated take-off mass in excess of 5,700 kg or with MAPSC more than 19 passengers involved in Commercial Air Transport operations, unless the aircraft is fitted with ACAS equipment (version 7.1 or later).

(d) All turbine engine aircraft of a maximum certificated take-off mass in excess of 15000 kg or authorised to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 1 January 2007, shall be equipped with an airborne collision avoidance system (ACAS).

(e) Traffic Alert and Collision Avoidance System (TCAS II or later equivalent) is accepted as a suitable ACAS system provided its installation is certificated by the State of Registry, and that its operation by flight crew is in accordance with instructions for the use of this equipment specified in the company operations manual.

(f) In the event of failure of ACAS equipment on aircraft that are away from their maintenance base, that aircraft may be dispatched with an unserviceable ACAS equipment if authorised by the State of Registry (i.e. approved MEL item) and if acceptable to the ATC unit (providing enroute or approach procedures do not require its use). Aircraft operating with unserviceable ACAS under this MEL dispensation shall indicate the unserviceability in Item 18 of the flight plan (Other information).

(g) The following conditions apply against this MEL dispensation to return the aircraft to base:

  (1) The aircraft navigation system shall be equipped with at least one GPS receiver

  (2) Where agreed Regulations and Procedures exist, these shall be maintained.

  (3) The application of an internal Rectification Interval Extension (RIE) by the operator as per CAR MEL.013(a), is not permissible with this equipment type failure.

  (4) An ICAO compliant altitude reporting transponder must be fitted and serviceable before departure.

  (5) An ACAS MEL dispensation will be valid for a period from the time of entry in the Technical log as an approved MEL item.

  (6) Conditions may be imposed by one or more States, which may include:

    (i) operating within certain restrictive hours, or

    (ii) via specific routes, or

    (iii) at stated flight levels (for safety reasons or otherwise).

  (7) The flight must be conducted along the most direct (or permissible) route to the delivery or maintenance destination airport.

(h) Aircraft operators are to ensure compliance with the above conditions, the MEL dispensation flight is in accordance with the operator's originally stated intentions, and that it must comply with any conditions laid down by the CAA and subsequently by the ATC authorities.

(i) Operators of aircraft intending to operate under provisions of this MEL approved item must seek approval to conduct flights through airspace of other ATC units from the appropriate State authorities.

(j) In the event when ACAS is inoperative, any aircraft with an unserviceable transponder as well as an unserviceable TCAS will not be permitted within the Oman FIR for which mandatory carriage of a transponder is required.

CAR OPS-3.670 Airborne weather radar equipment

The operator shall not operate a helicopter with a maximum approved passenger seating configuration (MAPSC) of more than 9 under IFR or at night when current weather reports indicate that thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne weather radar, may reasonably be expected along the route to be flown unless it is equipped with airborne weather radar equipment.

CAR OPS-3.675 Equipment for operations in icing conditions

(a) An operator shall not operate a Helicopter in expected or actual icing conditions unless it is certificated and equipped to operate in icing conditions.

(b) An operator shall not operate a Helicopter in expected or actual icing conditions at night unless it is equipped with a means to illuminate or detect the formation of ice. Any illumination that is used must be of a type that will not cause glare or reflection that would handicap crew members in the performance of their duties.

CAR OPS-3.685 Flight crew interphone system

An operator shall not operate a Helicopter on which a flight crew of more than one is required unless it is equipped with a flight crew interphone system, including headsets and microphones, not of a handheld type, for use by all members of the flight crew.

CAR OPS-3.690 Crew member interphone system

(See AMC OPS-3.690(b)(6) & IEM OPS-3.690(b)(7))

(a) The operator shall not operate a helicopter carrying a crew member other than a flight crew member unless it is equipped with a crew member interphone system.

(b) The crew member interphone system required by this paragraph must:

(1) Operate independently of the public address system except for handsets, headsets, microphones, selector switches and signalling devices;

(2) Provide a means of two-way communication between the flight crew compartment and each crew member station;

(3) Be readily accessible for use from each of the required flight crew stations in the flight crew compartment and in addition for cabin crew members;

(4) Be readily accessible for use at required cabin crew member stations close to each separate or pair of floor level emergency exits;

(5) Have an alerting system incorporating aural or visual signals for use by flight crew members to alert the cabin crew and for use by cabin crew members to alert the flight crew;

(6) Have a means for the recipient of a call to determine whether it is a normal call or an emergency call (See AMC OPS-3.690(b)(6)); and

(7) Provide on the ground a means of two-way communication between ground personnel and at least two flight crew members. (See IEM OPS-3.690(b)(7))

CAR OPS-3.695 Public address system

(a) An operator shall not operate a Helicopter with a maximum approved passenger seating configuration of more than nineteen (9) unless a public address system is installed.

(b) The public address system required by this paragraph must:

(1) Operate independently of the interphone systems except for handsets, headsets, microphones, selector switches and signalling devices;

(2) Be readily accessible for immediate use from each required flight crew member station;

(3) Be readily accessible for use from at least one cabin crew member station in the cabin, and each public address system microphone intended for cabin crew use must be positioned adjacent to a cabin crew member seat that is located near each required floor level emergency exit in the passenger compartment;

(4) Be capable of operation within ten (10) seconds by a cabin crew member at each of those stations in the compartment from which its use is accessible; and

(5) Be audible and intelligible at all passenger seats, toilets and cabin crew seats and work stations.

(6) Following a total failure of the normal electrical generating system, provide reliable operation for a minimum of 10 minutes.

(c) For helicopters with a maximum approved passenger seating configuration (MAPSC) of more than 9 but less than 19, the Public Address System is not required if:

(1) the helicopter is designed without a bulkhead between pilot and passengers; and

(2) the operator is able to demonstrate that when in flight, the pilot's voice is audible and intelligible at all passenger's seats.

CAR OPS-3.699 Definitions – Flight recording Equipment

(a) ***Flight Recorder:*** Any type of recorder installed in the aircraft for the purpose of complementing accident/incident investigation.

(b) ***Automatic deployable flight recorder (ADFR):*** A combination flight recorder installed on the aircraft which is capable of automatically deploying from the aircraft.

(c) ***Commercial Operation:*** An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire.

(d) ***General Aviation:*** An aircraft operation other than a commercial air transport operation or an aerial work operation.

CAR OPS-3.700 Cockpit Voice Recorders

(See Appendix 1 to OPS 3.700)

(See Appendix 1 to OPS 3.700/OPS 3.710/OPS 3.715)

(a) All helicopters of a maximum certificated take-off mass of over 7,000 kg shall be equipped with a CVR.

(b) For helicopters not equipped with a FDR, at least main rotor speed shall be recorded on the CVR.

(c) CVRs and CARS shall not use magnetic tape or wire.

(d) All helicopters required to be equipped with a CVR, shall be equipped with a CVR which shall retain the information recorded during at least the last 2 hours of their operation.

CAR OPS-3.710 Flight Data Recorders – Helicopters of between 2,250 kg and 3,175 kg

(See Appendix 1 to OPS 3.700/OPS 3.710/OPS 3.715)

(a) All turbine-engined helicopters of a maximum certificated take-off mass of over 2,250 kg, up to and including 3,175 kg for which the application for type certification was submitted to a Contracting State on or after 01 January shall be equipped with:

(1) a FDR which shall record at least parameters 1-48 listed in Appendix 3 to OPS 3.710/OPS 3.715; or

(2) a Class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilot(s), as defined in Appendix 2 to OPS 3.710/OPS 3.715, paragraph (b)(3); or

(3) an ADRS which shall record at least parameters 1-7 listed in Appendix 2 to OPS 3.710.

(b) FDRs or ADRS shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

Note: "The application for type certification is submitted to a Contracting State" refers to the date of application of the original "Type Certificate" for the helicopter type, not the date of certification of particular helicopter variants or derivative models.

CAR OPS-3.715 Flight Data Recorders – Helicopters Greater than 3,175 kg

(See Appendix 1 to OPS 3.700/OPS 3.710/OPS 3.715)

(a) All helicopters of a maximum certificated take-off mass of over 3,175 kg for which the individual certificate of airworthiness is first issued on or after 01 January 2016 shall be equipped with a FDR capable of recording at least the first 48 parameters listed in Appendix 3 to OPS 3.710/OPS 3.715.

(b) All helicopters of a maximum certificated take-off mass of over 3,175 kg for which the application for type certification is submitted to a Contracting State on or after 01 January 2023 shall be equipped with a FDR capable of recording at least the first 53 parameters listed in Appendix 3 to OPS 3.710/OPS 3.715.

(c) All helicopters of a maximum certificated take-off mass of over 7,000 kg, or having a passenger seating configuration of more than 19, for which the individual certificate of airworthiness is first issued on or after 01 January 1989 shall be equipped with a FDR capable of recording at least the first 30 parameters listed in Appendix 3 to OPS 3.710/OPS 3.715.

(d) FDRs shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

(e) All FDRs shall retain the information recorded during at least the last 10 hours of their operation, and in addition sufficient information from the preceding take-off for calibration purposes.

(f) FDRs that meet the current parameter certification requirements of the FAA, Transport Canada or EASA in respect to commercial air transport operations, shall be exempt from meeting the parameter requirements of CAR OPS 3.715.

Note: "The application for type certification is submitted to a Contracting State" refers to the date of application of the original "Type Certificate" for the helicopter type, not the date of certification of particular helicopter variants or derivative models.

CAR OPS-3.720 Flight Data Recorders – Data Link

(See Appendix 2 to OPS 3.710/OPS 3.715)

(a) All helicopters for which the individual certificate of airworthiness is first issued after 01 January 2016, which utilise any of the data link communications applications referred to in Appendix 2 to OPS 3.710/OPS 3.715 and are required to carry a CVR, shall record the data link communication messages on a crash protected flight recorder.

(b) All helicopters for which the individual certificate of airworthiness was first issued before 01 January 2016, that are required to carry a CVR and are modified on or after 01 January 2016 to use any of the data link communications applications referred to in Appendix 2 to OPS 3.710/OPS 3.715 shall record the data link communication messages on a crash protected flight recorder unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 01 January 2016.

Note: The "aircraft modifications" refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring).

(c) The minimum recording duration shall be equal to the duration of the CVR.

(d) Data link recording shall be able to be correlated to the recorded cockpit audio.

CAR OPS-3.721 Flight Recorders General Requirements

(a) The flight recorder system manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems:

    (1) manufacturer's operating instructions, equipment limitations and installation procedures;
    (2) parameter origin or source and equations which relate counts to units of measurement;
    (3) manufacturer's test reports; and
    (4) detailed information to ensure the continued serviceability of the flight recorder system.

(b) The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the Helicopter to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

Note 1: The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required as per Annex 6 Part1 Appendix 8.

Note 2: Conditions related to the continued serviceability of a flight recorder system are defined in section 7 of this appendix. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.

(c) Inspection of Flight Recorder Systems: Calibration of the FDR system;

(1) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall determine any discrepancies in the engineering conversion routines for the mandatory parameters and ensure that parameters are being recorded within the calibration tolerances; and

(2) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two years.

CAR OPS-3.723 Flight Data Analysis Programme

The operator of a Helicopter of a certificated take-off mass greater than 7,000 kgs, or having a passenger seating configuration of more than 9, and fitted with a flight data recorder should establish and maintain a flight data analysis programme as part of its safety management system.

(a) All Helicopters of a certificated take-off mass greater than 7,000 kg with a passenger seating capacity greater than 9, with a certificate of airworthiness first issued on or after 1 January 2026, shall be equipped with a means to support a flight data analysis programme.

(b) With effect from 1 January 2026, the operator of a Helicopter equipped as described in para (a) shall establish and maintain a flight data analysis programme as part of its safety management system.

CAR–OPS 3.725 Flight Data Link Recorders

(See Appendix 1 to CAR OPS-3.725 Table)

(a) All Helicopters /Helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which use any of the data link communications applications referred in para (d)(2) below and are required to carry a CVR, shall record the data link communications messages on a crash protected flight recorder.

(b) All Helicopters /Helicopters for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in para (d)(2), shall record the data link communications messages on a crash protected flight recorder, unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1 January 2016.

Note 1: Refer to Table C, Appendix 1 to CAR OPS-3.715/3.720/3.725 for examples of data link communication recording requirements.

Note2: A Class B AIR (Airborne Image Recorder) could be a means for recording data link communications *applications messages to and from the Helicopters /helicopters where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.*

Note 3: The "aircraft modifications" refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring).

(c) All Helicopters / Helicopters for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in para (d)(2) below, should record the data link communications messages on a crash-protected flight recorder, unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1 January 2016.

(1) Duration
The minimum recording duration shall be equal to the duration of the CVR.

(2) Correlation
Data link recording shall be able to be correlated to the recorded cockpit audio.

(d) Applications to be recorded (Commercial air transport, General aviation and Helicopter)

(1) Where the aircraft/helicopter flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft/helicopter) and downlinks (from the aircraft/helicopter), shall be recorded on the aircraft/helicopter. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note: Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft/helicopter.

(2) Messages applying to the applications listed at Table-C of Appendix 1 to CAR OPS- 3.725 shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

(e) Flight Crew-Machine Interface Recordings (only for commercial air transport)

(1) All Helicopters of a maximum take-off mass of over 27000 kg for which the application for type certification is submitted on or after 1 January 2023 shall be equipped with a crash-protected flight recorder which shall record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew as defined in para (f) below.

(2) All Helicopters of a maximum take-off mass of over 5700 kg, up to and including 27000 kg, for which the application for type certification is submitted on or after 1 January 2023 should be equipped with a crash-protected flight recorder which should record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew, as defined in para (f) below.

(3) Duration
The minimum flight crew-machine interface recording duration shall be at least for the last two (2) hours.

(4) Correlation
Flight crew-machine interface recordings shall be able to be correlated to the recorded cockpit audio.

(f) The Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS) Start and stop logic:

(1) The Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS) shall start to record prior to the Helicopter/helicopter moving under its own power and record continuously

until the termination of the flight when the Helicopter/helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(2) Classes:

(i) A Class "A" AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

(ii) A Class "B" AIR or AIRS captures data link message displays.

(iii) A Class "C" AIR or AIRS captures instruments and control panels.

Note 1: There are no provisions for Class "A" AIRs or AIRS in this CAR.

Note 2: A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS or where an FDR s not required.

Note 3: To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

(g) Applications to be recorded

(1) The operation of switches and selectors and the information displayed to the flight crew from electronic displays shall be captured by sensors or other electronic means.

(2) The recording of operation of switches and selectors by the flight crew shall include the following:

(i) any switch or selector that will affect the operation and the navigation of the aircraft; and

(ii) selection of normal and alternate systems.

(3) The recording of the information displayed to the flight crew from electronic displays shall include the following:

(i) primary flight and navigation displays;

(ii) aircraft system monitoring displays;

(iii) engine indication displays;

(iv) traffic, terrain, and weather displays;

(v) crew alerting systems displays;

(vi) stand-by instruments; and

(vii) installed EFB to the extent it is practical.

(4) If image sensors are used, the recording of such images shall not capture the head and shoulders of the flight crew members whilst seated in their normal operating position.

(h) Protection of recorded data and information

(1) It is prohibited to allow the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident as per Annex 13, except where the recordings or transcripts are:

(i) related to a safety-related event identified in the context of a safety management system;

(ii) are restricted to the relevant portions of a de-identified transcript of the recording; and

(iii) are subject to the protections accorded by Annex 19;

(iv) sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to protections accorded by Annex 19; or

(v) used for inspections of flight recorder systems as provided in Annex 6, Appendix 8, Section 7.

Note: Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19. When an investigation under Annex 13 is instituted, investigation records are subject to the protection accorded by Annex 13.

(2) It is prohibited to allow the use of recordings or transcripts of FDR, ADRS as well as Class B and Class C AIR and AIRS for purposes other than the investigation of an accident or incident as per CAR 13/ICAO Annex 13 as amended / CAA Equivalent requirements, except where the recordings or transcripts are subject to the protections accorded by CAA equivalent requirement to CAR100/ICAO Annex 19 as amended and are:

(i) used by the operator for airworthiness or maintenance purposes;

(ii) used by the operator in the operation of a flight date analysis programme required in Annex 6;

(iii) sought for use in proceedings not related to an event involving an accident or incident investigation;

(iv) de-identified; or

(v) disclosed under secure procedures.

Note: Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19.

CAR OPS-3.727 Combination Recorders

(See AC OPS-3.727)

All helicopters of a maximum certificated take-off mass over 2,700 kg, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).

CAR OPS-3.730 Seats, seat safety belts, harnesses and child restraint devices

(See AC OPS-3.730(a)(3))

(a) The operator shall not operate a helicopter unless it is equipped with:

(1) A seat or berth for each person who is aged two years or more;

(2) For helicopters first issued with an individual Certificate of Airworthiness, up to and including 31 July 1999 a safety belt, with or without a diagonal shoulder strap, or a safety harness for use in each passenger seat for each passenger aged two years or more;

(3) For helicopters first issued with an individual Certificate of Airworthiness, on or after 01 August 1999, a safety belt, with a diagonal shoulder strap, or a safety harness for use in each passenger seat for each passenger aged 2 years or more;

(4) A restraint device for each passenger less than 2 years of age;

(5) A safety harness for each flight crew seat incorporating a device which will automatically restrain the occupant's torso in the event of rapid deceleration; and

(6) A safety harness for each cabin crew member's seat.

Note: This requirement does not preclude use of passenger seats by cabin crew members carried in excess of the required cabin crew complement.

(7) Seats for cabin crew members located, where possible, near a floor level emergency exit. If the number of required cabin crew members exceeds the number of floor level emergency exits the additional cabin crew seats required shall be located such that the cabin crew member(s) may best be able to assist passengers in the event of an emergency evacuation. Such seats shall be forward or rearward facing within 15° of the longitudinal axis of the helicopter.

(b) All safety harnesses and safety belts must have a single point release. A safety belt with a diagonal shoulder strap is permitted if it is not reasonably practicable to fit the latter.

CAR OPS-3.731 Fasten Seat belt and No Smoking signs

An operator shall not operate a Helicopter in which all passenger seats are not visible from the flight deck, unless it is equipped with a means of indicating to all passengers and cabin crew when seat belts shall be fastened and smoking is not allowed.

CAR OPS-3.740 Placards

(See IEM OPS-3.740)

An operator shall not operate a helicopter unless the following placards are installed;

(a) Every exit from the aircraft shall be marked with the words "Exit" and "Emergency Exit" in both English, Arabic script and/or using pictorial placards.

(b) Every exit from the aircraft shall be marked with instructions in English, Arabic script and/or using pictorial placards to indicate the correct method of opening the exit.

(c) The markings shall be placed on or near the inside surface of the door or other closure of the exit and, if it is operable, from the outside of the aircraft on or near the exterior surface.

(d) The location instructions for all emergency equipment required to be located by a passenger shall be in English, Arabic script and/or using pictorial placards.

(e) The items depicted in the placard shall be available in the compartment indicated.

CAR OPS-3.745 First-Aid Kits

(See AMC OPS-3.745)

(a) The operator shall not operate a helicopter unless it is equipped with a first-aid kit, readily accessible for use:

(b) An operator shall ensure that first-aid kits are:

  (1) Inspected periodically to confirm, to the extent possible, that contents are maintained in the condition necessary for their intended use; and

  (2) Replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant.

CAR OPS-3.755 Universal Precautionary Kit

A universal precaution kit should be carried on a helicopter that is required to operate with at least one cabin crew member. Such a kit may be used to clean up any potentially infectious body contents such as blood, urine, vomit and faeces and to protect the cabin crew who are assisting potentially infectious cases of suspected communicable disease.

CAR OPS-3.770 Supply of Oxygen

(See IEM OPS-3.770 & AC OPS-3.770 (b)(2)(v))

Note: Approximate altitudes in the Standard Atmosphere corresponding to the values of absolute pressure used in the text are as follows:

Absolute pressure\ Metres\ Feet

700 hPa\ 3 000\ 10 000

620 hPa\ 4 000\ 13 000

376 hPa\ 7 600\ 25 000

A flight to be operated at flight altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply:

a) all crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 hPa and 620 hPa; and

b) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa. A flight to be operated with a pressurized helicopter shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 hPa. In addition, when the helicopter is operated at flight altitudes at which the atmospheric pressure is more than 376 hPa and cannot descend safely to a flight altitude at which the atmospheric pressure is equal to 620 hPa within four minutes, there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

CAR OPS-3.785 HUD or Equivalent displays

(See Appendix 1 to CAR OPS-3.785 HUD, VS or Equivalent)

An operator shall not operate a Helicopter equipped with a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system unless:

(a) An approval has been issued by the Authority for the operational use of such displays,

(b) The equipment meets the appropriate airworthiness certification requirements;

(c) The operator has carried out a safety risk assessment of the operations supported by the HUD or equivalent displays, EVS, SVS or CVS;

(d) The operator has established and documented the procedures for the use of, and training requirements for, a HUD or equivalent displays, EVS, SVS or CVS

(e) The criteria for the use of such systems for the safe operation of a Helicopter as described in Appendix 1 to CAR OPS-3.785 HUD, VS or Equivalent is complied with as applicable

Note 1: Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) ICAO Doc 9859 and CAR-100.

Note 2.-Information regarding, automatic landing systems, a HUD or equivalent displays, EVS, SVS, or CVS, is contained in the Manual of All-Weather Operations (Doc 9365).

CAR OPS-3.790 Hand fire extinguishers

(See AMC-1 OPS-3.790 and AMC-2 OPS-3.790)

(a) An operator shall not operate a Helicopter unless hand fire extinguishers are provided for use in crew, passenger and, as applicable, cargo compartments and galleys in accordance with the following:

(1) The type and quantity of extinguishing agent must be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used and, for personnel compartments, must minimise the hazard of toxic gas concentration;

(2) At least one hand fire extinguisher, containing Halon 1211 (bromo-chloro-difluoro- methane, CBrCIF2), or equivalent as the extinguishing agent, must be conveniently located on the flight deck for use by the flight crew;

Note: Any extinguishing agent used in a portable fire extinguisher in helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall not be of a type listed in Annex A, Group II of the Montreal Protocol on Substances That Deplete the Ozone Layer, 8th Edition, 2009.

(3) At least one hand fire extinguisher must be located in, or readily accessible for use in, each galley not located on the main passenger deck;

(4) At least one readily accessible hand fire extinguisher must be available for use in each cargo compartment which is accessible to crew members in flight for the purpose of firefighting; and

(5) At least the following number of hand fire extinguishers must be conveniently located in the passenger compartment(s):

Maximum approved passenger seating configuration	Number of Extinguishers
7 to 30	1
31 to 60	2
61 to 200	3

CAR OPS-3.795 Built-in Lavatory Fire Extinguisher

When two or more extinguishers are required, they must be evenly distributed in the passenger compartment.

Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in a helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2016 shall:

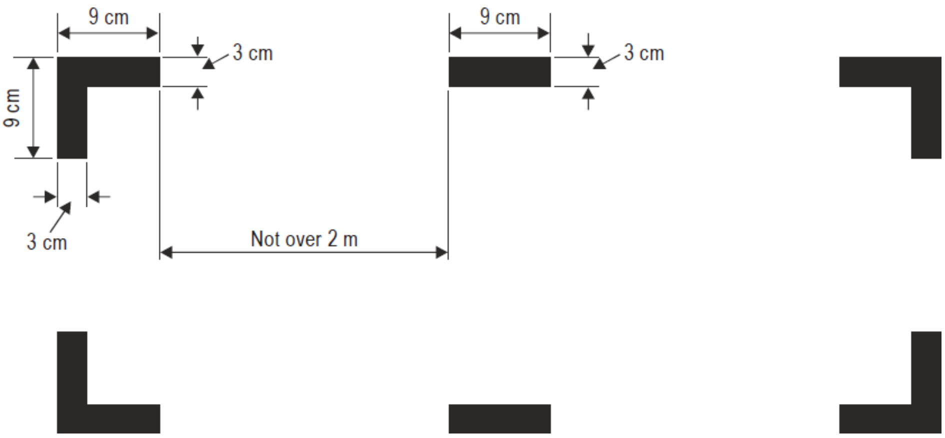
(a) meet the applicable minimum performance requirements of the State of Registry; and

(b) not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.

CAR OPS-3.800 Marking of break-in points

(a) An operator shall ensure that, if areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on a Helicopter as shown below. The colour of the markings shall be red or yellow, and if necessary, they shall be outlined in white to contrast with the background. If the corner markings are more than two (2) metres apart, intermediate lines nine (9) cm x 3 cm shall be inserted so that there is no more than two (2) metres between adjacent marks.

(b) If the corner markings are more than 2 m apart, intermediate lines 9 cm × 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.



CAR OPS-3.805 Means of emergency evacuation

(a) An operator shall not operate a Helicopter with passenger emergency exit sill heights:

(1) Which are more than 1.83 metres (6 feet) above the ground with the Helicopter on the ground and the landing gear extended; or

(2) Which would be more than 1.83 metres (6 feet) above the ground after the collapse of, or failure to extend of, one or more legs of the landing gear and for which a Type Certificate was first applied for on or after 1 April 2000, unless it has equipment or devices available at each exit,

where sub-paragraphs (1) or (2) apply, to enable passengers and crew to reach the ground safely in an emergency.

(b) Such equipment or devices need not be provided at over-wing exits if the designated place on the Helicopter structure at which the escape route terminates is less than 1·83 metres (6 feet) from the ground with the Helicopter on the ground, the landing gear extended, and the flaps in the takeoff or landing position, whichever flap position is higher from the ground.

(c) In Helicopters required to have a separate emergency exit for the flight crew and:
   (1) For which the lowest point of the emergency exit is more than 1·83 metres (6 feet) above the ground with the landing gear extended; or,
   (2) For which a Type Certificate was first applied for on or after 1 April 2000, would be more than 1·83 metres (6 ft) above the ground after the collapse of, or failure to extend of, one or more legs of the landing gear, there must be a device to assist all members of the flight crew in descending to reach the ground safely in an emergency.

CAR OPS-3.810 Megaphones

(See AMC OPS-3.810)

An operator shall not operate a Helicopter with a maximum approved passenger seating configuration (MAPSC) of more than Nineteen (19) and carrying one or more passengers, unless it is equipped with portable battery-powered megaphones readily accessible for use by crew members during an emergency evacuation; (Refer to the following table)

CAR OPS-3.815 Emergency lighting

The operator shall not operate a helicopter which has a maximum approved passenger seating configuration (MAPSC) of more than 19 unless it is equipped with:

(a) An emergency lighting system having an independent power supply to provide a source of general cabin illumination to facilitate the evacuation of the helicopter; and

(b) Illuminated emergency exit marking and locating signs.

CAR OPS-3.820 Automatic Emergency Locator Transmitter (ELT)

(See AMC OPS-3.820)

(a) The operator shall not operate a helicopter unless it is equipped with an automatic Emergency Locator Transmitter (ELT).

(b) The operator shall not operate a helicopter in Performance Class 1 or 2 on a flight over water in a hostile environment as defined in OPS 3.480(a)(12)(ii)(A) at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed, on a flight in support of or in connection with the offshore exploitation of mineral resources (including gas), unless it is equipped with an Automatically Deployable Emergency Locator Transmitter (ELT(AD)).

(c) The operator shall ensure that all ELTs are capable of transmitting simultaneously on 121.5MHz and 406 MHz, are coded in accordance with ICAO Annex 10 and are registered with the national agency responsible for initiating Search and Rescue or another nominated agency.

CAR OPS-3.825 Life Jackets

(See IEM OPS-3.825)

The operator shall not operate a helicopter for any operations on water or on a flight over water:

(a) When operating in Performance Class 3 beyond autorotational distance from land; or

(b) When operating in Performance Class 1 or 2 at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed; or

(c) When operating in Performance Class 2 or 3 when taking off or landing at a heliport where the take- off or approach path is over water, unless it is equipped with life jackets equipped with a survivor locator light, for each person on board, stowed in an easily accessible position, with safety belt or harness fastened, from the seat or berth of the person for whose use it is provided and an individual infant flotation device, equipped with a survivor locator light, for use by each infant on board.

CAR OPS-3.827 Crew Survival Suits

(See AMC OPS 3.827)

(a) The operator shall not operate a helicopter in Performance Class 1 or 2 on a flight over water at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed from land on a flight in support of or in connection with the offshore exploitation of mineral resources (including gas) when the weather report or forecasts available to the commander indicate that the sea temperature will be less than plus 10°C during the flight or when the estimated rescue time exceeds the estimated survival time unless each member of the crew is wearing a survival suit.

(b) The operator shall not operate a helicopter in Performance Class 3 on a flight over water beyond auto-rotational or safe forced landing distance from land when the weather report or forecasts available to the commander indicate that the sea temperature will be less than plus 10°C during the flight, unless each member of the crew is wearing a survival suit.

Note: When the elevation and strength of the sun results in a high temperature hazard on the flight deck, the flight crew may be exempted from paragraph (b) provided a survival suit is accessible to each pilot.

CAR OPS-3.830 Life-rafts and survival ELTs for extended overwater flights

(See AMC OPS-3.830(b)(2)

The operator shall not operate a helicopter on a flight over water at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed when operating in Performance Class 1 or 2, or 3 minutes flying time at normal cruising speed when operating in Performance Class 3 unless it carries:

(a) In the case of a helicopter carrying less than 12 persons, a minimum of one life-raft with a rated capacity of not less than the maximum number of persons on board;

(b) In the case of a helicopter carrying more than 11 persons, a minimum of two life-rafts sufficient together to accommodate all persons capable of being carried on board. Should one life-raft of the largest rated capacity be lost, the overload capacity of the remaining life-raft(s) shall be sufficient to accommodate all persons on the helicopter (See AMC OPS 3.830(a)(2));

(c) At least one survival Emergency Locator Transmitter (ELT(S)) for each life raft carried (but not more than a total of 2 ELTs are required), capable of transmitting on the distress frequencies prescribed in Appendix 1 to OPS 3.830. (See also AMC OPS 3.830(a)(3));

(d) Emergency exit illumination; and

(e) Lifesaving equipment including means of sustaining life as appropriate to the flight to be undertaken.

CAR OPS-3.835 Survival equipment

(See AMC OPS-3.835(c) and IEM OPS-3.835)

The operator shall not operate a helicopter in areas where search and rescue would be especially difficult unless it is equipped with the following:

(a) Signalling equipment to make the pyrotechnical distress signals described in ICAO Annex 2;

(b) At least one survival Emergency Locator Transmitter (ELT(S)) capable of transmitting on the distress frequencies prescribed in Appendix 1 to OPS 3.830 (see also AMC OPS 3.830(a)(3)); and

(c) Additional survival equipment for the route to be flown taking account of the number of persons on board (see AMC OPS 3.835(c)).

CAR OPS-3.837 Additional Requirements for Helicopters Operating to or from Helidecks located in a Hostile Sea Area (as defined in OPS 3.480(a)(11)(ii)(A))

(a) The operator shall not operate a helicopter on a flight to or from a helideck located in a hostile sea area at a distance from land corresponding to more than 10 minutes flying time at normal cruising speed on a flight in support of or in connection with the offshore exploitation of mineral resources (including gas) unless:

(1) When the weather report or forecasts available to the commander indicate that the sea temperature will be less than plus 10°C during the flight, or when the estimated rescue time exceeds the calculated survival time, or the flight is planned to be conducted at night, all persons on board are wearing a survival suit (see AMC OPS 3.827);

(2) All life rafts carried in accordance with OPS 3.830 are installed so as to be usable in the sea conditions in which the helicopter's ditching, flotation and trim characteristics were evaluated in order to comply with the ditching requirements for certification (See AMC OPS 3.837(a)(2));

(3) The helicopter is equipped with an emergency lighting system having an independent power supply to provide a source of general cabin illumination to facilitate the evacuation of the helicopter;

(4) All emergency exits, including crew emergency exits, and its means of opening are conspicuously marked for the guidance of occupants using the exits in daylight or in the dark. Such markings are designed to remain visible if the helicopter is capsized and the cabin is submerged;

(5) All non-jettisonable doors which are designated as Ditching Emergency Exits have a means of securing them in the open position so they do not interfere with occupants egress in all sea conditions up to the maximum required to be evaluated for ditching and flotation;

(6) All doors, windows or other openings in the passenger compartment authorised by the Authority as suitable for the purpose of underwater escape, are equipped so as to be operable in an emergency;

(7) Lifejackets are worn at all times; unless the passenger or crew member is wearing an integrated survival suit that meets the combined requirement of the survival suit and lifejacket which is acceptable to the Authority.

CAR OPS-3.840 Helicopters Certificated for Operating on Water - Miscellaneous Equipment

(a) The operator shall not operate on water a helicopter certificated for operating on water unless it is equipped with:

(1) A sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the aircraft on water, appropriate to its size, weight and handling characteristics; and

(2) Equipment for making the sound signals prescribed in the International Regulations for preventing collisions at sea, where applicable.

CAR OPS-3.843 All Helicopters on Flights Over Water - Ditching

(a) The operator shall not operate a helicopter in Performance Class 1 or 2 on a flight over water in a hostile environment at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed unless that helicopter is so designed for landing on water or is certificated in accordance with ditching provisions. Sea state shall be an integral part of ditching information and certification.

(b) The operator shall not operate a helicopter in Performance Class 1 or 2 on a flight over water in a non-hostile environment at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed unless that helicopter is; so designed for landing on water; or is certificated in accordance with ditching provisions; or is fitted with emergency flotation equipment.

(c) The operator shall not operate a helicopter in Performance Class 2, when taking-off or landing over water, unless that helicopter is; so designed for landing on water; or is certificated in accordance with ditching provisions; or is fitted with emergency floatation equipment. (See AMC OPS 3.843(c)). Except where, for the purpose of minimising exposure, the landing or take-off at a HEMS operating site located in a congested environment is conducted over water, unless otherwise required by the Authority.

(d) The operator shall not operate a helicopter in Performance Class 3 on a flight over water beyond safe forced landing distance from land unless that helicopter is; so designed for landing on water; or is certificated in accordance with ditching provisions; or is fitted with emergency flotation equipment.

Appendix 1 to OPS 3.700 Cockpit Voice Recorder (CVR) and Cockpit Audio Recording System (CARS)

(a) Start and stop logic

The CVR or CARS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR or CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(b) Signals to be recorded

(1) The CVR shall record simultaneously on four separate channels, or more, at least the following:

(i) voice communication transmitted from or received in the helicopter by radio;

(ii) aural environment on the flight deck;

(iii) voice communication of flight crew members on the flight deck using the helicopter's interphone system, if installed;

(iv) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and

(v) voice communication of flight crew members using the passenger address system, if installed.

(c) The preferred CVR audio allocation should be as follows:

(1) pilot-in-command audio panel;

(2) co-pilot audio panel;

(3) additional flight crew positions and time reference; and

(4) cockpit area microphone.

(d) The CARS shall record simultaneously on two separate channels, or more, at least the following:

(1) voice communication transmitted from or received in the helicopter by radio;

(2) aural environment on the flight deck; and

(3) voice communication of flight crew members on the flight deck using the helicopter's interphone system, if installed.

(e) The preferred CARS audio allocation should be as follows:

(1) voice communication; and

(2) aural environment on the flight deck.

Appendix 1 to OPS 3.700/OPS 3.710/OPS 3.715 Flight Recorders - General

Note 1: The following applies to all crash protected flight recorders which comprise one or more of the following:

(i) *a flight data recorder (FDR),*

(ii) *a cockpit voice recorder (CVR)*

(iii) *an airborne image recorder (AIR),*

(iv) *a data link recorder (DLR).*

When image or data link information is required to be recorded on a crash-protected flight recorder, it is permissible to record it on either the CVR or the FDR.

Note 2: The following applies to all lightweight flight recorders which comprise one or more of the following:

(i) *an aircraft data recording system (ADRS),*

(ii) *a cockpit audio recording system (CARS),*

(iii) *an airborne image recording system (AIRS)*

(iv) *a data link recording system (DLRS).*

When image or data link information is required to be recorded on a lightweight flight recorder, it is permissible to record it on either the CARS or the ADRS.

(a) Non-deployable flight recorder containers shall be painted a distinctive orange colour;

(b) Non-deployable crash protected flight recorder containers shall;

(1) carry reflective material to facilitate their location; and

(2) have a device to assist in locating that recorder in water and, not later than 01 January, 2019, have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz that operates for a minimum of 90 days.

(c) Automatic deployable flight recorder containers shall:

(1) be painted a distinctive orange colour, however the surface visible from outside the aircraft may be of another colour;

(2) carry reflective material to facilitate their location; and

(3) have an integrated automatically activated ELT.

(d) The flight recorder systems shall be installed so that:

(1) the probability of damage to the recordings is minimised;

(2) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and

(3) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and

(4) for helicopters for which the individual certificate of airworthiness is first issued on or after 01 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimised.

Note: The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialised replay or copying techniques.

(e) The flight recorder systems shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads.

(f) The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

(g) Means shall be provided for an accurate time correlation between the flight recorder systems recordings.

(h) The manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems:

(1) manufacturer's operating instructions, equipment limitations and installation procedures;

(2) parameter origin or source and equations which relate counts to units of measurement; and

(3) manufacturer's test reports.

(i) Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

Appendix 2 to OPS 3.700/OPS 3.710/OPS 3.715 Inspection of Flight Recorder Systems

(a) Prior to the first flight of the day, the built-in test features for the flight recorders and flight data acquisition unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

(b) FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording inspection intervals of one year. This period may be extended by the Authority to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring.

(c) DLR systems or DLRS shall have recording inspection intervals of two years. This period may be extended by the Authority to four years provided these systems have demonstrated a high integrity of serviceability and self-monitoring.

(d) Recording inspections shall be carried out as follows:

(1) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;

(2) the analysis of the FDR or ADRS recording shall evaluate the quality of the recorded data to determine if the bit error rate (including those errors introduced by recorder, the acquisition unit, the source of the data on the helicopter and by the tools used to extract the data from the recorder) is within acceptable limits and to determine the nature and distribution of the errors;

(3) the FDR or ADRS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;

(4) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;

(5) an annual examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR or CARS shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;

(6) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and

(7) an examination of the recorded images on the AIR or AIRS shall be carried out by replay of the AIR or AIRS recording. While installed in the aircraft, the AIR or AIRS shall record test images from each aircraft source and from relevant external sources to ensure that all required images meet recording quality standards.

(e) A flight recorder system shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

(f) A report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.

(g) Calibration of the FDR system:

(1) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at least every five years or in accordance with the recommendations of the sensor manufacturer to determine any discrepancies in the engineering conversion routines for the mandatory parameters and to ensure that parameters are being recorded within the calibration tolerances; and

(2) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed as recommended by the sensor manufacturer,

or at least every two years.

Appendix 1 to OPS 3.710/OPS 3.715 Flight Data Recorder (FDR) and Aircraft Data Recording Systems (ADRS)

(a) Start and Stop Logic

The FDR or ADRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power.

(b) Parameters to be Recorded

(1) The parameters that satisfy the requirements for FDRs are listed in the paragraph (3) below. The number of parameters to be recorded shall depend on helicopter complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of helicopter complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by helicopter systems or the flight crew to operate the helicopter. However, other parameters may be substituted with due regard to the helicopter type and the characteristics of the recording equipment.

(2) If further FDR recording capacity is available, recording of the following additional information shall be considered:

(i) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS); and

(ii) Additional engine parameters (EPR, N_1, fuel flow etc.)

(3) The following parameters shall satisfy the requirements for flight path and speed:

(i) Pressure altitude

(ii) Indicated airspeed or calibrated airspeed

(iii) Heading (primary flight crew reference)

(iv) Pitch attitude

(v) Roll attitude

(vi) Engine thrust/power

(vii) Landing-gear status*

(viii) Total or outside air temperature*

(ix) Time*

(x) Navigation data*: drift angle, wind speed, wind direction, latitude/longitude

(xi) Radio altitude*

Note: The parameters that satisfy the requirements for ADRS are listed in Appendix 2 to OPS 3.710.

(c) Additional Information

(1) The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.

(2) Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

Appendix 2 to OPS 3.710/OPS 3.715 Data Link Recorder (DLR) Applications to be Recorded

(a) Where the helicopter flight path is authorised or controlled through the use of data link messages, all data link messages, both uplinks (to the helicopter) and downlinks (from the helicopter), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note: Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

(b) Messages applying to the applications listed below shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

Item No.	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services.	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the helicopter are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

Key:
C: Complete contents recorded.
M: Information that enables correlation to any associated records stored separately from the helicopter.
*: Applications that are to be recorded only as far as is practicable given the architecture of the system.

Appendix 3 to OPS 3.710/3.715 Parameter Characteristics for Flight Data Recorders

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125% /h	1 s
2	Pressure altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed		As the installed pilot display measuring system	1	±3%	1 kt
4	Heading		360°	1	±2°	0.5°
5	Normal acceleration		–3 g to +6 g	0.125	±0.09 g excluding a datum error of ±0.045 g	0.004 g
6	Pitch attitude		±75° or 100% of useable range whichever is greater	0.5	±2°	0.5°
7	Roll attitude		±180°	0.5	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1	—	—
9	Power on each engine		Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor:					
	Main rotor speed		50–130%	0.51	±2%	0.3% of full range
	Rotor brake		Discrete		—	—

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
11	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)		Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and selection)		Discrete	1	—	—
13	Outside air temperature		Sensor range	2	±2°C	0.3°C
14*	Autopilot/ autothrottle/AFCS mode and engagement status		A suitable combination of discretes	1	—	—
15*	Stability augmentation system engagement		Discrete	1	—	—
16*	Main gearbox oil pressure		As installed	1	As installed	6.895 kN/m² (1 psi)
17*	Main gearbox oil temperature		As installed	2	As installed	1°C
18	Yaw rate		±400°/second	0.25	±1.5% maximum range excluding datum error of ±5%	±2°/s
19*	Sling load force		0 to 200% of certified load	0.5	±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
21	Lateral acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
22*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation		Signal range	1	±3%	0.3% of full range

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
24*	Horizontal beam deviation		Signal range	1	±3%	0.3% of full range
25	Marker beacon passage		Discrete	1	—	—
26	Warnings		Discrete(s)	1	—	—
27	Each navigation receiver frequency selection		Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and 2 distances		0–370 km (0–200 NM)	4	As installed	1 852 m (1 NM)
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)		As installed	2	As installed	As installed
30*	Landing gear and gear selector position		Discrete	4	—	—
31*	Engine exhaust gas temperature (T_4)		As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)		As installed	1	As installed	
33*	Fuel contents		As installed	4	As installed	
34*	Altitude rate		As installed	1	As installed	
35*	Ice detection		As installed	4	As installed	
36*	Helicopter health and usage monitor system		As installed	—	As installed	—
37	Engine control modes		Discrete	1	—	—
38*	Selected barometric setting (pilot and co-pilot)		As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height		As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)		Discrete(s)	4	—	—
47*	Multi-function/ engine/alerts display format		Discrete(s)	4	—	—
48*	Event marker		Discrete	1	—	—
49*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
50*	TCAS/ACAS (traffic alert and collision avoidance system) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
51*	Primary flight controls – pilot input forces	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Full range	0.125 (0.0625 recommended)	± 3% unless higher accuracy is uniquely required	0.5% of operating range
52*	Computed centre of gravity	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
53*	Helicopter computed weight	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range

Appendix 1 to OPS 3.710 Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS)

(a) Start and Stop Logic

The AIR or AIRS shall start to record prior to the helicopter moving under its own power and record continuously until the termination of the flight when the helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(b) Classes

(1) A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1: To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

Note 2: There are no provisions for Class A AIR or AIRS in this document.

(2) A Class B AIR or AIRS captures data link message displays.

(3) A Class C AIR or AIRS captures instruments and control panels.

Note: A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS, or where an FDR is not required.

Appendix 2 to OPS 3.710 Parameter Characteristics for Aircraft Data Recording Systems (ADRS)

Serial No.	Parameter	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading: a) Heading (Magnetic or time)	±180°	1	±2°	0.5° *	*Heading is preferred, if not available, yaw rate shall be recorded
	b) Yaw rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
2	Pitch: a) Pitch attitude	±90°	0.25	±2°	0.5°	*Pitch attitude is preferred, if not available, pitch rate shall be recorded
	b) Pitch rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	
3	Roll: a) Roll attitude	±180°	0.25	±2°	0.5°	Roll attitude is referred, if not available, roll rate hall be recorded
	b) Roll rate ±1%	±300°/s	0.25	+ drift of 360°/h	2°/s	
4	Positioning system: a) Time	24 hours	1	±0.5°	0.1°	UTC time preferred where available.
	b) Latitude/ longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0–1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
	e) Track	0–360°	2 (1 if available)	As installed (± 2° recommended)	0.5°	
	f) Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available

Serial No.	Parameter	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
5	Normal acceleration	–3 g to + 6 g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.05 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g 0.25	(0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 hPa (1.02 in-Hg) to 310.2 hPa (9.16 in-Hg) or available sensor range	1	As installed (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 hPa (0.03 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	–50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	A s the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Main rotor speed (Nr)	50% to 130% or available sensor range	0.5	As installed	0.3% of full range	
12	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For piston engined helicopters
13	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	

Serial No.	Parameter	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
15	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
16	Manifold pressure (*)	Full range	Each engine each second	As installed	0.2% of full range	*For piston engined helicopters
17	Engine thrust/ power/ torque parameters required to determine propulsive thrust/power *	Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbine engine helicopters.
18	Engine gas generator speed (Ng) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19	Free power turbine speed (Nf) (*)	0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
20	Collective pitch	Full range	0.5	As installed	0.1% of full range	
21	Coolant temperature (*)	Full range	1	As installed (±5°C recommended)	1° C	*Only for piston engined helicopters
22	Main voltage	Full range	Each engine each second	As installed	1 Volt	
23	Cylinder head temperature (*)	Full range	Each cylinder each second	As installed	2% of full range	*Only for piston engined helicopters
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and locked and down and-Locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	

Appendix 1 to OPS 3.775 Supplemental Oxygen for Non-pressurised Helicopters

(a)	(b)
SUPPLY FOR:	**DURATION AND PRESSURE ALTITUDE**
1. All occupants of flight deck seats on flight deck duty	Entire flight time at pressure altitudes above 10 000 ft.
2. All required cabin crew members	Entire flight time at pressure altitudes above 13 000 ft and for any period exceeding 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.
3. 100% of passengers (See Note)	Entire flight time at pressure altitudes above 13 000 ft.
4. 10% of passengers (See Note)	Entire flight time after 30 minutes at pressure altitudes greater than 10 000 ft but not exceeding 13 000 ft.

Note: For the purpose of this table 'passengers' means passengers actually carried and includes infants under the age of 2.

Appendix 1 to OPS 3.830 Emergency Locator Transmitter (ELT(S))

(See OPS 3.380 and OPS 3.835)

All ELT(S) shall be capable of transmitting simultaneously on 121.5 MHz and 406 MHz, be coded in accordance with ICAO Annex 10 and be registered with the national agency responsible for initiating Search and Rescue, or another nominated agency.

AMC OPS-3.630 Instruments and Equipment – Approval and Installation

(See CAR OPS-3.630)

(1) For Instruments and Equipment required by CAR OPS-3 Subpart K, "Approved" means that compliance with the applicable TSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a TSO does not exist, the applicable airworthiness standards apply unless otherwise prescribed in CAR OPS-3 or CAR-M.

(2) "Installed" means that the installation of Instruments and Equipment has been demonstrated to comply with the applicable airworthiness requirements of EASA CS-23/CS-25/CS-27/CS-29 (or an equivalent accepted by the CAA), or the relevant code used for Type Certification, and any applicable requirement prescribed in CAR OPS-3.

(3) Instruments and Equipment approved in accordance with design requirements and performance specifications other than TSOs, before the applicability dates prescribed in CAR OPS-3.001(b), are acceptable for use or installation on Helicopters operated for the purpose of commercial air transportation provided that any relevant OPS requirement is complied with.

(4) When a new version of a TSO (or of a specification other than a TSO) is issued, Instruments and Equipment approved in accordance with earlier requirements may be used or installed on Helicopters operated for the purpose of commercial air transportation provided that such Instruments and Equipment are operational, unless removal from service or withdrawal is required by means of an amendment to CAR OPS-3 or CAR-M.

AMC OPS 3.647 Equipment for Operations Requiring a Radio Communication and/or Radio Navigation System

(See OPS 3.647)

A headset, as required by CAR OPS 3.647, consists of a communication device which includes two earphones to receive and a microphone to transmit audio signals to the helicopter's communication system. To comply with the minimum performance requirements, the earphones and microphone should match with the communication system's characteristics and the flight deck environment. The headset should be adequately adjustable to fit the pilot's head. Headset boom microphones should be of the noise cancelling type.

AMC OPS-3.650/3.652 Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-3.650/3.652)

(1) Individual requirements of these paragraphs may be met by combinations of instruments or by integrated flight systems or by a combination of parameters on electronic displays provided that the information so available to each required pilot is not less than that provided by the instruments and associated equipment as specified in this Subpart.

(2) The equipment requirements of these paragraphs may be met by alternative means of compliance when equivalent safety of the installation has been shown during type certification approval of the Helicopter for the intended kind of operation.

AMC OPS-3.650/3.652 Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-3.650/3.652)

(See table below)

SERIAL		FLIGHTS UNDER VFR			FLIGHTS UNDER IFR OR AT NIGHT		
	INSTRUMENT	SINGLE PILOT	TWO PILOTS REQUIRED	MAX T/O MASS AUTH>3,175 kg OR MAX PAX>9 Pax	SINGLE PILOT	TWO REQUIRED PILOTS	MAX T/O MASS AUTH>3,175 kg OR MAX PAX>9 Pax
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	Magnetic Direction Indicator/ Compass	1	1	1	1	1	1
2	Accurate Time Piece	1	1	1	1	1	1
3	OAT Indicator	1	1	1	1	1	1
4	Sensitive Pressure Altimeter	1	2	2	2 Note (1)	2	2
5	Air Speed Indicator	1	2	2	1	2	2
6	Heated Pitot system	1 Note (2)	2 Note (2)	2	1	2	2
7	Pitot heat failure Indicator	-	-	-	1 Note (3)	2 Note (3)	2
8	Vertical Speed Indicator	1	2	2	1	2	2
9	Slip Indicator OR Turn Coordinator	1	2	2	1	2	2
10	Attitude Indicator	1 Note (4 or 5)	2 Notes (4 or 5)	2	1 (Note 8)	2 (Note 8)	2
11	Gyroscopic Direction Indicator	1 Note (4 or 5)	2 Notes (4 or 5)	2	1 (Note 8)	2 (Note 8)	2
12	Magnetic Gyroscopic Direction Indicator	-	-	-	1 (Note 7)	2 (Note 7)	2
13	Standby Attitude Indicator	-	-	-	1 (Note 6)	1 (Note 6)	1
14	Alternate Source of Static Pressure	-	-	-	1	1	1
15	Chart Holder	-	-	-	1 (Note 7)	1 (Note 7)	1

Notes 1: For single pilot night VFR operation one sensitive pressure altimeter may be substituted by a radio altimeter (OPS 3.652(c)).

Note 2: Required for helicopters with a maximum certificated take-off mass (MCTOM) over 3 175 kg or having a maximum approved passenger seating configuration (MAPSC) of more than 9 (OPS 3.650(l)).

Note 3: The pitot heater failure annunciation applies to any helicopter issued with an individual Certificate of Airworthiness after 1 August 1999. It also applies before that date when: the helicopter has a MCTOM greater than 3 175 kg and a maximum approved passenger seating configuration (MAPSC) greater than 9 (OPS 3.652(d)).

Note 4: Required for helicopters with a maximum certificated take-off mass (MCTOM) over 3 175 kg (OPS 3.650(i)).

Note 5: Required for any helicopters when operating over water; when out of sight of land or when the visibility is less than 1500 m (OPS 3.650(i)).

Note 6: For helicopters with a maximum certificated take-off mass (MCTOM) over 3 175 kg, CS-29 1303(g) may require either a gyroscopic rate-of-turn indicator combined with a slip-skid indicator (turn and bank indicator) or a standby attitude indicator satisfying the requirements of OPS 3.652(h). (However, the original type certification standard should be referred to determine the exact requirement.)

Note 7: For IFR operations only.

Note 8: For VFR night operations only.

AMC OPS-3.650(i) & 3 .652(i) Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-3.650(i) & 3.652(i))

A means to indicate outside air temperature indicator may be an air temperature indicator which provides indications that are convertible to outside air temperature.

IEM OPS-3.650(p) & 3.652(s) Headset, boom microphone and associated equipment

(See CAR OPS-3.650(p)/3.652(s))

A headset, as required by CAR OPS-3.650(p) and CAR OPS-3.652(s), consists of a communication device which includes an earphone(s) to receive and a microphone to transmit audio signals to the Helicopter's communication system. To comply with the minimum performance requirements, the earphone(s) and microphone should match with the communication system's characteristics and the flight deck environment. The headset should be adequately adjustable to fit the pilot's head. Headset boom microphones should be of the noise cancelling type.

AMC OPS-3.652(d) & (k)(2) Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-3.652(d) & (k)(2))

A combined pitot heater warning indicator is acceptable provided that a means exists to identify the failed heater in systems with two or more sensors.

AMC OPS 3.653 GNSS

(See CAR OPS-3.653)

CAA Mandatory Minimum Navigation System is TSO-C 145 /146 /196 or RNP capable aircraft as approved by the CAA.

Note 1: TSO-C 145 /146 /196 (or later versions) GNSS are recommended as this standard of GNSS equipment may be required to meet later navigation and ADS-B approvals.

Note 2: The above represents minimum equipment requirements. Some operations under the PBN may require more than one GNSS unit to be fitted.

AMC OPS 3.655 Procedures for Single Pilot Operation under IFR without an Autopilot.

(See OPS 3.655)

(a) Operators approved to conduct single pilot IFR operations in a helicopter without altitude hold and heading mode, should establish procedures to provide equivalent safety levels. These procedures should include the following:

(1) Appropriate training and checking additional to that contained in Appendix 1 to OPS 3.940(c).

(2) Appropriate increments to the heliport operating minima contained in Appendix 1 to OPS 3.430.

(b) Any sector of the flight which is to be conducted in IMC should not be planned to exceed 45 minutes.

AMC OPS-3.690(b)(6) Crew member interphone system

(See CAR OPS-3.690(b)(6))

(a) The means of determining whether or not an interphone call is a normal or an emergency call may be one or a combination of the following:
   (1) Lights of different colours;
   (2) Codes defined by the operator (e.g. Different number of rings for normal and emergency calls);
   (3) Any other indicating signal acceptable to the Authority.

IEM OPS-3.690(b)(7) Crewmember interphone system

(See CAR OPS-3.690(b)(7))

At least one interphone system station for use by ground personnel should be, where practicable, so located that the personnel using the system may avoid detection from within the Helicopter.

AMC OPS-3.700 Cockpit Voice Recorders

(See CAR OPS 3.700)

The operational performance requirements for Cockpit Voice Recorders should be those laid down in EUROCAE Document ED56 or ED56A (Minimum Operational Performance Requirements for Cockpit Voice Recorder Systems) December 1993 or as amended.

AC OPS 3.710 Cockpit Voice Recorders

(See CAR OPS-3.710)

Account should be taken of the operational performance requirements for Cockpit Voice Recorders as laid down in EUROCAE Documents ED56 or ED56A (Minimum Operational Performance Requirements for Cockpit Voice Recorder Systems) dated February 1988 and December 1993 respectively.

AC OPS 3.715 Flight Data Recorders

(See CAR OPS-3.715)

(a) The operational performance requirements for Flight Data Recorders should be those laid down in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.

(b) The parameters to be recorded should meet, as far as practicable, the performance specifications (designated ranges, sampling intervals, accuracy limits and minimum resolution in read-out) defined in the relevant tables of EUROCAE Minimum Operational Performance Specification for Flight Data Recorder Systems, Document ED 55 dated May 1990. The remarks columns of those tables are acceptable means of compliance to the parameter specifications.

(c) For Helicopters with novel or unique design or operational characteristics, the additional parameters should be those required in accordance with CS-25 or an equivalent accepted by the CAA during type or supplemental type certification or validation.

(d) If recording capacity is available, as many of the additional parameters specified in Table A1.5 of Document ED 55 (or as amended) dated May 1990 as possible should be recorded.

AC OPS-3.715/3.720 & 3.725 Flight Data Recorders

(See CAR OPS-3.720 /3.725)

(See Appendix 1 to AC OPS-3.715/3.720 & 3.725)

(a) The parameters to be recorded should meet the performance specifications (designated ranges, recording intervals and accuracy limits) defined in Table A of Appendix 1 to AC OPS3.720/3.725. Remarks in Table 1 of Appendix 1 to AC OPS-3.715/3.720/3.725 are acceptable means of compliance to the parameter's requirements.

(b) Flight data recorder systems, for which the recorded parameters do not comply with the performance specifications of Table A of Appendix 1 to AC OPS-3.715/3.720/3.725 (i.e. range, sampling intervals, accuracy limits and recommended resolution readout) may be acceptable to the Authority.

(c) For all Helicopters, so far as practicable, when further recording capacity is available, the recording of the following additional parameters should be considered:

(1) Remaining parameters in Table B of Appendix 1 to CAR OPS-3.720 or CAR OPS-3.725 as applicable;

(2) Any dedicated parameter relating to novel or unique design or operational characteristics of the Helicopter;

(3) operational information from electronic display systems, such as EFIS, ECAM or EICAS, with the following order of priority:

(i) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and auto-flight system engagement and mode indications if not recorded from another source;

(ii) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, Composite, Copy, etc.;

(iii) warning and alerts;

(iv) the identity of displayed pages from emergency procedures and checklists.

(4) retardation information including brake application for use in the investigation of landing overruns or rejected take offs; and

(5) additional engine parameters (EPR, N1, EGT, fuel flow, etc.)

(d) For the purpose of CAR OPS-3.720(d) and 3.720(e), the alleviation should be acceptable only when adding the recording of missing parameters to the existing flight data recorder system would require a major upgrade of the system itself. Account should be taken of the following:

(1) The extent of the modification required

(2) The down-time period; and

(3) Equipment software development.

(e) For the purpose of CAR OP-3.720(d) and 3.720(e), 3.725(c)(2) 3.725(c)(3) "capacity available" refers to the space on both Flight Data Acquisition Unit and the flight data recorder not allocated for recording the required parameters, or the parameters recorded for the purpose of CAR OPS3.037 (Accident prevention and flight safety programme) as acceptable to the Authority.

(f) For the purpose of CAR OPS-3.720(d)(1), 3.720(e)(1), 3.725(c)(2)(i) and 3.725(c)(3), a sensor is considered "readily available" when it is already available or can be easily incorporated.

Additional information to be considered

(a) Operational information from electronic display systems, such as Electronic Flight Instruments Systems (EFIS), Electronic Centralised Aircraft Monitor (ECAM) and Engine Indications and Crew Alerting System (EICAS). Use the following order of priority:

(1) Parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and auto-flight system

engagement and mode indications if not recorded from another source;
(2) Display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;
(3) Warnings and alerts;
(4) The identity of displayed pages for emergency procedures and checklists.

(b) Retardation information including brake application for use in the investigation of landing overruns and rejected take-offs; and

(c) Additional engine parameters (EPR, N1, EGT, fuel flow, etc.).

Table C – Description of Applications for Date Link Recorders

Item No	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services.	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the helicopter are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

AC OPS-3.727 Combination recorders

(See CAR OPS-3.727)

When two combination recorders are installed, one should be located near the cockpit, in order to minimise the risk of a data loss due to the failure of the wiring that gather data to the recorder. The other should be located at the rear of the Helicopter in order to minimise the risk of a data loss due to recorder damage in the case of a crash.

IEM OPS-3.740 Placards

(See CAR OPS-3.740)

The markings required must:

(a) Be painted, or affixed by other equally permanent means;
(b) Be red in colour, and in any case in which the colour of the adjacent back-ground is such as to render red markings not readily visible, be outlined in white or some other contrasting colour in such a manner as to render them readily visible;
(c) Be kept at all times clean and un-obscured.

AMC OPS-3.745 First-Aid Kits

(See CAR OPS-3.745)

List of contents in a First Aid Kit would include:

(a) Antiseptic swabs (10 packs)
(b) Bandage, adhesive strips
(c) Bandage, gauze 7.5 cm x 4.5m
(d) Bandage, triangular 100 cm. folded and safety pins;
(e) Dressing, burn 10 x 10cm;
(f) Dressing, compress, sterile 7.5cm x 12cm. approx.;
(g) Dressing, gauze, sterile 10.4x10.4cm. approx.;
(h) Adhesive tape, 2.5cm (roll);
(i) Skin closure strips;
(j) Hand cleanser or antiseptic cleansing swabs;
(k) Pad for shield or tape for eye;
(l) First Aid Scissors or trauma shears, 10cm (maximum)
(m) Adhesive tape, surgical 1.2 cm x 4.6 m;
(n) Tweezers, splinter;
(o) Disposable gloves (several pairs);
(p) Thermometers (non-mercury);
(q) Resuscitation mask with one way valve;
(r) First aid manual (an operator may decide to have one manual per aircraft I an early accessible location)
(s) Incident record form.

First aid kit could include the following medications.

(a) Mild to moderate analgesic
(b) Antiemetic
(c) Nasal decongestant
(d) Antacid
(e) Antihistamine
(f) Antidiarrheal
(g) Antibiotic burn cream
(h) Hydrocortisone sunburn cream

A list of contents in 2 languages (English and Arabic) will be placed inside the First Aid Kit tamperproof box. This list will also include information on the effects and side effects of medications carried.

AMC OPS-3.755 Universal Precaution Kit

(See CAR OPS-3.755)

The following should be included in the emergency medical kit carried in the Helicopter:

(a) Dry powder that can convert small liquid spill into a sterile granlauted gel

(b) Germicidal disinfectant for surface cleaning
(c) Skin wipes
(d) Face/eye mask (Separate or combined)
(e) Gloves (disposable)
(f) Protective apron
(g) Large absorbent towel
(h) Pick-up scoop with scraper
(i) Bio-hazard disposal waste bag
(j) Sphygmomanometer- non mercury
(k) Stethoscope
(l) Syringes and needles Oropharyngeal airways (2 sizes) Tourniquet
(m) Coronary vasodilator e.g. nitro-glycerine, Anti-smasmodic e.g. hyascene Epinephrine 1:1,000
(n) Adrenocortical steroid e.g. hydrocortisone Major analgesic e.g. nalbuphine
(o) Diuretic e.g. fursemide
(p) Antihistamine e.g. diphenhydramine hydrochloride Sedative/anticonvulsant e.g. diazepam
(q) Medication for Hypoglycaemia, hypertonic glucose and/or glucagon Antiemetic e.g. metoclopramide
(r) Atropine Digoxin
(s) Disposable Gloves
(t) Bronchial Dilator – injectable and inhaled form
(u) Needle Disposal Box
(v) Catheter
(w) A list of contents in 2 languages (English and Arabic). This should include information on the effects and side effects of drugs carried.

IEM OPS-3.760 First-aid Oxygen

(See CAR OPS-3.760)

(1) First–aid oxygen is intended for those passengers who, having been provided with the supplemental oxygen required under CAR OPS-3.770, still need to breathe undiluted oxygen when the amount of supplemental oxygen has been exhausted.
(2) When calculating the amount of first-aid oxygen, an operator should take into account the fact that, following a cabin depressurisation, supplemental oxygen as calculated in accordance with Appendix 1 to CAR OPS-3.770 should be sufficient to cope with hypoxic problems for:
    (a) all passengers when the cabin altitude is above 15,000 ft; and
    (b) a proportion of the passengers carried when the cabin altitude is between 10,000 ft and 15,000 ft.
(3) For the above reasons, the amount of first-aid oxygen should be calculated for the part of the flight after cabin depressurisation during which the cabin altitude is between 8,000 ft and 15,000 ft, when supplemental oxygen may no longer be available.
(4) Moreover, following cabin depressurisation an emergency descent should be carried out to the lowest altitude compatible with the safety of the flight. In addition, in these circumstances, the Helicopter should land at the first available heliport at the earliest opportunity.
(5) The conditions above should reduce the period of time during which the first-aid oxygen may be required and consequently should limit the amount of first-aid oxygen to be carried on board.

IEM OPS-3.770 Supplemental Oxygen – Pressurised Helicopters

(See CAR OPS-3.770)

(1) A quick donning mask is the type of mask that:
    (a) Can be placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand and within 5 seconds and will thereafter remain in

position, both hands being free;

(b) Can be put on without disturbing eye glasses and without delaying the flight crew member from proceeding with assigned emergency duties;

(c) After being put on, does not prevent immediate communication between the flight crew members and other crew members over the Helicopter intercommunication system;

(d) Does not inhibit radio communications.

(2) In determining the supplemental oxygen for the routes to be flown, it is assumed that the Helicopter will descend in accordance with the emergency procedures specified in the Operations Manual, without exceeding its operating limitations, to a flight altitude that will allow the flight to be completed safely (i.e. flight altitudes ensuring adequate terrain clearance, navigational accuracy, hazardous weather avoidance etc.)

Appendix 1 to CAR OPS-3.770 Supplemental Oxygen – Minimum Requirements for Pressurised Helicopters

(a)	(b)
SUPPLY FOR:	**DURATION AND CABIN PRESSURE ALTITUDE**
1. All occupants of flight deck seats on flight deck duty	Entire flight time when the cabin pressure altitude exceeds 13,000 ft and entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 13 000 ft after the first 30 minutes at those altitudes, but in no case less than: (1) 30 minutes for Helicopters certificated to fly at altitudes not exceeding 25,000 ft (Note 2) (2) 2 hours for Helicopters certificated to fly at altitudes more than 2,000 ft (Note 3).
2. All required cabin crew members	Entire flight time when cabin pressure altitude exceeds 13,000 ft but not less than 30 minutes (Note 2), and entire flight time when cabin pressure altitude is greater than 10,000 ft but does not exceed 13,000 ft after the first 30 minutes at these altitudes.
3. 100% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 15,000 ft but in no case less than 10 minutes. (Note 4)
4. 30% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 14,000 ft but does not exceed 15,000 ft.
5. 10% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 14,000 ft after the first 30 minutes at these altitudes.

Note 1: The supply provided must take account of the cabin pressure altitude and descent profile for the routes concerned.

Note 2: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the Helicopter's maximum certificated operating altitude to 10,000 ft in 10 minutes and followed by 20 minutes at 10,000 ft.

Note 3: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the Helicopter's maximum certificated operating altitude to 10 000 ft in 10 minutes and followed by 110 minutes at 10,000 ft. The oxygen required in CAR OPS-3.780(a)(1) may be included in determining the supply required.

Note 4: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the Helicopter's maximum certificated operating altitude to 15,000 ft in 10 minutes.

Note 5: For the purpose of this table 'passengers' means passengers actually carried and includes infants.

AC OPS-3.770(b)(2)(v) Supplemental Oxygen - Pressurised Helicopters (Not certificated to fly above 25,000 ft)

(See CAR OPS-3.770 (b)(2)(v))

(1) With respect to CAR OPS-3.770(b)(2)(v) the maximum altitude up to which a Helicopter can operate, without a passenger oxygen system installed and capable of providing oxygen to each cabin occupant, should be established using an emergency descent profile which takes into account the following conditions:
   (a) 17 seconds time delay for pilot's recognition and reaction including mask donning, for trouble shooting and configuring the Helicopter for the emergency descent;
   (b) maximum operational speed (VMO) or the airspeed approved in the Helicopter Flight Manual for emergency descent, whichever is the less;
   (c) all engines operative;
   (d) the estimated mass of the Helicopter at the top of climb.

(2) Emergency descent data (charts) established by the Helicopter manufacturer and published in the Helicopter Operating Manual and/or Helicopter Flight Manual should be used to ensure uniform application of the rule.

(3) On routes where the oxygen is necessary to be carried for 10% of the passengers for the flight time between 10,000ft and 13,000ft the oxygen may be provided either:
   (a) by a plug-in or drop-out oxygen system with sufficient outlets and dispensing units uniformly distributed throughout the cabin so as to provide oxygen to each passenger at his own discretion when seated on his assigned seat; or:
   (b) by portable bottles when a fully trained cabin crew member is carried on board of each such flight.

Appendix 1 to CAR OPS-3.775 Supplemental Oxygen for Non-Pressurised Helicopters

(a)	(b)
SUPPLY FOR:	**DURATION AND PRESSURE ALTITUDE**
(1) All occupants of flight deck seats on flight deck duty	Entire flight time at pressure altitudes above 10,000 ft
(2) All required cabin crew members	Entire flight time at pressure altitudes above 13,000 ft and for any period exceeding 30 minutes at pressure altitudes above 10,000 ft but not exceeding 13,000 ft
(3) 100% of passengers (See Note)	Entire flight time at pressure altitudes above 13,000 ft.
(4) 10% of passengers (See Note)	Entire flight time after 30 minutes at pressure altitudes greater than 10 000 ft but not exceeding 13,000 ft.

Note: For the purpose of this table 'passengers' means passengers actually carried and includes infants under the age of two (2) years.

Appendix 1 to CAR OPS-3.785 HUD, VS or Equivalent Head Up Display (HUD), Vision System (VS) or Equivalent

(See CAR-OPS-3.785)

Introduction

The material in this attachment provides guidance for certified HUD and vision systems intended for operational use in aircraft engaged in international air navigation. A HUD, vision systems and hybrid systems may be installed and operated to provide guidance, enhance situational awareness and/or to obtain an operational credit by establishing minima below the heliport operating minima, for approach ban purposes, or reducing the visibility requirements or requiring fewer ground facilities as compensated for by airborne capabilities. HUD and vision systems may be installed separately or together as part of a hybrid system. Any operational credit to be obtained from their use require approval from the State of Registry/ Operator.

Note 1: "Vision systems" is a generic term referring to the existing systems designed to provide images, i.e. enhanced vision systems (EVS), synthetic vision systems (SVS) and combined vision systems (CVS).

Note 2: Operational credit can be granted only within the limits of the design approval.

Note 3: Currently, operational credit has been given only to vision systems containing an image sensor providing a real-time image of the actual external scene on the HUD.

1 **HUD and equivalent displays**

1.1 General

1.1.1 A HUD presents flight information into the pilot's forward external field of view without significantly restricting that external view.

1.1.2 A variety of flight information may be presented on a HUD depending on the intended flight operation, flight conditions, systems capabilities and operational approval. A HUD may include, but is not limited to, the following:

(a) airspeed;
(b) altitude;
(c) heading;
(d) vertical speed;
(e) angle of attack;
(f) flight path or velocity vector;
(g) attitude with bank and pitch references;
(h) course and glide path with deviation indications;
(i) status indications (e.g. navigation sensor, autopilot, flight director); and
(j) alerts and warning displays (e.g. ACAS, wind shear, ground proximity warning).

1.2 Operational applications

1.2.1 Flight operations with a HUD can improve situational awareness by combining flight information located on head-down displays with the external view to provide pilots with more immediate awareness of relevant flight parameters and situation information while they continuously view the external scene. This improved situational awareness can also reduce errors in flight operations and improve the pilot's ability to transition between instrument and visual references as meteorological conditions change. Flight operations applications may include the following:

(a) enhanced situational awareness during all flight operations, but especially during taxi, take-off, approach and landing;
(b) reduced flight technical error during take-off, approach and landing; and
(c) improvements in performance due to precise prediction of touchdown area, tail strike awareness/warning and rapid recognition of and recovery from unusual attitudes.

1.2.2 A HUD may be used for the following purposes:

(a) to supplement conventional flight deck instrumentation in the performance of a particular task or operation. The primary cockpit instruments remain the primary means for manually controlling or manoeuvring the aircraft; and (b) as a primary flight display;

(i) information presented by the HUD may be used by the pilot in lieu of scanning head-down displays. Operational approval of a HUD for such use allows the pilot to control the aircraft by reference to the HUD for approved ground or flight operations; and

(ii) information presented by the HUD may be used as a means to achieve additional navigation or control performance. The required information is displayed on the HUD. Operational credit, in the form of lower minima, for a HUD used for this purpose may be approved for a particular aircraft or automatic flight control system. Additional credit may also be allowed when conducting HUD operations in situations where automated systems are otherwise used.

1.2.3 A HUD, as a stand-alone system, may qualify for operations with reduced visibility or RVR or replace some parts of the ground facilities such as touchdown zone and/or centre line lights. Examples and references to publications in this regard can be found in the Manual of All-Weather Operations(Doc 9365).

1.2.4 A HUD equivalent display is one that has at least the following characteristics; a head-up presentation not requiring transition of visual attention from head down to head up; displays sensor- derived imagery conformal with the pilot's external view; permits simultaneous view of the EVS sensor imagery, required aircraft flight symbology, and the external view; and display characteristics and dynamics are suitable for manual control of the aircraft. Before such systems can be used, the appropriate airworthiness and operational approvals should be obtained.

1.3 HUD training

1.3.1 Training requirements should be established, monitored and approved by the Authority of the State of Registry for general aviation. Training requirements should include requirements for recent experience if the State determines that these requirements are significantly different than the current requirements for the use of conventional head- down instrumentation.

1.3.2 HUD training should address all flight operations for which the HUD is designed and operationally approved. Some training elements may require adjustments based on whether the Helicopter has a single or dual HUD installation. Training should include contingency procedures required in the event of head-up display degradation or failure. HUD training should include the following elements as applicable to the intended use:

(a) an understanding of the HUD, its flight path, energy management concepts and symbology. This should include operations during critical flight events (e.g. ACAS Traffic Advisory/Resolution Advisory, upset and wind shear recovery, engine or system failure);

(b) HUD limitations and normal procedures, including maintenance and operational checks performed to ensure normal system function prior to use. These checks include pilot seat adjustment to attain and maintain appropriate viewing angles and verification of HUD operating modes;

(c) HUD use during low visibility operations, including taxi, take-off, instrument approach and landing in both day and night conditions. This training should include the transition from head down to head-up and head-up to head-down operations;

(d) failure modes of the HUD and the impact of the failure modes or limitations on crew performance;

(e) crew coordination, monitoring and verbal call-out procedures for single HUD installations with head-down monitoring for the pilot not equipped with a HUD and head-up monitoring for the pilot equipped with a HUD;

(f) crew coordination, monitoring and verbal call-out procedures for dual HUD installations with use of a HUD by the pilot flying the aircraft and either head-up or head-down monitoring by the other pilot;

(g) consideration of the potential for loss of situational awareness due to "tunnel vision" (also known as cognitive tunnelling or attention tunnelling);

(h) any effects that weather, such as low ceilings and visibilities, may have on the performance of a

(i) HUD; and

(ii) HUD airworthiness requirements.

2 **Vision systems**

2.1 General

2.1.1 Vision systems can display electronic real-time images of the actual external scene achieved through the use of image sensors (EVS) or display synthetic images, which are derived from the onboard avionic systems (SVS). Vision systems can also consist of a combination of these two systems or combined vision systems (CVS). Such a system may display electronic real-time images of the external scene using the EVS component of the system. However, the merging of EVS and SVS into a CVS is dependent on the intended function (e.g. whether or not there is intent to achieve operational credit).

2.1.2 The information from vision systems may be displayed on a head-up or head-down display. When enhanced vision imagery is displayed on a HUD, it should be presented to the pilot's forward external field of view without significantly restricting that external view.

2.1.3 The enhanced position fixing and guidance provided by SVS may provide additional safety for all phases of flight especially low visibility taxi, take-off, approach and landing operations.

2.1.4 Light emitting diode (LED) lights may not be visible to infrared-based vision systems due to the fact that LED lights are not incandescent and they do not have a significant heat signature. Operators of such vision systems will need to acquire information about the LED implementation programmes at heliports where they operate.

2.2 Operational applications

2.2.1 Flight operations with enhanced vision image sensors allow the pilot to view an image of the external scene obscured by darkness or other visibility restrictions. When the external scene is partially obscured, enhanced vision imaging may allow the pilot to acquire an image of the external scene earlier than with natural or unaided vision. The improved acquisition of an image of the external scene may improve situational awareness.

2.2.2 Vision system imagery may also allow pilots to detect terrain or obstructions on the runway or taxiways. A vision system image can also provide visual cues to enable earlier runway alignment and a more stabilized approach.

2.2.3 The combined display of aircraft performance, guidance and imagery may allow the pilot to maintain a more stabilized approach and smoothly transition from enhanced visual references to natural visual references.

2.3 Vision systems training

2.3.1 Training requirements should be established, monitored and approved by the Authority. Training requirements should include recency of experience requirements if the Authority determines that these requirements are significantly different than the current requirements for the use of a HUD without enhanced vision imagery or conventional head-down instrumentation.

2.3.2 Training should address all flight operations for which the vision system is approved. This training should include contingency procedures required in the event of system degradation or failure. Training for situational awareness should not interfere with other required operations. Training for operational credit should also require training on the applicable HUD used to present the enhanced visual imagery. Training should include the following elements as applicable:

(a) an understanding of the system characteristics and operational constraints;
(b) normal procedures, controls, modes and system adjustments (e.g. sensor theory including radiant versus thermal energy and resulting images);
(c) operational constraints, normal procedures, controls, modes and system adjustments;
(d) limitations;
(e) airworthiness requirements;
(f) vision system display during low visibility operations, including taxi, take-off, instrument approach and landing; system use for instrument approach procedures in both day and night conditions;
(g) failure modes and the impact of failure modes or limitations upon crew performance, in particular, for two-pilot operations;
(h) crew coordination and monitoring procedures and pilot call-out responsibilities;
(i) transition from enhanced imagery to visual conditions during runway visual acquisition;
(j) rejected landing: with the loss of visual cues of the landing area, touchdown zone or rollout area;
(k) any effects that weather, such as low ceilings and visibilities, may have on the performance of the vision system; and
(l) effects of heliport lighting using LED lights.

2.4 Operational concepts

2.4.1 Instrument approach operations that involve the use of vision systems include the instrument phase and the visual phase. The instrument phase ends at the published MDA/H or DA/H unless a missed approach is initiated. The continued approach to landing from MDA/H or DA/H will be conducted using visual references. The visual references will be acquired by use of an EVS or CVS, natural vision or a combination of the two.

2.4.2 Down to a defined height, typically 30 m (100 ft), the visual references will be acquired by means of the vision system. Below this height the visual references should be solely based on natural vision. In the most advanced applications, the vision system is expected to be able to be used down to touchdown without the requirement for natural vision acquisition of visual references. Using the EVS or CVS does not change the classification of an instrument approach procedure, since the published DA/H remains unchanged and manoeuvring below DA/H is conducted by visual references acquired by means of the an EVS or CVS.

2.4.3 In addition to the operational credit that EVS/CVS is able to provide, these systems may also provide an operational and safety advantage through improved situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for Type A approach operations than for Type B approach operations

2.5 Visual references

2.5.1 The required visual references do not change due to the use of an EVS or CVS, but those references are allowed to be acquired by means of either vision system until a certain height during the approach.

2.5.2 In regions that have developed requirements for operations with vision systems, the visual references are indicated in Table 2.B-1.

Table2.B-1

OPERATIONS BELOW DA/DH OR MDA/MDH	
Example 1	**Example 2**
For procedures designed to support Type A operations, the following visual references for the intended runway should be distinctly visible and identifiable: (a) the approach lighting system; or (b) the runway threshold, identified by at least one of the following: − the beginning of the runway landing surface; − threshold lights; or − runway end identifier lights; and (c) the touchdown zone, identified by at least one of the following: − the runway touchdown zone landing surface; − touchdown zone lights; − touchdown zone markings; or − runway lights.	For procedures designed to support 3D Type A and Type B Cat I operations, the following visual references should be displayed and identifiable to the pilot on the EVS image: (a) elements of the approach lighting system; or (b) the runway threshold, identified by at least one of the following: − the beginning of the runway landing surface; − threshold lights; − threshold identification lights; or − the touchdown zone, identified by at least one of the following: (c) the runway touchdown zone landing surface; - touchdown zone lights; - touchdown zone markings; or - runway lights
Operations below 60 m (200 ft) above touch down zone elevation –	Operations below 60 m (200 ft) above threshold elevation –
No additional requirements apply at 60 m (200 ft)	For procedures designed to support 3D Type A operations, the visual references are the same as those specified below for Type B Cat I
Operations below 30 m (100 ft) above touch down zone elevation –	Operations below 30 m (100 ft) above threshold elevation –
The visibility should be sufficient for the following to be distinctly visible and identifiable to the pilot without reliance on the EVS: (a) the lights or markings of the threshold; or (b) the lights or markings of the touchdown zone.	For procedures designed to support Type B Cat II operations, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot without reliance on the EVS: (a) the lights or markings of the threshold; or (b) the lights or markings of the touchdown zone.

3 **Hybrid systems**

3.1 A hybrid system generically means that two or more systems are combined. The hybrid system typically has improved performance compared to each of the component systems, which in turn may qualify for operational credit. Vision systems are normally part of a hybrid system,
e.g. EVS is typically combined with a HUD. Including more components in the hybrid system normally enhances the performance of the system.

3.2 Table 2.B-2 provides some examples of hybrid system components. Any combination of the listed systems may constitute a hybrid system. The degree of operational credit that may be given to a hybrid system depends on its performance (accuracy, integrity and availability) as assessed and determined by the certification and operational approval processes.

Table 2.B-2. Examples of Hybrid system components

Systems based on image sensors	Systems not based on image sensors
EVS • Passive infrared sensors • Active infrared sensors • Passive millimetre wave radiometer • Active millimetre wave radar	SVS
	Auto-flight systems, flight control computers, automatic landing systems
	Systems for position fixing
CVS (where the EVS component as above qualifies for operational credit)	CVS (the SVS component)
	HUD, equivalent display
	ILS, GNSS

4 **Operational credits**

4.1 Heliport operating minima are expressed in terms of minimum visibility/RVR and MDA/H or DA/H. With respect to operational credit this means that the visibility/RVR requirements, established in the instrument approach procedure, may be reduced or satisfied for aircraft equipped with appropriately approved vision systems such as EVS. Reasons for granting operational credit may be when aircraft are better equipped than what was originally considered when designing the instrument approach procedure or when runway visual aids considered in the design of the procedure are not available but can be compensated by on- board equipment.

4.2 Credits related to visibility/RVR can be given using at least three concepts. The first concept is to reduce the required RVR which will allow the aircraft to continue the approach beyond the approach ban point with a reported RVR lower than what was established for the approach procedure. Where a minimum visibility is prescribed, a second concept to grant operational credit may be used. In this case, the required minimum visibility is kept unchanged, but it is satisfied by means of the on-board equipment, typically an EVS. The result of both these concepts is that operations are allowed in meteorological conditions where otherwise they would not be possible. A third concept is to give operational credit by

allowing operations in visibility/RVR which are not lower than those established for the approach procedure, but the approach operation is conducted with less facilities on the ground. One example of the latter is to allow category II operations without touchdown and/or centre line lights, compensated by additional on-board equipment, e.g. a HUD.

4.3 Granting operational credits does not affect the classification of an instrument approach procedure since, instrument approach procedures are designed to support a given instrument approach operation (i.e. Type, Category). However, the design of those procedures may not take into consideration on-board equipment that may compensate for facilities on the ground.

4.4 In order to provide optimum service, the ATS may have to be informed about the capabilities of the better-equipped aircraft, e.g. which is the minimum RVR required.

4.5 In addition to the operational credit that HUD, vision systems and hybrid systems are able to provide, these systems will also provide an operational and safety advantage through improved situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for 3D Type A approach operations than for Type B approach operations.

5 **Operational Procedures**

5.1 It is not prohibited to use vision systems in connection with circling. However, due to the system layout of a vision system and the nature of a circling procedure, key visual references can be obtained only by natural vision, and operational credit is not feasible for existing vision systems. The vision system may provide additional situational awareness.

5.2 The operational procedures associated with the use of a HUD, vision systems and hybrid systems should be included in the operations manual. The instructions in the operations manual should include:

(a) any limitation that is imposed by the airworthiness or operational approvals; (b) how operational credit affects:

(1) flight planning with respect to destination and alternate heliports;
(2) ground operations;
(3) flight execution, e.g. approach ban and minimum visibility;
(4) crew resource management that takes into account the equipment configuration, e.g. the pilots may have different presentation equipment;
(5) standard operating procedures, e.g. use of auto-flight systems, call-outs that may be particular to the vision system or hybrid system, criteria for stabilized approach;
(6) ATS flight plans and radio communication.

6 **Approvals**

6.1 General

6.1.1 An operator that wishes to conduct operations with a HUD or equivalent display, vision system or hybrid system will need to obtain certain approvals (See Annex 6, Part I, 4.2.8.1.1 and 6.23, and the corresponding requirements in Annex 6, Parts II and III). The extent of the approvals will depend on the intended operation and the complexity of the equipment.

6.1.2 Enhanced vision imagery may be used to improve situational awareness without a specific operational approval. However, the standard operating procedures for these types of operations need to be specified in the operations manual. An example of this type of operation may include an EVS or an SVS on a head-down display that is used only for situational awareness of the surrounding area of the aircraft during ground operations where the display is not in the pilot's primary field of view. For enhanced situational awareness, the installation and operational procedures need to ensure that the operation of the vision system does not interfere with normal procedures or the operation or use of other aircraft systems. In some cases, modifications to these normal procedures for other aircraft systems or equipment may be necessary to ensure compatibility.

6.1.3 When a vision system or a hybrid system with vision systems imagery is used for operational credit, operational approvals will typically require that the imagery be combined with flight guidance and presented on a HUD. Operational approvals may require that this information also be presented on a head-down display. Operational credit may be applied for any flight operation, but credit for instrument approach and take-off operations is most common.

6.1.4 When the application for approval relates to operational credits for systems not including a vision system, the guidance in this attachment may be used to the extent applicable as determined by the Authority for general aviation.

6.1.5 Operators should be aware that some States may require some information about the operational credit(s) which has been granted by the Authority or the State of Registry for general aviation. Typically the approval from that State will have to be presented, and in some cases the State of the Heliport may wish to issue an approval or to validate the original approval.

6.2 Approvals for operational credit:

1. To obtain operational credit the operator will need to specify the desired operational credit and submit a suitable application. The content of a suitable application should include:

(a) Applicant details —– required for all approval requests. The official name and business or trading name(s), address, mailing address, e-mail address and contact telephone/fax numbers of the applicant.

Note: For AOC holders, the company name, AOC number and e-mail address should be required.

(b) Aircraft details — required for all approval requests. Aircraft make(s), model(s) and registration mark(s).

(c) Operator's vision system compliance list. The contents of the compliance list are included in Table 2.B-3. The compliance list should include the information that is relevant to the approval requested and the registration marks of the aircraft involved. If more than one type of aircraft/fleet is included in a single application a completed compliance list should be included for each aircraft/fleet.

(d) Documents to be included with the application. Copies of all documents referred to in column 4 of the operator's vision system compliance list (Table 2.B-3) should be included when returning the completed application form to the civil aviation Authority. There should no need to send complete manuals; only the relevant sections/pages should be required.

(e) Name, title and signature.

2. The Operator shall apply to the Authority for operational credit(s) authorization for operations with advanced aircraft. Where the operational credit relates to low visibility operations, the Authority shall issue a specific approval. Such authorizations shall not affect the classification of the instrument approach procedure.

   Note 1.- Operational credit includes:

   (a) For the purposes of an approach ban (An instrument approach shall not be continued below 300 m (1 000 ft) above the heliport elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the heliport operating minima) or dispatch considerations, a minimum below the heliport operating minima;

   Note1.-Guidance on operational credit and how to express the operational credit in the Operations Specifications is contained in the Manual of All-Weather Operations(ICAO Doc 9365)

3. The applicant for a specific approval for the operational credit, the Operator shall ensure that:

   a) The Helicopter meets the appropriate airworthiness certification requirements;
   b) the information necessary to support effective crew tasks for the operation is appropriately available to both pilots where the number of flight crew members specified in the operations manual is more than one;
   c) the operator has carried out a safety risk assessment of the operations supported by the equipment;
   d) the operator has established and documented normal and abnormal procedures and MEL;
   e) The operator has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;
   f) the operator has established a system for data collection, evaluation and trend monitoring for low visibility operations for which there is an operational credit; and
   g) the operator has instituted appropriate procedures in respect of continuing airworthiness (maintenance and repair) practices and programmes.

   Note 1. Guidance on Safety risk assessments is contained in ICAO Doc 9859 Note 2. Guidance on Operational approvals is contained in ICAO Doc 9365

4. For operations with operational credit with minima above those related to low visibility operations, the operator shall comply with the Authority established criteria for the safe operation of the aeroplane.

   Note. -Guidance on operational credit for operations with minima above those related to low visibility operations is contained in the Manual of All-Weather Operations (ICAO Doc 9365).

Table 2.B-3 Example of an AOC vision system compliance list

Main Heading	Expanded areas to be addressed by the application / Sub- requirements	Operator's operations manual reference or document reference
1. Reference documents used in compiling the submission	The submission should be based on current up-to-date regulatory material. A compliance statement showing how the criteria of the applicable regulations and requirements have been satisfied.	
2. Aircraft flight manual (AFM)	A copy of the relevant AFM entry showing the aircraft certification basis for the vision system and any operational conditions.	
3. Feedback and reporting of Significant problems	An outline of the process for the reporting of failures in the operational use of procedures. *Note: In particular, significant problems with the vision system/ HUD systems, reporting on circumstances/ locations where the vision system was unsatisfactory.*	
4. Instrument approach chart provider and operating minima	The name of the provider of the relevant instrument approach charts. Confirmation that all heliport operating minima are established in accordance with criteria specified by the relevant Authority.	

Main Heading	Expanded areas to be addressed by the application / Sub- requirements	Operator's operations manual reference or document reference
5.Operations manual entries and SOP Sub Requirements	Manufacturer/operator developed. Manufacturer's procedures are recommended as a starting point and should include at least the items in the sub-requirements below. Definitions. Check crew qualified for vision system/HUD operations. MEL handling. Equipment required for vision system operations. Types of approach where vision systems can be used. Statement that the autopilot/flight director should be used whenever possible. Minimum visual references for landing. Approach ban and RVR. Stabilized approach criteria. Correct seating and eye position. Crew coordination, e.g. duties of the pilot flying and the pilot not flying: - limitations; - designation of handling and non- handling pilots; - use of automatic flight control system; - checklist handling; - approach briefing; - radio communications handling; - monitoring and cross-checking of instruments and radio aids; and - use of the repeater display by the pilot not flying. Contingency procedures including: • failures above and below decision height; • ILS deviation warnings; • autopilot & auto-throttle disconnect; • electrical failures; • engine failure; • failures and loss of visual references at or below decision height; • vision system/HUD failure below normal decision height; • wind shear; • ACAS warnings; EGPWS warnings.	
6. Safety risk assessment	Sub requirements: Operator's safety risk assessment	

AMC-1 OPS-3.790 Hand Fire Extinguishers

(See CAR OPS-3.790)

(a) The number and location of hand fire extinguishers should be such as to provide adequate availability for use, account being taken of the number and size of the passenger compartments, the need to minimise the hazard of toxic gas concentrations and the location of toilets, galleys etc. These considerations may result in the number being greater than the minimum prescribed.

(b) There should be at least one fire extinguisher suitable for both flammable fluid and electrical equipment fires installed on the flight deck. Additional extinguishers may be required for the protection of other compartments accessible to the crew in flight. Dry chemical fire extinguishers should not be used on the flight deck, or in any compartment not separated by a partition from the flight deck, because of the adverse effect on vision during discharge and, if conductive, interference with electrical contacts by the chemical residues.

(c) Where only one hand fire extinguisher is required in the passenger compartments it should be located near the cabin crew member's station, where provided.

(d) Where two or more hand fire extinguishers are required in the passenger compartments and their location is not otherwise dictated by consideration of paragraph (1) above, an extinguisher should be located near each end of the cabin with the remainder distributed throughout the cabin as evenly as is practicable.

(e) Unless an extinguisher is clearly visible, its location should be indicated by a placard sign or an appropriate symbol.

AMC-2 OPS-3.790 Hand Fire Extinguishers

Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in a Helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in a Helicopter for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall:

(a) meet the applicable minimum performance requirements of the State of Registry; and

(b) not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.

Note: Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.

AMC OPS-3.810 Megaphones

(See CAR OPS-3.810)

(a) Where one megaphone is required, it should be readily accessible from a cabin crew member's assigned seat. Where two or more megaphones are required, they should be suitably distributed in the passenger cabin(s) and readily accessible to crew members assigned to direct emergency evacuations.

(b) This does not necessarily require megaphones to be positioned such that they can be reached by a crew member when strapped in a cabin crew member's seat.

(c) In the event of a known emergency situation, where the use of the megaphone may be required it should be relocated to a position readily accessible to the cabin crew member's seat.

AC OPS-3.820 Emergency Locator Transmitter (ELT)

(See CAR OPS-3.820, CAR OPS-3.830(c) and CAR OPS-3.835(b))

(a) Types of automatic Emergency Locator Transmitters are defined as follows:

(1) Automatic Fixed (ELT (AF)). This type of ELT is intended to be permanently attached to the helicopter before and after a crash and is designed to aid SAR teams in locating a crash site;

(2) Automatic Portable (ELT (AP)). This type of ELT is intended to be rigidly attached to the helicopter before a crash, but readily removable from the helicopter after a crash. It functions as an ELT during the crash sequence. If the ELT does not employ an integral antenna, the aircraft-mounted antenna may be disconnected and an auxiliary antenna (stored on the ELT case) attached to the ELT. The ELT can be tethered to a survivor or a life-raft. This type of ELT is intended to aid SAR teams in locating the crash site or survivor(s);

(3) Automatic Deployable (ELT (AD)). This type of ELT is intended to be rigidly attached to the helicopter before the crash and automatically ejected and deployed after the crash sensor has determined that a crash has occurred. This type of ELT should float in water and is intended to aid SAR teams in locating the crash site.

(b) To minimise the possibility of damage in the event of crash impact, the Automatic Emergency Locator Transmitter should be rigidly fixed to the helicopter structure as far aft as practicable with its antenna and connections so arranged as to maximise the probability of the signal being radiated after a crash.

IEM OPS-3.825 Life Jackets

(See CAR OPS-3.825)

For the purpose of CAR OPS-3.825, seat cushions are not considered to be flotation devices when calculating the number of life jackets required to be on the aircraft.

AMC OPS 3.827 Crew Survival Suits – Estimating Survival Time

(See OPS 3.827)

(a) Introduction

(1) A person accidentally immersed in cold seas (typically offshore Northern Europe) will have a better chance of survival if he is wearing an effective survival suit in addition to a life-jacket. By wearing the survival suit, he can slow down the rate which his body temperature falls and protect himself from the greater risk of drowning brought about by incapacitation due to hypothermia.

(2) The complete survival suit system – suit, life-jacket and clothes worn under the suit – should be able to keep the wearer alive long enough for the rescue services to find and recover him. In practice the limit is about 3 hours. If a group of persons in the water cannot be rescued within this time they are likely to have become so scattered and separated that location will be extremely difficult, especially in the rough water typical of Northern European sea areas. If it is expected that in water protection is required for periods greater than 3 hours, improvements should be sought in the search and rescue procedures rather than in the immersion suit protection.

(b) Survival times

(1) The aim must be to ensure that a man in the water can survive long enough to be rescued, i.e. his survival time must be greater than the likely rescue time. The factors affecting both times are shown in Figure 1. The figure emphasises that survival time is influenced by many factors, physical and human.

Some of the factors are relevant to survival in cold water, some are relevant in water at any temperature.

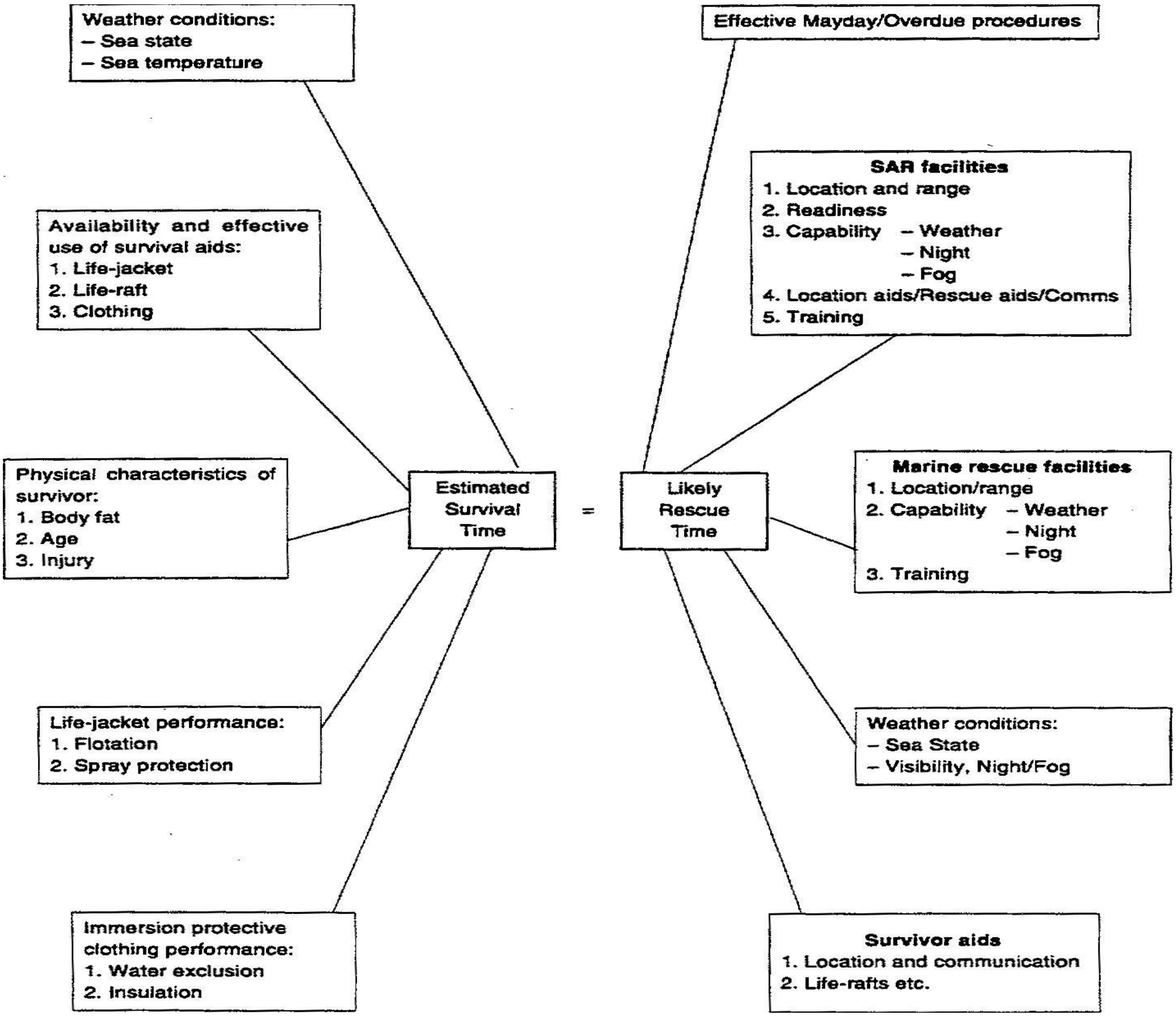


Fig. 1 The Survival Equation

(2) Broad estimates of likely survival times for the thin offshore individual are given in Fig. 2. As survival time is significantly affected by the prevailing weather conditions at the time of immersion, the Beaufort wind scale has been used as an indicator of these surface conditions.

Clothing assembly	Beaufort wind force	Times within which the most vulnerable individuals are likely to drown	
		(water temp 5°c)	(water temp 13°c)
Working clothes (no immersion suit)	0 – 2	Within ¾ hour	Within 1 ¼ hours
	3 – 4	Within ½ hour	Within ½ hour
	5 and above	Significantly less than ½ hour	Significantly less than ½ hour
Immersion suit worn over working clothes (with leakage inside suit)	0 -2	May well exceed 3 hours	May well exceed 3 hours
	3 – 4	Within 2 ¾ hours	May well exceed 3 hours
	5 and above	Significantly less than 2 ¾ hours. May well exceed 1 hour	May well exceed 3 hours

(3) Consideration must also be given to escaping from the helicopter itself should it submerge or invert in the water. In this case escape time is limited to the length of time the occupants can hold their breath. The breath hold time can be greatly reduced by the effect of cold shock. Cold shock is caused by the sudden drop in skin temperature on immersion, and is characterised by a gasp reflex and uncontrolled breathing.
The urge to breathe rapidly becomes overwhelming and, if still submerged, the individual will inhale water resulting in drowning. Delaying the onset of cold shock by wearing an immersion suit will extend the available escape time from a submerged helicopter.
(4) The effects of water leakage and hydrostatic compression on the insulation quality of clothing are well recognised. In a nominally dry system the insulation is provided by still air trapped within the clothing fibres and between the layers of suit and clothes. It has been observed that many systems lose some of their insulative capacity either because the clothes under the 'waterproof' survival suit get wet to some extent or because of hydrostatic compression of the whole assembly. As a result of water leakage and compression, survival times will be shortened. The wearing of warm clothing under the suit is recommended.
(5) Whatever type of survival suit and other clothing is provided, it should not be forgotten that significant heat loss can occur from the head.

AMC OPS 3.830(a)(2) Life-rafts and ELT for Extended Overwater Flights

(See OPS 3.830(a)(2))

(a) Each life-raft required by OPS 3.830 shall conform to the following specification:
  (1) They shall be of an approved design and stowed so as to facilitate their ready use in an emergency;
  (2) They shall be radar conspicuous to standard airborne radar equipment;
  (3) When carrying more than one life-raft on board, at least 50% shall be jettisonable by the crew while seated at their normal station, where necessary by remote control;
  (4) Those life-rafts which are not jettisonable by remote control or by the crew shall be of such weight as to permit handling by one person. 40 kg shall be considered a maximum weight.
(b) Each life-raft required by OPS 3.830 shall contain at least the following:
  (1) One approved survivor locator light;
  (2) One approved visual signalling device;
  (3) One canopy (for use as a sail, sunshade or rain catcher;
  (4) One radar reflector;
  (5) One 20 m retaining line designed to hold the life-raft near the helicopter but to release it if the helicopter becomes totally submerged;
  (6) One sea anchor;
  (7) One survival kit, appropriately equipped for the route to be flown, which shall contain at least the following:
    (i) One life-raft repair kit;
    (ii) One bailing bucket;
    (iii) One signalling mirror;
    (iv) One police whistle;
    (v) One buoyant raft knife;
    (vi) One supplementary means of inflation;
    (vii) Seasickness tablets;
    (viii) One first-aid kit;
    (ix) One portable means of illumination;

(x) One half litre of pure water and one sea water desalting kit;

(xi) One comprehensive illustrated survival booklet in an appropriate language.

Batteries used in the ELTs should be replaced (or recharged, if the battery is rechargeable) when the equipment has been in use for more than 1 cumulative hour, and also when 50% of their useful life (or for rechargeable, 50% of their useful life of charge), as established by the equipment manufacturer has expired. The new expiration date for the replacement (or recharged) battery must be legibly marked on the outside of the equipment. The battery useful life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

AMC OPS 3.830(a)(3) Survival Emergency Locator Transmitter (ELT(S))

(See OPS 3.830(a)(3))

A survival ELT (ELT(S)) is intended to be removed from the helicopter and activated by survivors of a crash. An ELT(S) should be stowed so as to facilitate its ready removal and use in an emergency. An ELT(S) may be activated manually or automatically (e.g. by water activation). It should be designed to be tethered to a life raft or a survivor.

AMC OPS-3.830(b)(2) Life-rafts and ELT for extended overwater flights

(See CAR OPS-3.830(b)(2))

(a) The following should be readily available with each life-raft:

(1) Means for maintaining buoyancy;

(2) A sea anchor:

(3) Life-lines, and means of attaching one life-raft to another;

(4) Paddles for life-rafts with a capacity of 6 or less;

(5) Means of protecting the occupants from the elements;

(6) A water-resistant torch;

(7) Signalling equipment to make the pyrotechnical distress signals described in ICAO Annex 2;

(8) 100 g of glucose tablet for each 4, or fraction of 4, persons which the life-raft is designed to carry:

(9) At least 2 litres of drinkable water provided in durable containers or means of making sea water drinkable or a combination of both; and

(10) First-aid equipment.

As far as practicable, items listed above should be contained in a pack.

IEM OPS-3.835 Survival Equipment

(See CAR OPS-3.835)

(a) The expression ‘Areas in which search and rescue would be especially difficult’ should be interpreted in the context of this CAR as meaning:

(1) Areas so designated by the State responsible for managing search and rescue; or

(2) Areas that are largely uninhabited and where:

(i) The State responsible for managing search and rescue has not published any information to confirm that search and rescue would not be especially difficult; and

(ii) The State referred to in (a) above does not, as a matter of policy, designate areas as being especially difficult for search and rescue.

AMC OPS-3.835(c) Survival Equipment

(See CAR OPS-3.835(c))

(a) At least the following survival equipment should be carried when required:
   (1) Two (2) litres of drinkable water for each 50, or fraction of 50, persons on board provided in durable containers;
   (2) One knife;
   (3) One set of Air/Ground codes;
   (4) In addition, when polar conditions are expected, the following should be carried:
   (5) A means for melting snow;
   (6) Sleeping bags for use by 1/3 of all persons on board and space blankets for the remainder or space blankets for all passengers on board;
   (7) One (1) Arctic/Polar suit for each crew member carried.
   (8) If any item of equipment contained in the above list is already carried on board the Helicopter in accordance with another requirement, there is no need for this to be duplicated.

AMC OPS 3.837(a)(2) Additional Requirements for Helicopters Operating to Helidecks located in a Hostile Sea Area

(See OPS 3.837)

(a) Operators should be aware that projections on the exterior surface of the helicopter, which are located in a zone delineated by boundaries which are 1.22 m (4 ft) above and 0.61 m (2 ft) below the established static water line could cause damage to a deployed life raft. Examples of projections which need to be considered are aerials, overboard vents, unprotected split pin tails, guttering and any projection sharper than a three dimensional right angled corner.
(b) While the boundaries specified in para 1 above are intended as a guide, the total area which should be considered should also take into account the likely behaviour of the life raft after deployment in all sea states up to the maximum in which the helicopter is capable of remaining upright.
(c) Operators and maintenance organisations are reminded that wherever a modification or alteration is made to a helicopter within the boundaries specified, the need to prevent the modification or alteration causing damage to a deployed life raft should be taken into account in the design.
(d) Particular care should also be taken during routine maintenance to ensure that additional hazards are not introduced by, for example, leaving inspection panels with sharp corners proud of the surrounding fuselage surface, or allowing door sills to deteriorate to a point where sharp edges become a hazard.
(e) The same considerations apply in respect of emergency flotation equipment.

AMC OPS 3.843(c) Flights Overwater - Performance Class 2 Take-off and Landing

(See OPS 3.843(c))

When helicopters are operated in Performance Class 2 and are taking-off or landing over water, they are exposed to a critical power unit failure. They should therefore be designed for landing on water, certificated in accordance with ditching provisions, or have the appropriate floats fitted (for a non-hostile environment).

SECTION 1 - SUBPART L – COMMUNICATION AND NAVIGATION EQUIPMENT

CAR OPS-3.845 General introduction

(See GM OPS-3.845)

(a) An operator shall ensure that a flight does not commence unless the communication and navigation equipment required under this Subpart is:
  (1) Approved and installed in accordance with the requirements applicable to them, including the minimum performance standard and the operational and airworthiness requirements;
  (2) Installed such that the failure of any single unit required for either communication or navigation purposes, or both, will not result in the failure of another unit required for communications or navigation purposes.
  (3) In operable condition for the kind of operation being conducted except as provided in the MEL (CAR OPS-3.030 refers); and
  (4) So arranged that if equipment is to be used by one flight crew member at his station during flight it must be readily operable from his station. When a single item of equipment is required to be operated by more than one flight crew member it must be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.

(b) Communication and navigation equipment minimum performance standards are those prescribed in the applicable Technical Standard Orders (TSO), unless different performance standards are prescribed in the operational or airworthiness codes. Communication and navigation equipment complying with design and performance specifications other than TSO on the date of CAR OPS-3 implementation may remain in service, or be installed, unless additional requirements are prescribed in this Subpart. Communication and navigation equipment which has already been approved does not need to comply with a revised TSO or a revised specification, other than TSO, unless a retroactive requirement is prescribed.

(c) An Operator shall obtain operational approval before operating in areas where compliance with Performance Based Communication and Surveillance (PBCS) requirements is specified. (See AMC 3.845(c))

CAR OPS-3.850 Communication/ Radio Equipment

(a) An operator shall not operate a Helicopter unless it is equipped with radio required for the kind of operation being conducted.

(b) Where two independent (separate and complete) radio systems are required under this Subpart, each system must have an independent antenna installation except that, where rigidly supported non-wire antennae or other antenna installations of equivalent reliability are used, only one antenna is required.

(c) The radio communication equipment required to comply with paragraph (a) above must also provide for communications on the aeronautical emergency frequency 121·5 MHz.

(d) For flights in defined portions of airspace or on routes where an RCP type has been prescribed, a helicopter shall, in addition to the requirements specified in this Subpart:
  (1) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s); and
  (2) have information relevant to the helicopter RCP specification capabilities is listed in the flight manual or other helicopter documentation approved by the State of Design or Authority; and
  (3) have information relevant to the helicopter RCP specification capabilities included in the MEL.

(e) The Authority, for operations where an RCP specification for PBC has been prescribed, ensure that the operator has established and documented:
  (1) normal and abnormal procedures, including contingency procedures;

(2) flight crew qualification and proficiency requirements, in accordance with appropriate RCP specifications;
(3) a training programme for relevant personnel consistent with the intended operations; and
(4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RCP specifications.

(f) The Authority shall ensure that, in respect of those helicopters mentioned in sub-paragraph (d) above, adequate provisions exist for:
(1) receiving the reports of observed communication performance issued by monitoring programmes; and

(g) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specification.

CAR OPS-3.855 Audio Selector Panel

An operator shall not operate a Helicopter under IFR unless it is equipped with an audio selector panel accessible to each required flight crew member.

CAR OPS-3.860 Radio equipment for operations under VFR over routes navigated by reference to visual landmarks

(a) An operator shall not operate a Helicopter under VFR over routes that can be navigated by reference to visual landmarks, unless it is equipped with the radio communication equipment necessary under normal operating conditions to fulfil the following:
(1) Communicate with appropriate ground stations;
(2) Communicate with appropriate air traffic control facilities from any point in controlled airspace within which flights are intended; and
(3) Receive meteorological information;
(4) When mandated by airspace requirements, reply to SSR interrogations with a pressure-altitude reporting transponder which operates in accordance with ICAO Annex 10, Volume IV.

CAR OPS-3.865 Communication and Navigation equipment for operations under IFR, or under VFR over routes not navigated by reference to visual landmarks

(See AMC OPS-3.865) (See AC OPS-3.865 (c)(1)(i) & AC OPS-3.865(e))

(a) An operator shall not operate a Helicopter under IFR, or under VFR over routes that cannot be navigated by reference to visual landmarks, unless the Helicopter is equipped with radio communication and navigation equipment in accordance with the requirements of air traffic services in the area(s) of operation.
(b) *Radio equipment*. An operator shall ensure that radio equipment comprises not less than:
(1) Two independent radio communication systems necessary under normal operating conditions to communicate with an appropriate ground station from any point on the route including diversions; and
(2) When mandated by airspace requirements, a pressure-altitude reporting transponder which operates in accordance with ICAO Annex 10, Volume IV or SSR transponder equipment as required for the route being flown.
(c) *Navigation equipment.* An operator shall ensure that navigation equipment will enable it to proceed in accordance with its flight plan; and in accordance with the requirements of air traffic services; and
(1) Comprises not less than:
(i) Two independent navigation aids appropriate to the route/area to be flown;
(ii) An approach aid suitable for the destination and alternate heliports;

(iii) An Area Navigation System when area navigation is required for the route/area being flown;

(iv) Two VOR receiving systems on any route, or part thereof, where navigation is based only on VOR signals; and

(v) Two ADF systems on any route, or part thereof, where navigation is based only on NDB signals, or

(2) For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, a helicopter shall, in addition to requirements specified in this Subpart;

(i) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s); and

(ii) have information relevant to the helicopter navigation specification capabilities is listed in the flight manual or other helicopter documentation approved by the State of Design or Authority; and

(iii) have information relevant to the helicopter navigation specification capabilities included in the MEL.

(See also AMC OPS 3.243).

(3) On flights in which it is intended to land in instrument meteorological conditions, a helicopter shall be provided with appropriate navigation equipment providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance at each heliport at which it is intended to land in instrument meteorological conditions and at any designated alternate heliports.

(d) The Authority shall, for operations where a navigation specification for PBN has been prescribed, ensure that the operator has established and documented:

(1) normal and abnormal procedures, including contingency procedures;

(2) flight crew qualification and proficiency requirements, in accordance with appropriate navigation specifications;

(3) a training programme for relevant personnel consistent with the intended operations; and

(4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate navigation specifications.

(e) The Authority shall issue a specific approval for operations based on PBN authorisation required (AR) navigation specifications.

(f) The operator may operate a helicopter that is not equipped with the navigation equipment specified in sub-paragraph(s) (c)(1)(iv) and/or (c)(1)(v) above, provided that it is equipped with alternative equipment authorised for the route/area being flown by the Authority. The reliability and the accuracy of alternative equipment must allow safe navigation for the intended route.

(g) When operating in regional airspace requiring FM immunity performance standards, the operator shall ensure that VHF communication equipment, ILS Localiser and VOR receivers installed on helicopters to be operated under IFR are of a type that has been approved as complying with the FM immunity performance standards (see AC OPS 3.865(e)).

(h) Where not more than one item of equipment specified in (a) above is unserviceable when the helicopter is about to begin a flight, the helicopter may nevertheless take-off on that flight if:

(1) It is not reasonably practical to repair or replace that item, before the commencement of the flight;

(2) The helicopter has not made more than one flight since the item was found to be unserviceable; and

(3) The commander has satisfied himself that, taking into account the latest information available as to the route/area and heliport to be used (including any planned diversion) and the weather

conditions likely to be encountered, the flight can be made safely and in accordance with any relevant requirements of the appropriate air traffic control limit.

CAR OPS-3.866 Transponder equipment

(See AMC OPS-3.866)

(a) An operator shall not operate a Helicopter unless it is equipped with;
   (1) A pressure altitude reporting SSR transponder; and
   (2) any other SSR transponder capability required for the route being flown.
(b) An operator shall ensure that that any Helicopter:
   (3) operating under IFR, are equipped with SSR transponders having the capabilities set out in AMC OPS-3.866 Part 1;
   (4) with a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots, operating flights under IFR or within controlled airspace, are equipped with SSR transponders having, in addition to the capabilities set out in AMC OPS-3.866 Part 1, 2 and 3. The ADS-B functionality shall be installed no later than the date of mandate of ADS-B (1 January 2020) (Also see CAR OPS3.867).
(c) An operator shall ensure that aircraft equipped in accordance with paragraph (b) and having a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots operate with antenna diversity as prescribed in paragraph 3.1.2.10.4 of ICAO Annex 10, Volume IV.
(d) All Helicopters for which the individual certificate of airworthiness is first issued after 1 January 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

CAR OPS-3.867 ADS-B (OUT and IN)

(See AMC OPS 3.867 ADS-B)

ADS-B refers to automatic dependent surveillance - broadcast, a surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and position fixing systems. It refers to a surveillance technology where ADS-B Out equipped aircraft broadcast position, altitude, velocity, and other information in support of both air-to-ground and air-to-air surveillance applications.

(a) ADS-B OUT
   An operator shall not operate a Helicopter under IFR after 01 January 2020, unless it is equipped with ADS-B OUT.
(b) ADS-B IN

An operator shall not operate a Helicopter equipped with the ADS-B IN capability unless approved by the CAA.

CAR OPS-3.867 Surveillance Equipment

(a) A helicopter shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.
(b) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), a helicopter shall, in addition to the requirements specified in sub-paragraph (a);
   (1) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);
   (2) have information relevant to the helicopter RSP specification capabilities listed in the flight manual or other helicopter documentation approved by the State of Design or Authority; and

(3) have information relevant to the helicopter RSP specification capabilities included in the MEL.

(c) The Authority shall, for operations where an RSP specification for PBS has been prescribed, ensure that the operator has established and documented;

(1) normal and abnormal procedures, including contingency procedures;

(2) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;

(3) a training programme for relevant personnel consistent with the intended operations; and

(4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.

(d) The Authority shall ensure that, in respect of those helicopters mentioned in sub-paragraph (b), adequate provisions exist for;

(1) receiving the reports of observed surveillance performance issued by monitoring programmes; and

(2) taking immediate corrective action for individual helicopter, helicopter types or operators, identified in such reports as not complying with the RSP specification.

CAR OPS-3.872 Equipment for operation in defined airspace with Reduced Vertical Separation Minima (RVSM)

(a) An operator shall ensure that Helicopters operated in RVSM airspace are equipped with:

(1) Two independent altitude measurement systems;

(2) An altitude alerting system;

(3) An automatic altitude control system; and

(4) A secondary surveillance radar (SSR) transponder with altitude reporting system that can be connected to the altitude measurement system in use for altitude keeping.

CAR OPS-3.873 Electronic Navigation Data Management

(a) The operator shall not use a navigation database which supports an airborne navigation application as a primary means of navigation unless the navigation database supplier holds a Type 2 Letter of Acceptance (LoA) or equivalent.

(b) If the operator's supplier does not hold a Type 2 LoA or equivalent, the operator shall not use the electronic navigation data products unless the Authority has approved the operator's procedures for ensuring that the process applied and the delivered products have met equivalent standards of integrity.

(c) The operator shall not use electronic navigation data products for other navigation applications unless the Authority has approved the operator's procedures for ensuring that the process applied and the delivered products have met acceptable standards of integrity and that the products are compatible with the intended function of the equipment that will use them.

(d) The operator shall continue to monitor both the process and the products according to the requirements of OPS 3.035.

The operator shall implement procedures that ensure timely distribution and insertion of current and unaltered electronic navigation data to all aircraft that require it.

AMC OPS-3.845(c) PBCS (Performance Based Communication Surveillance) Operational approval

(See CAR OPS-3.845(c)) (Reference: ICAO Doc 9869 PBCS Manual, ICAO PBCS websites: https://www.icao.int/airnavigation/pbcs)

The following should be submitted by the applicant for an operation approval:

(a) Airspace PBCS specifications required to be met by the appropriate airspace authorities;

(b) The operator's documentation to ensure that it includes:

(i) normal and abnormal procedures including contingency procedures in particular to ensure that the required Communications/Navigation/Surveillance (CNS) systems are operational and flight crews report any failure or malfunction of GNSS, ADS-C or CPDLC equipment to Air Traffic Control (ATC) as soon as it becomes apparent;

(ii) flight crew qualification and proficiency requirements, in accordance with appropriate RCP/RSP specification(s);

(iii) procedures to ensure that the planned use of associated communication and surveillance capabilities for the flight will be in accordance with regulations, policies and procedures in control areas for the flight, as published by the applicable States in their AIPs (or equivalent publications);

(iv) procedures to ensure that proper denotation of PBCS capabilities are included in flight plan;

(v) a training programme for relevant personnel (including required non-flight crew personnel) consistent with the intended operations; and vi. appropriate maintenance procedures to ensure continued airworthiness, in accordance with the appropriate RCP/RSP specification(s).

(c) Following means for demonstrating the aircraft eligibility and airworthiness compliance with the TCP/RSP allocations (any limitations, assumptions or specific procedures considered in the framework of the airworthiness approval must be addressed):

(i) The aircraft manufacturer should demonstrate that the aircraft system meets the RCP/RSP allocations. For a FANS 1/A CPDLC and ADS-C aircraft system, RTCA DO306/EUROCAE ED122 is equivalent to RCP 240, RCP 400, RSP 180 and RSP 400
specifications. For an ATN B1 or FANS 1/A CPDLC aircraft system, RTCA DO- 290/EUROCAE ED-120 provides performance criteria for the EUR Region.

(ii) The aircraft manufacturer should also demonstrate that the aircraft meets the RCP/RSP integrity criteria and associated safety requirements. RCP/RSP integrity is typically shown by analysis, design, system architecture, and evaluations of HMI, taking into account flight crew training and qualification programmes instituted by the aircraft operator.

(iii) The aircraft manufacturer should demonstrate that the aircraft system meets the RCP/RSP availability criteria. RCP/RSP availability is typically shown by the evaluation of equipment failure and the number of similar components (redundancy) installed on the aircraft. For voice communication, the number and types of radios required may be specified by operating rules and airspace requirements (i.e. the AIP or equivalent publication).

(iv) The aircraft manufacturer should demonstrate that the aircraft system, when operating with a representative ATS system (i.e. simulation or real ground system), is capable of meeting the operational RCP/RSP time and continuity criteria.

(v) The aircraft manufacturer should demonstrate that the aircraft system provides the flight crew with alerts in case of aircraft system or connectivity failures, causing the aircraft to be incapable of meeting the RCP/RSP specification.

(vi) The aircraft manufacturer should identify any specific items related to PBCS capability in the master minimum equipment list (MMEL).

(vii) The aircraft manufacturer supplier should identify the demonstrated PBCS capability of the aircraft, any associated operating limitations, information and procedures, in the flight manual.

(d) Means of ensuring that the aircraft system is properly maintained, including configuring user modifiable software, such as those used to manage communication media and routing policies, to meet the appropriate RCP/RSP specification(s).

(e) Means of ensuring compliance of contracted services, such as those with communication services providers (CSPs) with respect to PBCS operations. CSPs should be bound by contractual arrangements stipulating the RCP/RSP allocations, notification to ATS units, aircraft operators and others, as appropriate, of any failure condition that may impact PBCS operations, and any monitoring or recording requirements; and

(f) Documentation and maintenance of:

(i) Operating procedures for the specific data link system(s) including use of message sets;

(ii) Procedures for participation in PBCS monitoring programmes including problem reporting;

(iii) Policies and procedures to control configuration of aircraft system including software; and communication subnetwork for managing media and routing.

Note: ICAO Doc 9869 (PBCS Manual) can be used as additional guidance for PBCS implementation and monitoring.

GM OPS-3.845 Communication and Navigation Equipment – Approval and Installation

(See CAR OPS-3.845)

(1) For Communication and Navigation Equipment required by CAR OPS-3 Subpart L, “Approved” means that compliance with the applicable TSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a TSO does not exist, the applicable airworthiness standards or equivalent apply unless otherwise prescribed in CAR OPS-3 or CAR-M.

(2) “Installed” means that the installation of Communication and Navigation Equipment has been demonstrated to comply with the applicable airworthiness requirements of CS-23/CS- 25/ CS-27/ CS-29 (or an equivalent accepted by the CAA), or the relevant code used for an equivalent Type Certification, and any applicable requirement prescribed in CAR OPS-3.

(3) Communication and Navigation Equipment approved in accordance with design requirements and performance specifications other than TSOs, are acceptable for use or installation on Helicopters operated for the purpose of commercial air transportation provided that any relevant OPS requirement is complied with.

(4) When a new version of a TSO (or of a specification other than a CS-TSO) is issued, Communication and Navigation Equipment approved in accordance with earlier requirements may be used or installed on Helicopters operated for the purpose of commercial air transportation provided that such Communication and Navigation Equipment are operational, unless removal from service or withdrawal is required by means of an amendment to CAR OPS1 or CAR-M. The same provisions apply in the case where an existing TSO (or a specification) is superseded by a new TSO (or a new specification).

AMC OPS-3.865 Combinations of Instruments and Integrated Flight Systems

(See CAR OPS-3.865)

Individual requirements of CAR OPS-3.865 may be met by combinations of instruments or by integrated flight systems or by a combination of parameters on electronic displays provided that the information so available to each required pilot is not less than that provided by the instruments and associated equipment’s specified.

AC OPS-3.865(c)(1)(i) IFR operations without ADF system

(See CAR OPS-3.865(c)(1)(i))

(1) To perform IFR operations without an ADF system installed, an operator should consider the following guidelines on equipment carriage, operational procedures and training criteria.

(2) The removal/non-installation of ADF equipment from a Helicopter may only be done where it is not essential for navigation, provided that alternative equipment giving equivalent or enhanced navigation capability is carried. The carriage of an additional VOR receiver may accomplish this or a GNSS receiver approved for IFR operations.

(3) For IFR operations without ADF, an operator should ensure that:

(a) route segments that rely solely on ADF for navigation are not flown;

(b) a firm commitment is made not to fly any ADF/NDB procedures;

(c) that the MEL has been amended to take account of the non-carriage of ADF;

(d) that the Operations Manual does not reference any procedures based on NDB signals for the Helicopters concerned;

(e) that flight planning and dispatch procedures are consistent with the above- mentioned criteria.

(4) The removal of ADF should be taken into account by the operator in the initial and recurrent training of flight crew.

AC OPS-3.865(e) FM Immunity Equipment Standards

(See CAR OPS-3.865(e))

(1) FM immunity performance Standards for ILS Localiser, VOR receivers and VHF communication receivers have been incorporated in ICAO Annex 10, Volume I – Radio Navigation Aids Fifth Edition dated July 1996, Chapter 3, Paragraphs 3.1.4, 3.3.8 and Volume III, Part II – Voice Communications Systems, Paragraph 2.3.3.

(2) Acceptable equipment standards, consistent with ICAO Annex 10, are contained in EUROCAE Minimum Operational Performance Specifications, documents ED-22B for VOR receivers, ED23B for VHF communication receivers and ED-46B for LOC receivers and the corresponding RTCA documents DO-186, DO-195 and DO-196.

Note: Operations within the Oman FIR do not require FM Immunity.

AMC OPS-3.866 Transponder Equipment

(See CAR OPS-3.866)

(A) Part 1: SSR transponder capabilities

(1) The minimum capability for the secondary surveillance transponder should be Mode S Level 2 certified in accordance with ICAO Annex 10, Volume IV, paragraphs 2.1.5.1.2, 2.1.5.1.7 and 3.1.2.10.

(2) Each implemented transponder register should be compliant with the corresponding section of ICAO Document 9871.

(3) The following data items should be made available to the transponder and be transmitted by the transponder via the Mode S protocol and in accordance with the formats specified in ICAO document 9871 (2nd edition):

(a) 24-bit ICAO aircraft address;

(b) Mode A code;

(c) pressure altitude;

(d) flight status (on the ground or airborne);

(e) data link capability report;
  — airborne collision avoidance system (ACAS) capability,
  — Mode S specific services capability,
  — aircraft identification capability,
  — squitter capability,
  — surveillance identifier capability,
  — common usage Ground Initiated Comms.
  — B (GICB) capability report (indication of change),
  — Mode S subnetwork version number;

(f) common usage GICB capability report;

(g) aircraft identification;

(h) special position indication (SPI);

(i) emergency status (general emergency, no communications, unlawful interference) including the use of specific Mode A codes to indicate different emergency states;

(j) ACAS active resolution advisories when the aircraft is equipped with Traffic alert and collision avoidance system II (TCAS II).

(4) Other data items may be made available to the transponder.

(5) The data items referred to in para (4) should only be transmitted by the transponder via the Mode S protocol if the aircraft and equipment certification process covers the transmission of these data items via the Mode S protocol.

(6) The continuity of transponder functionality supporting the Mode S protocol should be equal to or less than 2. 10 -4 per flight hour (i.e. mean time between failure equal to or greater than 5 000 flight hours).

(B) Part 2: SSR transponder capabilities

(1) The minimum capability for the secondary surveillance transponder should be Mode S Level 2 certified in accordance with paragraphs 2.1.5.1.2, 2.1.5.1.6, 2.1.5.1.7 and 3.1.2.10 of ICAO Annex 10, Volume IV.

(2) Each implemented transponder register should be compliant with the corresponding section of ICAO document 9871.

(3) The following data items should be made available to the transponder and be transmitted by the transponder via Version 2 of the extended squitter (ES) ADS-B protocol in accordance with the formats specified in ICAO document 9871:

(a) 24-bit ICAO aircraft address;

(b) aircraft identification;

(c) Mode A code;

(d) special position indication (SPI) using the same source as for the same parameter specified in Part A;

(e) emergency status (general emergency, no communications, unlawful interference) using the same source as for the same parameter specified in Para A(3)(i) above;

(f) ADS-B version number (equal to 2);

(g) ADS-B emitter category;

(h) geodetic horizontal position in accordance with the world geodetic system revision 1984 (WGS84) latitude and longitude, both while airborne or on the ground;

(i) geodetic horizontal position quality indicators (corresponding to the integrity containment bound (NIC), 95 % navigation accuracy category for position (NAC p), source integrity level (SIL) and system design assurance level (SDA));

(j) pressure altitude using the same source as for same parameter specified in Para A;

(k) geometric altitude in accordance with the world geodetic system revision 1984 (WGS84), provided in addition and encoded as a difference to pressure altitude;

(l) geometric vertical accuracy (GVA);

(m) velocity over ground, both while airborne (east/west and north/south airborne velocity over ground) or on the ground (surface heading/ground track and movement);

(n) velocity quality indicator corresponding to navigation accuracy category for velocity (NAC v);

(o) coded aircraft length and width;

(p) global navigation satellite system (GNSS) antenna offset;

(q) vertical rate: barometric vertical rate using the same source as for the same parameter specified in the data item in point 2 (g) of Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol, or Global Navigation Satellite System (GNSS) vertical rate;

(r) mode control panel/flight control unit (MCP/FCU) selected altitude using the same source as for the same parameter specified in Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol;
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(s) barometric pressure setting (minus 800 hecto-Pascals) using the same source as for the same parameter specified in Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol;

(t) ACAS active resolution advisories when the aircraft is equipped with TCAS II using the same source as for the same parameter specified in Part A.

(4) Surveillance data items (the data items in point 3(h), (k) and (m)) and their quality indicator data items (the data items in point 3(i), (l) and (n)) should be provided to the transponders on the same physical interface.

(5) The data source connected to the transponder and providing the data items in point 3(h) and (i) should meet the following data integrity requirements:

(a) horizontal position (data item in point 3(h)) source integrity level (SIL, expressed with respect to NIC) should be equal to or less than 10 -7 per flight-hour;

(b) horizontal position (data item in point 3(h)) integrity time to alert (leading to a change of the NIC quality indicator), if on-board monitoring is required to meet the horizontal position source integrity level, should be equal to or less than 10 seconds.

(6) The primary data source providing the data items in point 3(h) and (i) should be at least compatible with GNSS receivers that perform receiver autonomous integrity monitoring (RAIM) and fault detection and exclusion (FDE), along with the output of corresponding measurement status information, as well as integrity containment bound and 95 % accuracy bound indications.

(7) The system integrity level of the data sources providing the data items in point 3(f), (g), (k) to (p) should be equal to or less than 10 -5 per flight-hour.

(8) The quality indicator information (NIC, NACp, SIL, SDA, NACv and GVA) (the data items in point 3(i), (l) and (n)) should express the actual performance of the selected data source as valid at the time of applicability of the measurement of the data items in point 3(h), (k) and (m)).

(9) With respect to the processing of the data items in point 3(a) to (t), the transponder system integrity level for the extended squitter ADS-B protocol, including any interconnecting avionics to the transponder, should be equal to or less than 10 -5 per flight-hour.

(10) The total latency of the horizontal position data (the data items in point 3(h) and (i)) should be

equal to or less than 1,5 second in 95 % of all transmissions.

(11) The uncompensated latency of the horizontal position data (data item in point 3(h)) should be equal to or less than 0,6 second in 95 % of the cases and should be equal to or less than 1,0 second in 99,9 % of all transmissions.

(12) The total latency of the ground speed data items (the data items in point 3(m) and (n)) should be equal to or less than 1,5 second in 95 % of all transmissions.

(13) If the transponder is set to use a Mode A conspicuity code of 1000, then the broadcast of Mode A code information via the extended squitter ADS-B protocol should be inhibited.

(14) Other data items may be made available to the transponder.

(15) Except for military reserved formats, the data items referred to in point 14 should only be transmitted by the transponder via the extended squitter ADS-B protocol if the aircraft and equipment certification process covers the transmission of these data items via the extended squitter ADS-B protocol.

(16) The continuity of transponder functionality supporting the ADS-B protocol should be equal to or less than 2. 10 -4 per flight hour (i.e. mean time between failure equal to or greater than 5,000 flight hours).

(C) Part 3: SSR transponder additional capabilities

(1) Each transponder register that is implemented should be compliant with the corresponding section of ICAO document 9871 (2nd edition).

(2) The following data items should be made available to the transponder and be transmitted by the transponder as requested by the ground-based surveillance chain, via the Mode S protocol and in accordance with the formats specified in ICAO document 9871 (2nd edition):

(a) MCP/FCU selected altitude;
(b) roll angle;
(c) true track angle;
(d) ground speed;
(e) magnetic heading;
(f) indicated airspeed (IAS) or mach number; (g) vertical rate (barometric or baro-inertial);
(h) barometric pressure setting (minus 800 hecto-Pascals);
(i) track angle rate or true airspeed if track angle rate is not available.
(j) Other data items may be made available to the transponder.

(3) The data items referred to in para (c)(2) should only be transmitted by the transponder via the Mode S protocol if the aircraft and equipment certification process covers the transmission of these data items via the Mode S protocol.

AMC OPS-3.867 ADS-B

(See CAR OPS-3.867 ADS-B)

ADS-B capability should be demonstrated against EASA/FAA Certification Specifications - Airborne Communications, Navigation and Surveillance (CS-ACNS) or an equivalent accepted by the Authority.

SECTION 1 - SUBPART M – HELICOPTER MAINTENANCE

Withdrawn

This Subpart has been entirely withdrawn due to the implementation of CAR-M

SECTION 1 - SUBPART N – FLIGHT CREW

CAR OPS-3.930 Flight Crew Member Emergency Duties

(a) The operator shall, for each type of Helicopter, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation.

(b) Annual training in accomplishing these functions shall be contained in the operator's training programme and shall include instruction in the use of all emergency and life-saving equipment required to be carried, and drills in the emergency evacuation of the Helicopter.

CAR OPS-3.935 Composition of Flight Crew

(See Appendices 1 & 2 to CAR OPS-3.940) (See AMC OPS-3.940(a)(4));

(a) The operator shall ensure that;

(1) the number and composition of the flight crew shall not be less than that specified in the operations manual.

(2) the flight crews shall include flight crew members in addition to the minimum numbers specified in the Helicopter Flight Manual or other documents associated with the certificate of airworthiness, when necessitated by considerations related to the type of helicopter used, the type of operation involved and the duration of flight between points where flight crews are changed.

(3) the flight crew shall include at least one member authorised by the Authority, as State of Registry, to operate the type of radio transmitting equipment to be used.

(4) for each type of helicopter, all flight crew members are assigned the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation.

Annual training in accomplishing these functions shall be contained in the operator's training programme and shall include instruction in the use of all emergency and lifesaving equipment required to be carried, and drills in the emergency evacuation of the helicopter.

(5) All flight crew members hold an applicable and valid licence acceptable to the Authority and are suitably qualified and competent to conduct the duties assigned to them;

(6) Procedures are established, acceptable to the Authority, to prevent the crewing together of inexperienced flight crew members; (See AMC OPS 3.940(a)(4));

(7) One pilot amongst the flight crew is designated as the commander who may delegate the conduct of the flight to another suitably qualified pilot.

(8) When engaging the services of flight crew members who are self-employed and/or working on a freelance or part-time basis, the requirements of Subpart N are complied with.

(9) For crew members serving the operator as a commander, initial operator's Crew Resource Management (CRM) training shall be completed before commencing unsupervised line flying.

(b) *Pilots*. The operator shall ensure that:

(1) Commanders and co-pilots on an IFR flight hold a valid instrument rating, except that the holder of a pilot licence may fly in VMC at night, provided he is appropriately qualified for the circumstances, airspace and flight conditions in which the flight is conducted. This qualification requirement must be entered in the Operations Manual and be acceptable to the Authority. (See AMC OPS 3.940(b)(1)).

(2) For IFR operations using helicopters with a maximum approved passenger seating configuration (MAPSC) of more than 9:

(i) The minimum flight crew is two qualified pilots; and

(ii) The commander holds a valid Airline Transport Pilot's Licence (Helicopter) (ATPL(H));

(3) For operations using helicopters with a maximum approved passenger seating configuration **(**MAPSC) of more than 19:

(i) The minimum flight crew is two qualified pilots;

(ii) The commander holds a valid Airline Transport Pilot's Licence (Helicopter) (ATPL(H)).

(c) Helicopters not covered by sub-paragraph (b)(2) and (b)(3) above may be operated by a single pilot provided that the requirements of Appendix 1 to OPS 3.940(c) are satisfied.

CAR OPS-3.940 Flight Crew Member Training Programmes

(a) The operator shall establish and maintain a ground and flight training programme, approved by the Authority, which ensures that all flight crew members are adequately trained to perform their assigned duties.

(b) The training programme shall:

(1) include ground and flight training facilities and properly qualified instructors as determined by the Authority;

(2) consist of ground and flight training in the type(s) of Helicopter on which the flight crew member serves;

(3) include proper flight crew coordination and training in all types of emergency and abnormal situations or procedures caused by engine, transmission, rotor, airframe or systems malfunctions, fire or other abnormalities; and

(4) include upset prevention and recovery training;

(5) include training in knowledge and skills related to visual and instrument flight procedures for the intended area of operation, charting, human performance including threat and error management and in the transport of dangerous goods and, where applicable, procedures specific to the environment in which the helicopter is to be operated;

(6) ensure that all flight crew members know the functions for which they are responsible and the relation of these functions to the functions of other crew members, particularly in regard to abnormal or emergency procedures;

(7) shall include training in knowledge and skills related to the operational use of head-up display and/or enhanced vision systems for those helicopters so equipped; and

(8) be given on a recurrent basis, as determined by the Authority and shall include an assessment of competence.

Note 1: Flight training may, to the extent deemed appropriate by the Authority, be given in flight simulation training devices approved by the Authority for that purpose.

Note 2: The scope of the recurrent training required by CAR OPS-3.930 and paras (a) & (b) above, may be varied and need not be as extensive as the initial training given in a particular type of Helicopter.

Note 3: The use of correspondence courses and written examinations as well as other means may, to the extent deemed feasible by the Authority, be utilized in meeting the requirements for periodic ground training.

Note 4: For more information on dangerous goods operational requirements, see Subpart R.

Note 5: Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factors Training Manual (Doc 9683).

Note 6: Information for pilots and flight operations personnel on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

Note 7: Guidance material to design flight crew training programmes can be found in the Manual of Evidence-based Training (Doc 9995).

Note 8: Guidance material on the different means used to assess competence can be found in the Attachment to Chapter 2 of the Procedures for Air Navigation Services — Training (PANSTRG, Doc 9868).

Note 9: Procedures for upset prevention and recovery training in a flight simulation training device are contained in the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868).

Note 10: Guidance on upset prevention and recovery training in a flight simulation training device is contained in the Manual on Helicopter Upset Prevention and Recovery Training (Doc 10011).

(c) The requirement for recurrent flight training in a particular type of Helicopter shall be considered fulfilled by:
   (1) the use, to the extent deemed feasible by the Authority, of flight simulation training devices approved by that State for that purpose; or
   (2) the completion within the appropriate period of the proficiency check required by CAR OPS-3.965(b) in that type of Helicopter.

CAR OPS-3.943 Initial Operator's Crew Resource Management (CRM) training

(See AMC OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e))

(See IEM OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e))

(a) When a flight crew member has not previously completed initial Operator's Crew Resource Management (CRM) training (either new employees or existing staff), then the operator shall ensure that the flight crew member completes an initial course. New employees shall complete initial Operator's CRM Training within their first year of joining an operator. Flight crew who are already operating as flight crew members in commercial air transportation and who have not completed CRM training shall complete an initial operator's CRM training course.

(b) Initial CRM training shall be conducted by suitably qualified personnel (See AC-1 OPS 3.943).

(c) Initial CRM training is conducted in accordance with a detailed course syllabus included in the Operations Manual, and shall contain at least the following items:
   (1) Human error and reliability, error chain, error prevention and detection;
   (2) Company safety culture, Standard Operating Procedures (SOPs), organisational factors;
   (3) Stress, stress management, fatigue and vigilance;
   (4) Information acquisition and processing, situation awareness, workload management;
   (5) Decision making;
   (6) Communication and co-ordination inside and outside the cockpit;
   (7) Leadership and team behaviour, synergy;
   (8) Automation and philosophy of the use of automation (if relevant to the type);
   (9) Specific type-related differences;
   (10) Case based studies;
   (11) Additional areas which warrant extra attention, as identified by the safety management system (see OPS 3.037).

(d) Initial CRM training is conducted in accordance with a detailed course syllabus included in the Operations Manual.

CAR OPS-3.945 Conversion training and checking

(See Appendix 1 to CAR OPS-3.945 / AMC OPS-3.945 / IEM OPS-3.945) (See AMC OPS-3.943/ 3.945(a)(9)/3.955(b)(6)/ 3.965(e))

(See IEM OPS-3.943/ 3.945(a)(9)/3.955(b)(6)/ 3.965(e))

(See AMC-1 CAR OPS-3.945&3.965) (See AMC-2 CAR OPS-3.945&3.965) (See GM-1 CAR OPS-3.945) (See GM-1 CAR OPS-3.945 & 3.965)

(See GM-2 CAR OPS-3.945&3.965) (See GM-3 CAR OPS-3.945&3.965) (See GM-4 CAR OPS-3.945&3.965) (See GM-5 CAR OPS-3.945&3.965)

(a) An operator shall ensure that:

(1) A flight crew member completes a Type Rating course which satisfies the requirements applicable to the issue of Flight Crew Licenses requirements of CAR– FCL when changing from one type of Helicopter to another type or class for which a new type or class rating is required;

(2) A flight crew member completes an operator's conversion course before commencing unsupervised line flying:

(i) When changing to a Helicopter for which a new type or class rating is required; or

(ii) When changing operator;

(3) Conversion training is conducted by suitably qualified personnel in accordance with a detailed course syllabus included in the Operations Manual. The operator shall ensure that the personnel integrating elements of CRM into conversion training are suitably qualified;

(4) The amount of training required by the operator's conversion course is determined after due note has been taken of the flight crew member's previous training as recorded in his training records prescribed in CAR OPS-3.985;

(5) The minimum standards of qualification and experience required of flight crew members before undertaking conversion training are specified in the Operations Manual;

(6) Each flight crew member undergoes the checks required by CAR OPS-3.965(b) and the training and checks required by CAR OPS-3.965(d) before commencing line flying under supervision;

(7) Upon completion of line flying under supervision, the check required by CAR OPS- 3.965(c) is undertaken;

(8) Once an operator's conversion course has been commenced, a flight crew member does not undertake flying duties on another type or class until the course is completed or terminated; and

(9) Elements of CRM training are integrated into the conversion course. (See AMC OPS3.943/3.945(a)(9)/3.955(b)(6)/3.965(e)) (See IEM OPS-3.943/3.945(a)(9), 3.955(b)(6), 3.965(e) and AMC OPS-3.945(a)(9) and IEM OPS-3.945(a)(9)).

(b) In the case of changing Helicopter type or class, the check required by CAR OPS-3.965(b) may be combined with the type or class rating skill test under the requirements applicable to the issue of Flight Crew Licenses.

(c) The operator's conversion course and the Type or Class Rating course required for the issue of Flight Crew Licenses may be combined.

(d) A pilot, undertaking a ZFTT course, shall:

(1) Commence Line Flying Under Supervision (LIFUS) as soon as possible within twenty- one (21) days after completion of the skill test. If Line Flying Under Supervision has not been commenced within the twenty-one (21) days, the operator shall provide appropriate training acceptable to the Authority. (See IEM OPS-3.945(d))

(2) Complete the six (6) take-offs and landings required in Appendix CAR FCL- 3.261(c)(2) in a flight simulator, qualified in accordance with CAR-ORA (SUBPART- FSTD) and user approved by the Authority, not later than twenty-one (21) days after the completion of the skill test. This simulator session shall be conducted by a TRI(A) occupying a pilot's seat. If these take-offs and landings have not been performed within the twenty-one (21) days, the operator shall provide refresher training acceptable to the Authority.

(3) If these takeoffs and landings have not been performed within the twenty-one (21) days, a pilot shall be provided an additional ZFTT simulator session of six (6) take- offs and landings prior to commencing LIFUS. For any subsequent gap in commencing LIFUS after the additional simulator session, the Head of Training shall ensure that the pilot has completed three (3) take-offs and

landings in a ZFTT simulator session in the previous twenty-one (21) days prior to commencing LIFUS.

CAR OPS-3.950 Differences training and Familiarisation training

(a) An operator shall ensure that a flight crew member completes:
  (1) Differences training which requires additional knowledge and training on an appropriate training device or the Helicopter;
    (i) When operating another variant of a Helicopter of the same type or another type of the same class currently operated; or
    (ii) When changing equipment and/or procedures on types or variants currently operated;
  (2) Familiarisation training which requires the acquisition of additional knowledge:
    (i) When operating another Helicopter of the same type; or
    (ii) When changing equipment and/or procedures on types or variants currently operated.
(b) The operator shall specify in the Operations Manual when such differences training or familiarisation training is required.

CAR OPS-3.955 Nomination/ Upgrade as Commander

(a) A pilot upgrading to commander shall complete an appropriate command course.
(b) The operator shall specify in the Operations Manual a minimum experience level for upgrade to commander from within the company and for those joining as direct entry commanders.

CAR OPS-3.960 Commanders – Minimum Qualification Requirements

(a) The minimum qualification requirements for a commander are either:
  (1) An Airline Transport Pilot Licence (Helicopter) (ATPL(H)); or
  (2) A Commercial Pilot's Licence (Helicopter) (CPL(H) provided that:
    (i) When conducting operations under instrument flight rules (IFR), the Commander has a minimum of 700 hours total flight time on helicopters which includes 300 hours as pilot-in-command and 100 hours under IFR. The 300 hours as pilot-in-command may be substituted by co-pilot hours on a 2 for 1 basis provided those hours were gained within an established two pilot crew concept system described in the Operations Manual;
    (ii) When conducting operations under visual meteorological conditions (VMC) at night, a commander, without a valid instrument rating, has 300 hours total flight time on helicopters which includes 100 hours as pilot-in-command and 10 hours at night as pilot flying.

CAR OPS-3.965 Recurrent training and checking

(See Appendix 1 to CAR OPS-3.965 Recurrent training and checking – Pilots & Appendix 2 to CAROPS-3.965)
(See AMC OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e) Crew Resource Management (CRM))
(See IEM OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e)) (See AMC-1 CAR OPS-3.945 & 3.965) (See AMC-2 CAR OPS-3.945&3.965) (See GM-1 CAR OPS-3.945&3.965)
(See GM-2 CAR OPS-3.945&3.965) (See GM-3 CAR OPS-3.945&3.965) (See GM-4 CAR OPS-3.945&3.965) (See GM-5 CAR OPS-3.945&3.965) (See AMC OPS-3.965(d)) (See GM OPS-3.965(b)(2))

(a) *General.* An operator shall ensure that:
  (1) Each flight crew member undergoes recurrent training and checking and that all such training and checking is relevant to the type or variant of Helicopter on which the flight crew member operates;
  (2) A recurrent training and checking programme is established in the Operations Manual and

approved by the Authority;

(3) Recurrent training is conducted by the following personnel:

(i) *Ground and refresher training* – by suitably qualified personnel;

(ii) *Helicopter/Flight Simulator training* – by a Type Rating Instructor (TRI), or in the case of the Flight Simulator, a Synthetic Flight Instructor (SFI), providing that the TRI or SFI satisfies the operator's experience and knowledge requirements sufficient to instruct on the items specified in Appendix 1 to CAR OPS-3.965 paragraphs (a)(1)(i)(A) and (B) of Appendix to OPS 3.965;

(iii) *Emergency and safety equipment training and checking* – by suitably qualified personnel; and

(iv) *Crew Resource Management (CRM) training* – by suitably qualified personnel.

(4) Recurrent checking is conducted by the following personnel:

(i) *Operator proficiency check* – by a Type Rating Examiner (TRE) or a Flight Examiner (FE) with the appropriate type rating, nominated by the operator and acceptable to the Authority or, a Synthetic Flight Examiner (SFE) if the check is conducted in a flight simulator approved for the purpose; and;

(ii) *Line checks* – by suitably qualified commanders trained in the assessment of CRM skills (see AC-2 OPS 3.943 paragraph 4) nominated by the operator and acceptable to the Authority;

(iii) *Emergency and safety equipment checking* – by suitably qualified personnel.

(b) *Operator Proficiency Check*

(1) An operator shall ensure that:

(i) Each flight crew member undergoes operator proficiency checks to demonstrate his competence in carrying out normal, abnormal and emergency procedures; and

(ii) The check is conducted without external visual reference when the flight crew member will be required to operate under IFR.

(iii) Each flight crew member undergoes operator proficiency checks as part of a normal flight crew complement.

(2) Except as stated in (3) below, the period of validity of an operator proficiency check shall be six (6) calendar months in addition to the remainder of the month of issue. If issued within the final two (2) calendar months of validity of a previous operator proficiency check, the period of validity shall be extended from the date of issue until six (6) calendar months from the expiry date of that previous operator proficiency check. Before a flight crew member, without a valid instrument rating, may operate VMC at night he will be required to undergo a proficiency check at night. Thereafter, each second proficiency check shall then be conducted at night.

(3) The period of validity of an operator proficiency check for private Helicopters below a maximum certificated take-off mass of 5700 kg, and not turbo jet, shall be twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final two (2) calendar months of validity of a previous operator proficiency check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous operator proficiency check.

(c) *Line Check.* An operator shall ensure that each flight crew member undergoes a line check on the Helicopter to demonstrate his competence in carrying out normal line operations described in the Operations Manual. The period of validity of a line check shall be twelve (12) calendar months, in addition to the remainder of the month of issue. If issued within the final two (2) calendar months of validity of a previous line check the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous line check. (See AMC OPS-3.965(c)).

(d) *Emergency and Safety Equipment training and checking.* An operator shall ensure that each flight crew member undergoes training and checking on the location and use of all emergency and safety equipment carried. The period of validity of an emergency and safety equipment check shall be twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous emergency and safety check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous emergency and safety equipment check. (See AMC OPS -3.965(d)).

(e) *CRM.* An operator shall ensure that:

(1) Elements of CRM are integrated into all appropriate phases of the recurrent training, and;

(2) Each flight crew member undergoes specific modular CRM training. All major topics of CRM training shall be covered over a period not exceeding 3 years;

(f) *Ground and Refresher training.* An operator shall ensure that each flight crew member undergoes ground and refresher training at least every twelve (12) calendar months. If the training is conducted within two (2) calendar months prior to the expiry of the twelve (12) calendar months period, the next ground and refresher training must be completed within twelve (12) calendar months of the original expiry date of the previous ground and refresher training.

(g) *Helicopter/Flight Simulator training.* An operator shall ensure that each flight crew member undergoes Helicopter/Flight Simulator training at least every twelve (12) calendar months. If the training is conducted within two (2) calendar months prior to the expiry of the twelve (12) calendar months period, the next Helicopter/STD training must be completed within twelve (12) calendar months of the original expiry date of the previous Helicopter/Flight Simulator training.

CAR OPS-3.968 Pilot qualification to operate in either pilot's seat

(See Appendix 1 to CAR OPS-3.968)

(a) An operator shall ensure that:

(1) A pilot who may be assigned to operate in either pilot's seat completes appropriate training and checking; and

(2) The training and checking programme is specified in the Operations Manual and is acceptable to the Authority.

CAR OPS-3.970 Recent experience

(See AMC OPS-3.970 & IEM OPS-3.970(a)(2))

(a) The operator shall ensure that, except as permitted in sub-paragraph (b) below:

(1) A pilot does not operate a helicopter unless he has carried out at least three take-offs, three circuits and three landings as pilot flying in a helicopter of the same type, or a Flight Simulator, of the helicopter type to be used, in the preceding 90 days.

(2) For night VMC operations:

(i) a pilot without a valid instrument rating has carried out at least three take-offs, three circuits and three landings at night in the preceding 90 days. This recency may be obtained in a FSTD.

(ii) a pilot with a valid instrument rating satisfies the night recent experience requirement if he has carried out at least three instrument approaches in the preceding 90 days. This recency may be obtained in a FSTD.

(b) The 90 day period prescribed in sub-paragraph (a) above may be extended up to a maximum of 120 days by line flying under the supervision of a nominated commander.

CAR OPS-3.975 Route/ Role/ Area - Competence qualification

(See AMC OPS-3.975)

(a) The operator shall ensure that, prior to being assigned as commander or as pilot to whom the conduct of flight may be delegated by the commander on a route, in a role or an area, the pilot has obtained adequate knowledge of the route to be flown and of the heliports (including alternates), facilities and procedures to be used. Each such pilot shall demonstrate to the operator an adequate knowledge of the operation to be flown. This shall include knowledge of:
  (1) the terrain and minimum safe altitudes;
  (2) the seasonal meteorological conditions;
  (3) the meteorological, communication and air traffic facilities, services and procedures;
  (4) the search and rescue procedures; and
  (5) the navigation facilities and procedures associated with the route or area in which the flight is to take place; and

(b) procedures applicable to flight paths over heavily populated areas and areas of high air traffic density, obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures, and applicable operating minima.

(c) A pilot-in-command shall have made a flight, representative of the operation with which the pilot is to be engaged which must include a landing at a representative heliport, as a member of the flight crew and accompanied by a pilot who is qualified for the operation.

(d) The operator shall not continue to utilise a pilot as a pilot-in-command on an operation in an area specified by the operator and approved by the Authority unless, within the preceding 12 months, the pilot has made at least one representative flight as a pilot member of the flight crew, or as a check pilot, or as an observer on the flight deck. In the event that more than 12 months elapse in which a pilot has not made such a representative flight, prior to again serving as a pilot-in-command on that operation, that pilot must requalify in accordance with sub-paragraphs (a), (b) and (c) above.

(e) The period of validity of the route/role/area competence qualification shall be 12 calendar months in addition to the remainder of:
  (1) The month of qualification; or
  (2) The month of the latest operation on the route, in the role or area.

(f) The route/role/area competence qualification shall be revalidated by operating on the route, in the role or area within the period of validity prescribed in sub-paragraph (f) above.

(g) If revalidated within the final 2 calendar months of validity of previous route/role/area competence qualification, the period of validity shall extend from the date of revalidation until 12 calendar months from the expiry date of that previous route/role/area competence qualification.

CAR OPS-3.978 Alternative Training and Qualification Programme

(See Appendix 1 to CAR OPS-3.978) (See AC OPS-3.978)

(See AC-1 to 8 for Appendix 1 to CAR OPS-3.978)

(a) An operator, following a minimum of two years continuous operations, may substitute the training and checking requirements for flight crew specified in Appendix 1 to CAR OPS- 3.978(a) by an Alternative Training and Qualification Programme (ATQP) approved by the Authority. The two years continuous operations may be reduced at the discretion of the Authority.

(b) The ATQP must contain training and checking which establishes and maintains a level of proficiency demonstrated to be at least not less than the level of proficiency achieved by following the provisions of CAR OPS-3.945, 3.965 and 3.970. The standard of flight crew training and qualification shall be established prior to the introduction of ATQP; the required ATQP training and qualification standards shall also be specified.

(c) An operator applying for approval to implement an ATQP shall provide the Authority with an implementation plan in accordance with paragraph (c) of Appendix 1 to CAR OPS-3.978.

(d) In addition to the checks required by CAR OPS-3.965 and 3.970 an operator shall ensure that each flight crew member undergoes a Line Orientated Evaluation (LOE).

(e) After two (2) years of operating within an approved ATQP an operator may, with the approval of the Authority, extend the periods of validity of CAR OPS-3.965 and 3.970 as follows:

(1) Operator proficiency check – twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous operator proficiency check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous operator proficiency check.

(2) The Line Check – twenty-four (24) calendar months in addition to the remainder of the month of issue. If issued within the final 6 calendar months of validity of a previous line check, the period of validity shall extend from the date of issue until twenty-four (24) calendar months from the expiry date of that previous line check.

The line check may be combined with a Line Oriented Quality Evaluation (LOQE) with the approval of the Authority.

(3) Emergency and Safety equipment checking – twenty-four (24) calendar months in addition to the remainder of the month of issue. If issued within the final six (6) calendar months of validity of a previous check, the period of validity shall extend from the date of issue until twenty-four (24) calendar months from the expiry date of that previous check.

(f) The ATQP shall be the responsibility of a nominated post-holder.

CAR OPS-3.980 Operation on more than one type or variant

(See Appendix 1 to CAR OPS-3.980) (See AMC-1 OPS-3.980 & AMC-2 OPS-3.980(b))

(a) An operator shall ensure that a flight crew member does not operate on more than one type or variant, unless:

(1) the flight crew member is competent to do so; and

(2) Appropriate procedures, approved by the Authority are included in the Operations Manual.

(b) When the operator schedules flight crew on several variants of the same type of helicopter or different types of helicopters with similar characteristics in terms of operating procedures, systems and handling, the Authority shall decide under which conditions the requirements of OPS 3.965 for each variant or each type of helicopter can be combined.

CAR OPS-3.981 Operation of Helicopters and Aeroplanes

(a) When a flight crew member operates both Helicopters and Aeroplanes:

(1) An operator shall ensure that operations of Helicopter and Aeroplanes are limited to one type of each.

(2) The operator shall specify appropriate procedures and/or operational restrictions, approved by the Authority, in the Operations Manual.

CAR OPS-3.985 Training records

(See IEM OPS-3.985)

(a) An operator shall:

(1) Maintain records of all training, checking and qualification prescribed in CAR OPS- 3.945, 3.955, 3.965, 3.968 and 3.975 undertaken by a flight crew member; and

(2) Make the records of all conversion courses and recurrent training and checking available, on request, to the flight crew member concerned.

Appendix 1 to CAR OPS-3.940 In-flight relief of flight crew members

(a) A flight crew member may be relieved in flight of his duties at the controls by another suitably qualified flight crew member.

(b) Relief of the Commander

(1) The commander may delegate conduct of the flight to:

(i) Another qualified commander; or

(ii) For operations only above FL 200, a pilot qualified as detailed in subparagraph(c) below.

(c) Minimum requirements for a pilot relieving the commander:

(1) Valid Airline Transport Pilot License;

(2) Conversion training and checking (including Type Rating training) as prescribed in CAR OPS- 3.945;

(3) All recurrent training and checking as prescribed in CAR OPS-3.965 and CAR OPS- 3.968; and

(4) Route competence qualification as prescribed in CAR OPS-3.975.

(d) Relief of the co-pilot:

(1) The co-pilot may be relieved by:

(i) Another suitably qualified pilot; or

(ii) A cruise relief co-pilot qualified as detailed in sub-paragraph (e) below.

(e) Minimum requirements for Cruise Relief Co-Pilot:

(1) Valid Commercial Pilot License with Instrument Rating;

(2) Conversion training and checking, including Type Rating training, as prescribed in CAR OPS-3.945 except the requirement for take-off and landing training;

(3) All recurrent training and checking as prescribed in CAR OPS-3.965 except the requirement for take-off and landing training; and

(4) To operate in the role of co-pilot in the cruise only and not below FL 200.

(5) Recent experience as prescribed in CAR OPS-3.970 is not required. The pilot shall, however, carry out Flight Simulator recency and refresher flying skill training at intervals not exceeding ninety (90) days. This refresher training may be combined with the training prescribed in CAR OPS- 3.965.

(f) Relief of the system panel operator. A system panel operator may be relieved in flight by a crew member who holds a Flight Engineer's license or by a flight crew member with a qualification acceptable to the Authority**.**

Appendix 2 to CAR OPS-3.940 Single Pilot Operations Under IFR or at Night

(a) Helicopters referred to in CAR OPS-3.940(b)(2) may be operated by a single pilot under IFR or at night when the following requirements are satisfied:

(1) The operator shall include in the Operations Manual a pilot's conversion and recurrent training programme which includes the additional requirements for a single pilot operation;

(2) In particular, the cockpit procedures must include:

(i) Engine management and emergency handling;

(ii) Use of normal, abnormal and emergency checklists;

(iii) ATC communication;

(iv) Departure and approach procedures;

(v) Autopilot management; and

(vi) Use of simplified in-flight documentation;

(vii) Single pilot resource management.

(3) The recurrent checks required by CAR OPS-3.965 shall be performed in the single pilot role on the type or class of Helicopter in an environment representative of the operation;

(b) The pilot shall meet the Commanders minimum qualification requirements of OPS 3.960.

(c) For IFR operations, the pilot shall have experience as follows:

(1) 25 hours total IFR flight experience in the relevant operating environment.

(2) 25 hours flight experience on the specific type of helicopter, approved for single pilot IFR, of which 10 hours is as commander or commander under supervision, including 5 sectors of IFR line flying under supervision using the single pilot procedures.

(3) The minimum required recent experience for a pilot engaged in a single-pilot operation under IFR shall be 5 IFR flights, including 3 instrument approaches, carried out during the preceding 90 days on a helicopter approved in the single pilot role. This requirement may be replaced by an IFR instrument approach check on the helicopter or a FSTD.

Note: Additional equipment requirements for alleviating pilot workload are prescribed in OPS 3.655.

Appendix 1 to CAR OPS-3.945 Operator's Conversion Course

(See AMC OPS-3.945)

(See AMC OPS-3.943, 3.945(a)(9), 3.955(b)(6) & 3.965(e))

(See IEM OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e)) (See IEM OPS-3.945)

(a) An operator's conversion course shall include:

(1) Ground training and checking including Helicopter systems, normal, abnormal and emergency procedures;

(2) Emergency and safety equipment training and checking which must be completed before Helicopter training commences;

(3) Helicopter/FSTD training and checking; and

(4) Line flying under supervision and line check.

(b) The conversion course shall be conducted in the order set out in sub-paragraph (a) above.

(c) Elements of Crew Resource Management shall be integrated into the conversion course, and conducted by suitably qualified personnel.

(d) When a flight crew member has not previously completed an operator's conversion course, the operator shall ensure that in addition to sub-paragraph (a) above, the flight crew member undergoes general first aid training and, if applicable, ditching procedures training using the equipment in water.

Appendix to CAR OPS-3.955 - Upgrading to Commander

(a) *Upgrade Training Course*

(1) The command course required by OPS 3.955(a) must be specified in the Operations Manual and include at least the following:

(i) Training in a flight simulator (including Line Orientated Flying Training) and/or flying training including a proficiency check operating as commander;

(ii) Operator command responsibilities;

(iii) Line training in command under supervision. A minimum of 10 hours including at least 10 sectors is required for pilots already qualified on the helicopter type;

(iv) Completion of a commander's line check and route/role/area competency qualification.

(v) For initial upgrade to commander the course shall also include CRM. (See AC-1 OPS 3.943).

(2) *Combined Upgrading and Conversion Course*. If a pilot is converting from one helicopter type or variant to another when upgrading to commander:

(i) The Command Course shall also include a Conversion Course in accordance with OPS 3.945.

(ii) Additional sectors shall be required for a pilot transitioning on to a new type of helicopter.

Appendix 1 to CAR OP-3.965 - Recurrent Training and Checking - Pilots

(See AMC Appendix 1 to OPS 3.965)

(See AC No. 1 to OPS 3.943)

(See AC No. 2 to OPS 3.943)

(See AMC OPS 3.945)

(a) *Recurrent Training* - Recurrent training shall comprise:

(1) *Ground and refresher training*

(i) The ground and refresher training programme shall include:

(A) Helicopter systems;

(B) Operational procedures and requirements including ground de-/anti-icing and pilot incapacitation; and

(C) Accident/Incident and occurrence review.

(ii) Knowledge of the ground and refresher training shall be verified by a questionnaire or other suitable methods.

(2) *Helicopter/flight simulator training*

(i) The helicopter/flight simulator training programme shall be established such that all major failures of helicopter systems and associated procedures will be covered within a 3 year period.

(ii) When engine malfunctions are simulated, if no synthetic training device is available, these emergencies may be covered in the helicopter using a safe airborne simulation. In the event that such training is conducted in the helicopter, due consideration must be given to the effect of any subsequent failure and the exercise must be preceded by a comprehensive briefing.

(iii) Helicopter/flight simulator training may be combined with the operator proficiency check.

(3) *Emergency and Safety Equipment Training*

(i) The emergency and safety equipment training programme may be combined with emergency and safety equipment checking and shall be conducted in a helicopter or a suitable alternative training device.

(ii) Every year the emergency and safety equipment training programme must include the following:

(A) Actual donning of a lifejacket, where fitted;

(B) Actual donning of protective breathing equipment, where fitted;

(C) Actual handling of fire extinguishers, of the type used;

(D) Instruction on the location and use of all emergency and safety equipment carried on the helicopter;

(E) Instruction on the location and use of all types of exits; and

(F) Security procedures.

(iii) Every three years the programme of training must include the following:

(A) Actual operation of all types of exits;

(B) Actual fire-fighting using equipment representative of that carried in the helicopter on an actual or simulated fire except that, with Halon extinguishers, an alternative method acceptable to the Authority may be used;

(C) The effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment, if applicable;

(D) Demonstration in the use of the life-rafts where fitted, or, demonstration and use of the life-rafts where they are fitted for extended overwater operations (See AMC to Appendix 1 to OPS 3.965, sub-paragraph (a)(3)(iii)(D);

(E) First aid; appropriate to the helicopter type, the kind of operation and crew complement (particularly in the case when crew members are not carried); and
(F) when serving on helicopters operated above 3 000 m (10 000 ft), the effect of lack of oxygen and, in the case of pressurised helicopters, as regards physiological phenomena accompanying a loss of pressurisation.

(4) *CRM.*

(b) *Recurrent checking*. Recurrent checking shall comprise:

(1) *Operator proficiency checks*.

(i) Where applicable, proficiency checks must include the following abnormal/emergency procedures:

(A) Engine fire;
(B) Fuselage fire;
(C) Emergency operation of under carriage;
(D) Fuel dumping;
(E) Engine Failure and relight;
(F) Hydraulic failure;
(G) Electrical failure;
(H) Engine failure during take-off before decision point;
(I) Engine failure during take-off after decision point;
(J) Engine failure during landing before decision point;
(K) Engine failure during landing after decision point;
(L) Flight and engine control system malfunctions;
(M) Recovery from unusual attitudes;
(N) Landing with one or more engine(s) inoperative;
(O) IMC auto-rotation techniques;
(P) Auto-rotation to a designated area;
(Q) Pilot incapacitation; and
(R) Directional control failures and malfunctions.

(ii) For pilots required to engage in IFR operations proficiency checks include the following additional abnormal/emergency procedures:

(A) Precision instrument approach to minima with, in the case of multi-engined helicopters, a simulated failure of one engine;
(B) Go-around on instruments from minima with, in the case of multi-engined helicopters, a simulated failure of one engine;
(C) Non precision approach to minima;
(D) Landing with a simulated failure of one or more engines; and
(E) Where appropriate to the helicopter type, approach with flight control system/flight director system malfunctions, flight instrument and navigation equipment failures.

(2) *Emergency and safety equipment checks*. The items to be checked shall be those for which training has been carried out in accordance with sub-paragraph (a)(3) above.

(3) *Line checks*;

(i) Line checks must establish the ability to perform satisfactorily a complete line operation including pre-flight and post-flight procedures and use of the equipment provided, as specified in the Operations Manual.

(ii) The flight crew must be assessed on their CRM skills for the purpose of;

(A) providing feedback to the crew collectively and individually; and
(B) improving the CRM training system.

(iii) When pilots are assigned duties as pilot flying and pilot non-flying they must be checked in both functions.
(iv) Line checks must be completed in a helicopter.
(v) The person conducting a line check, who is described in OPS 3.965(a)(4)(ii), should occupy an observer's seat whenever practical.

(4) *Single pilot operations*;
(i) The recurrent checks required by sub-paragraphs (1) to (3) above shall be performed in the single pilot role on a particular helicopter type in an environment representative of the operation.

Appendix 1 to OPS 3.968 Pilot Qualification to Operate in either Pilot's Seat

(a) Commanders whose duties also require them to carry out the duties of co-pilot, or commanders required to conduct training or examining duties, shall complete their proficiency checks respectively from left and right hand seats, on alternative proficiency checks, provided that when the type rating proficiency check is combined with the operator proficiency check the commander completes his training or checking from his normally occupied seat. All checks, from whatever seat, must be completed as prescribed in OPS 3.965(b)
(b) When engine-out manoeuvres are carried out in a helicopter, the engine failure must be simulated. When carried out in a single engine helicopter, the engine failure must be simulated and the training captain must carry out the autorotative landing respectively from left and right hand seats on alternative proficiency checks.
(c) When operating in the co-pilot's seat, the checks required by OPS 3.965 and OPS 3.968 for operating in the commander's seat must, in addition, be valid and current.
(d) A pilot relieving the commander shall have demonstrated, concurrent with the operator proficiency checks prescribed in OPS 3.965(b), practice of drills and procedures which would not, normally, be the relieving pilot's responsibility. Where the differences between left and right seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.
(e) A pilot other than the commander occupying the commander's seat shall demonstrate practice of drills and procedures, concurrent with the operator proficiency checks prescribed in OPS 3.965(b), which would otherwise have been the commander's responsibility acting as pilot non-flying. Where the differences between right and left seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.

Appendix 1 to CAR OPS-3.980 Operation on more than one type or variant

(See AMC-1 OPS-3.980)

(a) When a flight crew member operates more than one Helicopter class, type or variant listed in CAR FCL and associated procedures for class-single pilot and/or CAR FCL and associated procedures for class type-single pilot, but not within a single license endorsement, an operator must comply with the following:
(1) A flight crew member shall not operate more than:
(i) Three piston engine Helicopter types or variants; or
(ii) Three turbo-propeller Helicopter types or variants; or
(iii) One turbo-propeller Helicopter type or variant and one piston engine Helicopter type or variant; or.
(iv) One turbo-propeller Helicopter type or variant and any Helicopter within a particular class.
(2) CAR OPS-3.965 for each type or variant operated unless the operator has demonstrated

specific procedures and/or operational restrictions which are acceptable to the AUTHORITY.

(b) When a flight crew member operates more than one Helicopter type or variant within one or more license endorsement as defined by CAR FCL and associated procedures for type - multi- pilot, an operator shall ensure that:

(1) The minimum flight crew complement specified in the Operations Manual is the same for each type or variant to be operated;

(2) A flight crew member does not operate more than two Helicopter types or variants for which a separate license endorsement is required; and

(3) Only Helicopters within one license endorsement are flown in any one flight duty period unless the operator has established procedures to ensure adequate time for preparation.

Note: In cases where more than one license endorsement is involved, see sub-paragraphs (c) and (d) below.

(c) When a flight crew member operates more than one Helicopter type or variant listed in CARFCL and associated procedures for CAR FCL and associated procedures for type - single pilot and type - multi pilot, but not within a single license endorsement, an operator must comply with:

(1) Subparagraphs (b)(1), (b)(2) and (b)(3) above; and

(d) Subparagraph (d) below. When a flight crew member operates more than one Helicopter type or variant listed in CAR FCL and associated procedures for type - multi pilot, but not within a single license endorsement, an operator must comply with the following:

(1) Subparagraphs (b)(1), (b)(2) and (b)(3) above;

(2) Before exercising the privileges of two (2) license endorsements:

(i) Flight crew members must have completed two consecutive operator proficiency checks and must have 500 hours in the relevant crew position in commercial air transport operations with the same operator.

(ii) In the case of a pilot having experience with an operator and exercising the privileges of two (2) license endorsements, and then being promoted to command with the same operator on one of those types, the required minimum experience as commander is six (6) months and 300 hours, and the pilot must have completed two (2) consecutive operator proficiency checks before again being eligible to exercise two (2) license endorsements.

(3) Before commencing training for and operation of another type or variant, flight crew members must have completed three (3) months and 150 hours flying on the base Helicopter which must include at least one proficiency check.

(4) After completion of the initial line check on the new type, fifty (50) hours flying or twenty (20) sectors must be achieved solely on Helicopters of the new type rating.

(5) Notwithstanding CAR OPS-3.970, for each type operated unless credits have been allowed by the Authority in accordance with sub-paragraph (7) below.

(6) The period within which line flying experience is required on each type must be specified in the Operations Manual.

(7) Where credits are sought to reduce the training and checking and recent experience requirements between Helicopter types, the operator must demonstrate to the Authority which items need not be repeated on each type or variant because of similarities:

(i) CAR OPS-3.965(b) requires two operator proficiency checks every year. When credit is given in accordance with sub-paragraph (7) above for operator proficiency checks to alternate between the two types, each operator proficiency check revalidates the operator proficiency check for the other type. Provided that the period between proficiency checks for revalidation or renewal of type rating does not exceed that prescribed in CAR-FCL for each type, the CAR-FCL requirements will be satisfied. In addition, relevant and approved recurrent training must be specified in the Operations Manual.

(ii) CAR OPS-3.965(c) requires one line check every year. When credit is given in accordance with sub-paragraph (7) above for line checks to alternate between types or variants, each line check revalidates the line check for the other type or variant.

(iii) Annual emergency and safety equipment training and checking must cover all requirements for each type.

(8) CAR OPS-3.965 (Recurrent training and checking) for each type or variant operated unless credits have been allowed by the Authority in accordance with sub- paragraph (7) above.

(e) When a flight crew member operates combinations of Helicopter types or variants as defined by CAR FCL and associated procedures for type - multi-pilot, an operator must demonstrate that specific procedures and/or operational restrictions are approved in accordance with CAR OPS-3.980.

AMC OPS 3.940(a)(4) Crewing of Inexperienced Flight Crew Members

(See OPS 3.940(a)(4))

(a) The operator should consider that when two flight crew members are required, a flight crew member, following completion of a Type Rating or command course, and the associated line flying under supervision, is inexperienced until either:
   (1) He has achieved 50 flight hours on the type and/or in the role within a period of 60 days; or
   (2) He has achieved 100 flight hours on the type and/or in the role (no time limit).

(b) A lesser number of flight hours, on the type and/or in the role, may be acceptable to the Authority when:
   (1) A new operator is commencing operations; or
   (2) The operator introduces a new helicopter type; or
   (3) Flight crew members have previously completed a type conversion course with the same operator (re-conversion); and
   (4) Subject to any other conditions which the Authority may impose.

AMC OPS 3.940(b)(1) Composition of Flight Crew

(See OPS 3.940(b)(1))

(a) In some States the Airspace Authorities have determined that all flight at night should be conducted under IFR. These States then make provisions for helicopter flights at night to be conducted under conditions similar to night VFR in other States.

(b) For States (where national legislation requires flight in accordance with IFR at night) who take advantage of this alleviation, the operator should comply with guidance published by the Authority to ensure that the pilot is appropriately qualified.

AMC OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e) Crew Resource Management (CRM)

(See CAR OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e)/3.965(a)(3)(iv))

(See IEM OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e))

(a) ***General***
   (1) Crew Resource Management (CRM) is the effective utilisation of all available resources (e.g. crew members, Helicopter systems, supporting facilities and persons) to achieve safe and efficient operation.
   (2) The objective of CRM is to enhance the communication and management skills of the flight crew member concerned. The emphasis is placed on the non-technical aspects of flight crew performance.

(b) ***Operator's Initial CRM Training***
   (1) CRM training programmes are designed to provide knowledge of, and familiarity with, human factors relevant to flight operations. The course duration should be a minimum of one day for single pilot operations and two days for all other types of operations. It should cover all elements in Table 1, column (a) to the level required by column (c) (Operator's conversion course when changing aircraft type).
   (2) A CRM facilitator will possess group facilitation skills and should at least:
      (i) have followed a theoretical HPL course covering the whole syllabus of the HPL examination; or
      (ii) have successfully passed the Human Performance and Limitations (HPL) examination (see the requirements applicable to the issue of Flight Crew Licences); and

(iii) have and maintain adequate knowledge of the operation and helicopter type; and

(iv) be supervised by suitably qualified CRM training personnel when conducting their first initial CRM training session; and

(v) have knowledge of group management, group dynamics and personal awareness.

(3) An operator should ensure that the operator's CRM training programme addresses the nature of the operations of the company, as well as the associated procedures and the culture of the company. This will include areas of operations which produce particular difficulties or involve adverse climatic conditions and any unusual hazards.

(4) If the operator does not have sufficient means to establish an operator's CRM training, they may use a course provided by another operator, or a third-party training organisation acceptable to the Authority. In this event the operator should ensure that the content of the course meets his operational requirements. When crew members from several companies follow the same course, CRM core elements should be specific to the nature of operations of the companies and the trainees concerned.

(5) A flight crew member's CRM skill should not be assessed on completing the applicable modules in the operator's training courses (see Table 1).

(c) ***Operator's Conversion Course CRM training***

(1) If the flight crew member undergoes a conversion course ***with a change of Helicopter*** **type**, all elements in Table 1, column (a) should be integrated into all appropriate phases of the operator's conversion course and covered to the level required by column (c) (conversion course when changing type), unless the two operators use the same CRM training (third party) provider.

(2) If the flight crew member undergoes a conversion course ***with a change of operator,*** all elements in Table 1, column (a) shall be integrated into all appropriate phases of the operator's conversion course and covered to the level required by column (d) (conversion course when changing operator).

(3) A flight crew member should not be assessed on completing elements of CRM training which are part of an operator's conversion course.

(d) ***Command course CRM training***

(1) An operator should ensure that all elements in Table 1, column (a) are integrated into the command course and covered to the level required by column (e) (command course).

(2) A flight crew member should not be assessed when completing elements of CRM training which are part of the command course, although feedback should be given.

(e) ***Recurrent CRM training***

(1) An operator should ensure that elements of CRM are integrated into all appropriate phases of recurrent training every year; and that all elements in Table 1, column (a) are covered to the level required by column (f) (recurrent training);

(2) A flight crew member should be assessed on completing elements of CRM training which are part of the recurrent training.

(f) ***Implementation of CRM***

(1) The following table indicates which elements of CRM shall be included in each type of training:

Table 1

<table>
<tr><th>Core Elements
(a)</th><th>Initial Operator’s CRM Training (b)</th><th>Operator’s conversion course when changing type (c)</th><th>Operator’s conversion course when changing operator (d)</th><th>Command course
(e)</th><th>Recurrent training
(f)</th></tr>
<tr><td>Human error and reliability, error chain, error prevention and detection</td><td rowspan="7">In depth</td><td>In depth</td><td>Overview</td><td>Overview</td><td rowspan="7">Overview</td></tr>
<tr><td>Company safety culture, SOPs, organisational factors</td><td rowspan="2">Not required</td><td>In depth</td><td rowspan="6">In depth</td></tr>
<tr><td>Stress, stress management, fatigue & vigilance</td><td rowspan="3">Not Required</td></tr>
<tr><td>Information acquisition and processing situation awareness, workload management</td><td rowspan="4">Overview</td></tr>
<tr><td>Decision making</td></tr>
<tr><td>Communication and co- ordination inside and outside the cockpit</td><td rowspan="2">Overview</td></tr>
<tr><td>Leadership and team behaviour synergy</td></tr>
<tr><td>Automation, philosophy of the use of automation (if relevant to the type)</td><td rowspan="2">As Required</td><td rowspan="2">In depth</td><td>In depth</td><td rowspan="2">As required</td><td rowspan="2">As required</td></tr>
<tr><td>Specific type-related differences</td><td>Not required</td></tr>
<tr><td>Case based studies</td><td>In depth</td><td>In depth</td><td>In depth</td><td>In depth</td><td>As appropriate</td></tr>
</table>

Note: The levels of training in Table 1 can be described as follows:

(1) ‘Required’ means training that should be instructional or interactive in style to meet the objectives specified in the CRM training Programme or to refresh and strengthen knowledge gained in a previous training.

(2) ‘In-depth’ means training that should be instructional or interactive in style taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills and attitudes. The CRM training elements should be tailored to the specific needs of the training phase being undertaken.

(g) ***Co-ordination between flight crew and cabin crew training***;

(1) Operators should, as far as is practicable, provide combined training for flight and cabin crews that includes briefing and debriefing.

(2) There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew Facilitators/ Instructors to observe and provide feedback on the training modules observed.

(3) Provision should be made for transfer of relevant knowledge and skills between flight crew and cabin crew CRM facilitators.

(h) ***Assessment of CRM Skills***

(See IEM OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e), paragraph (4))

(1) Assessment of CRM skills should:
   (i) Provide feedback to the individual and serve to identify retraining where needed; and
   (ii) Be used to improve the CRM training system.

(2) Prior to the introduction of CRM skills assessment, a detailed description of the CRM methodology including terminology used, acceptable to the Authority, will be published in the Operations Manual.

(3) Operators shall establish procedures including retraining, to be applied in the event that personnel do not achieve or maintain the required standards (See Appendix 1 to CAR OPS-3.1045, Part D, paragraph 3.2 refers).

(4) If the operator proficiency check is combined with the Type Rating revalidation/ renewal check, the assessment of CRM skills will satisfy the Multi Crew Co- operation requirements of the Type Rating revalidation/renewal. This assessment will not affect the validity of the Type Rating.

IEM OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e) Crew Resource Management (CRM)

(See CAR OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e))

(See AMC-CAR OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e))

(a) CRM training should reflect the culture of the operator and be conducted by means of both classroom training and practical exercises including group discussions and accident and serious incident reviews to analyse communication problems and instances or examples of a lack of information or crew management.

(b) Whenever it is practicable to do so, consideration should be given to conducting relevant parts of CRM training in synthetic training devices which reproduce, in an acceptable way, a realistic operational environment and permit interaction. This includes, but is not limited to, simulators with appropriate LOFT scenarios.

(c) It is recommended that, whenever possible, initial CRM training be conducted in a group session outside the company premises so that the opportunity is provided for flight crew members to interact and communicate away from the pressures of their usual working environment.

(d) Assessment of CRM Skills

   (1) Assessment of CRM skills is the process of observing, recording, interpreting, evaluating and debriefing crew members, where appropriate, pilot performance and knowledge against a required standard using an acceptable methodology in the context of overall performance. It includes the concept of self-critique, and feedback which can be given continuously during training or in summary following a check. In order to enhance the effectiveness of the programme this methodology should, where possible, be agreed with flight crew representatives.

   (2) NOTECHS or other acceptable methods of CRM skills assessment should be used included in an overall assessment of the flight crew members performance and be in accordance with approved standards. The operator in conjunction with the training modules shall establish suitable methods of assessment. The selection criteria and training requirements of the assessors and their relevant qualifications, knowledge and skills should be established.

   (3) Individual assessments are not appropriate until the crew member has completed the Operator's CRM course and completed the first OPC. For first CRM skills assessment, the following methodology is considered satisfactory:

      (i) An operator shall establish the CRM training programme, including an agreed list of standard terminology. This should be evaluated with regard to methods, length of training, depth of subjects and effectiveness.

      (ii) A training and standardisation programme for training personnel should then be established.

(iii) For a transition period, the evaluation system should be crew rather than individually based.

(e) Methodology of CRM skills assessment:

(1) The assessment should be based on the following principles:

(i) only observable, repetitive behaviours are assessed,

(ii) the assessment should positively reflect any CRM skills that result in enhanced safety,

(iii) assessments should include behaviour which contributes to a technical failure, such technical failure being errors leading to an event which requires debriefing by the person conducting the line check,

(iv) the crew and, where needed, the individual will then be orally debriefed.

(2) De-identified summaries of all CRM assessments by the operator should be used to provide feedback to update and improve the operator's CRM training.

(f) Levels of Training.

(1) *Required.* means training that should be instructional or interactive in style to meet the objectives specified in the CRM training Programme or to refresh and strengthen knowledge gained in a previous training.

(2) *In Depth.* 'in-depth' means training that should be instructive or group participation (being interactive in style) taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills and attitudes. Core elements should be tailored to the specific needs of the training phase being undertaken.

AC OPS 3.945(a)(9) Crew Resource Management - Use of Automation

(See OPS 3.945(a)(9))

(a) The conversion course should include training in the use and knowledge of automation and in the recognition of systems and human limitations associated with the use of automation. The operator should therefore ensure that a flight crew member receives training on:

(1) The application of the operations policy concerning the use of automation as stated in the Operations Manual; and

(2) System and human limitations associated with the use of automation.

(b) The objective of this training should be to provide appropriate knowledge, skills and behavioural patterns for managing and operating automated systems. Special attention should be given to how automation increases the need for crews to have a common understanding of the way in which the system performs, and any features of automation which make this understanding difficult.

AMC OPS-3.945 Conversion Course Syllabus

(See CAR OPS-3.945 & Appendix 1 to CAR OPS-3.945)

(a) General

(1) The conversion course should be conducted in the following order:

(i) Ground training covering all helicopter systems and emergency procedures (with or without flight simulator or other training device).

(ii) Emergency and safety equipment training and checking (completed before flying training on the helicopter commences).

(iii) Flying training (flight simulator and/or helicopter).

(iv) Line flying under supervision.

(b) Ground training

(1) Ground training should comprise a properly organised programme of ground instruction by training staff with adequate facilities, including any necessary audio, mechanical and visual aids.

However, if the helicopter concerned is relatively simple, private study may be adequate if the operator provides suitable manuals and/or study notes.

(2) The course of ground instruction should incorporate formal tests on such matters, where applicable, as helicopter systems, performance and flight planning, etc.

(c) Flying training

(1) Flying training should be structured and sufficiently comprehensive to familiarise the flight crew member thoroughly with all aspects of limitations and normal operation of the helicopter, including the use of all cockpit equipment, and with all abnormal/emergency procedures and should be carried out by suitably qualified Type Rating Instructors and/or Type Rating Examiners.

(2) In planning flying training on helicopters with a flight crew of 2 or more, particular emphasis should be placed on the practice of Line Orientated Flying Training (LOFT) with emphasis on Crew Resource Management (CRM) and the use of correct crew coordinated procedures, including coping with incapacitations.

(3) Generally the same training and practice in the flying of the helicopter should be given to co-pilots as well as commanders. The 'flight handling' sections of the syllabus for commanders and co-pilots alike should include all the requirements of the appropriate proficiency check required by OPS 3.965.

(4) Training should include all elements of an instrument rating test where it is likely that the flight crew member will be required to operate under IFR.

(5) Unless the training programme has been carried out in an appropriate flight simulator, and in a manner approved for zero flight time conversions, the training required should include an element of proficiency training on a helicopter, including at least 3 take-offs and landings.

(6) Unless already covered by paragraph 3.3 above before they are assigned to line duty all flight crew should have successfully completed a proficiency check with a Type Rating Examiner.

(d) Emergency and safety equipment training and checking. Emergency and safety equipment training should take place whenever practicable in conjunction with crew members doing similar training with emphasis on co-ordinated procedures and two-way communications.

(1) For new crew members, or as applicable on conversion, the following should be addressed:

(i) Instruction should be given on aeromedical topics which should include at least:

(A) First aid subjects in general, and as appropriate to the helicopter type and crew complement;

(B) Guidance on the avoidance of food poisoning; iii. The possible dangers associated with the contamination of the skin or eyes by aviation fuel and other fluids and the immediate treatment;

(C) The recognition and treatment of hypoxia and hyperventilation; and,

(D) Survival training and guidance on hygiene appropriate to the routes operated.

(ii) Training should also include:

(A) The importance of effective coordination between flight crew and crew members;

(B) The use of smoke protection equipment and protective clothing where carried. In the case of the first type of helicopter so equipped, training should be associated with experience of movement in a cosmetic smoke filled environment; and

(C) Actual firefighting using equipment representative of that carried in the helicopter;

(D) The operational procedures of security, rescue and emergency services.

(iii) Operators should provide survival training appropriate to their areas of operation, (e.g. polar, desert, jungle or sea), including the use of any survival equipment carried.

(iv) A comprehensive drill to cover all ditching procedures should be practised where flotation equipment is carried. This should include practice of the actual donning and inflation of a lifejacket, together with a demonstration or film of the inflation of life-rafts and/or slide-rafts and associated equipment. This practice should, in initial training, be conducted using the equipment in water, although previous certificated training with another operator or the use of similar equipment will be accepted in lieu of further wet drill training.

(v) Instruction on the location of emergency and safety equipment, correct use of all appropriate drills, and procedures that could be required of flight crew in different emergency situations. Evacuation of the helicopter (or a realistic training device) by use of a slide where fitted should be included when the Operations Manual procedure requires the early evacuation of flight crew to assist on the ground.

(vi) On completion of emergency and safety equipment training the flight crew member should undergo the check specified in OPS 3.965(c).

(e) Line flying under supervision

(1) Following completion of flying training and checking as part of the conversion course, all flight crew members should operate a minimum number of sectors and/or flying hours under the supervision of a nominated flight crew member. The minimum figures should be specified in the Operations Manual and should be selected after due note has been taken of the complexity of the helicopter and the experience of the flight crew member.

(2) On completion of the sectors and/or flying hours under supervision, a line check should be completed.

(f) Passenger handling. Other than general training on dealing with people, emphasis should be placed on the following:

(1) Advice on the recognition and management of passengers who appear or become intoxicated with alcohol, under the influence of drugs or aggressive;

(2) Methods used to motivate passengers and the crowd control necessary to expedite a helicopter evacuation;

(3) Awareness of the types of dangerous goods which may, and may not, be carried in a passenger cabin, including the completion of a dangerous goods training programme; and

(4) The importance of correct seat allocation with reference to helicopter mass and balance. Particular emphasis should also be given on the seating of disabled passengers and the necessity of seating able-bodied passengers adjacent to unsupervised exits.

(g) Discipline and responsibilities. Amongst other subjects, emphasis should be placed on discipline and an individual's responsibilities in relation to:

(1) His ongoing competence and fitness to operate as a crew member with special regard to flight time limitation requirements; and

(2) Security procedures.

(h) Passenger briefing/safety demonstrations. Training should be given in the preparation of passengers for normal and emergency situations.

IEM OPS-3.945(d) Line Flying under Supervision (LIFUS)

(See CAR OPS-3.945(d))

(a) Introduction

Line flying under supervision (LIFUS) provides the opportunity for a flight crew member to carry into practice the procedures and techniques he has been made familiar with during the ground and flying training of a conversion course. This is accomplished under the supervision of a flight crewmember specifically nominated and trained for the task. At the end of line flying under supervision, the respective crewmember should be able to perform a safe and efficient flight conducted within the tasks of his crewmember station.

(b) A variety of reasonable combinations may exist with respect to:
  (1) A flight crew member's previous experience;
  (2) The complexity of the helicopter concerned; and
  (3) The type of route/role/area operations,

AMC OPS 3.945(a)(8) Completion of the Operator's Conversion Course

(See OPS 3.945(a)(8))

(a) A conversion course is deemed to have started when the flying or FSTD has begun. The theoretical element of a conversion course may be undertaken ahead of the practical element.

(b) Under certain circumstances a conversion course may have started and reached a stage where, for unforeseen reasons, it is not possible to complete it without a delay. In these circumstances the operator may apply to the Authority to allow the pilot to revert to the original type.

(c) Before the resumption of the conversion course the operator should establish with the Authority how much of the conversion course needs to be re-covered before continuing with the remainder of the course.

AMC Appendix 1 to OPS 3.955(a)(1)(v) Upgrading to Commander - CRM training

(See Appendix 1 to OPS 3.955(a)(1)(v))

(a) The objective of this training is to enhance the communication and management skills of the flight crew member concerned. The emphasis is placed on the non-technical aspects of flight crew performance.

(b) This CRM training should contain the following elements:
  (1) The basic module
    (i) Situational awareness;
    (ii) Appropriate assertiveness/guidelines for effective speaking up;
    (iii) Effective communication within the crew;
    (iv) Enhancing crew co-operation;
    (v) Identifying and managing stress.
  (2) The specific module; aimed at management skills.
    (i) Information management including the effective utilisation of all available resources such as other crew members, aircraft systems, supporting facilities and information from outside.
    (ii) Leadership;
    (iii) Delegation;
    (iv) Judgement and decision making;
    (v) Effective communication skills as desired for commanders.

(c) This training should include both:
  (1) Classroom training; and
  (2) Practical exercises including group discussions and accident reviews to analyse communication problems and instances or examples of a lack of information or crew management.

AMC OPS 3.965 Recurrent Training and Checking

(See OPS 3.965)

(a) General. The line check is performed in the helicopter. All other training and checking should be performed in the helicopter or an appropriate Synthetic Training Device or, in the case of emergency and safety equipment training, in a suitable alternative training device. The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the helicopter type operated by the flight crew member.

(b) Line Checks
   (1) The operator has a statutory obligation to check that his pilots are competent to perform their duties. The line check is considered a particularly important factor in the development, maintenance and refinement of high operating standards, and can provide the operator with a valuable indication of the usefulness of his training policy and methods. The requirement is for a test of ability to perform satisfactorily a complete line operation from start to finish, including pre-flight and post-flight procedures and use of the equipment provided and for an involvement of an overall assessment of the ability to perform the duties required as specified in the Operations Manual. The route chosen should be such as to give adequate representation of the scope of a pilot's normal operations. The line check is not intended to determine competence on any particular route.
   (2) The commander in particular should also demonstrate his ability to 'manage' the operation and take appropriate command decisions.
   (3) Since pilots may carry out either the handling or the non-handling duties, all pilots should be checked in both roles.

(c) Proficiency Training and Checking. When a flight simulator is used, the opportunity should be taken, where possible, to use Line Oriented Flying Training (LOFT).

AMC OPS-3.965(c) Line checks

(See CAR OPS-3.965(c))

(a) Where a pilot is required to operate as pilot flying and pilot non-flying, he should be checked on one sector as pilot flying and on another sector as pilot non-flying.

(b) However, where an operator’s procedures require integrated flight preparation, integrated cockpit initialisation and that each pilot performs both flying and non-flying duties on the same sector, then the line check may be performed on a single sector.

AMC OPS-3.965(d) Emergency and Safety Equipment Training

(See CAR OPS-3.965(d))

(a) The successful resolution of Helicopter emergencies requires interaction between flight crew and cabin crew and emphasis should be placed on the importance of effective co-ordination and two-way communication between all crew members in various emergency situations.

(b) Emergency and Safety Equipment training should include joint practice in Helicopter evacuations so that all who are involved are aware of the duties other crew members should perform. When such practice is not possible, combined flight crew and cabin crew training should include joint discussion of emergency scenarios.

(c) Emergency and safety equipment training should, as far as is practicable, take place in conjunction with cabin crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight deck and the cabin.

AMC Appendix 1 to OPS 3.965 Recurrent Training and Checking

(See Appendix 1 to OPS 3.965)

(a) Use and approval of Synthetic Training Devices (FSTD) training. Training and checking provides an opportunity for the practice of abnormal/emergency procedures which rarely arise in normal operations and is a part of a structured programme of recurrent training. This should be carried out in a Synthetic Training Device whenever possible.

(b) Where there is a Flight Manual limitation on the use of certain emergency power ratings, procedures to permit realistic engine-failure training and demonstration of competence, without actual use of the emergency power ratings, must be developed in conjunction with the aircraft manufacturer and included in the aircraft flight manual. These procedures must also be approved by the Authority.

(c) Where the emergency drills require action by the non-handling pilot, the check should additionally cover knowledge of these drills.

(d) Because of the unacceptable risk when simulating emergencies such as rotor failure, icing problems, certain types of engine(s) (e.g. during continued take-off or go-around, total hydraulic failure etc.), or because of environmental considerations associated with some emergencies (e.g. fuel dumping) these emergencies should preferably be covered in a Synthetic Training Device. If no Synthetic Training Device is available these emergencies may be covered in the helicopter using a safe airborne simulation, bearing in mind the effect of any subsequent failure, and discussion on the ground.

(e) The operator proficiency check may include the annual instrument rating test. In this case a combined check report may be used details of which shall be contained in the Operations Manual.

AMC to Appendix 1 to OPS 3.965 sub-paragraph (a)(3)(iii)(D) Water Survival Training

(See Appendix 1 to OPS 3.965 sub-paragraph (a)(3)(iii)(D))

(a) Where life-rafts are fitted for extended overwater operations (such as Sea Pilot transfer; offshore operation; regular, or scheduled, coast to coast overwater operations; or other operations designated as such by the Authority), a comprehensive wet drill to cover all ditching procedures should be practised by aircraft crews. This wet drill is to include, as appropriate, practice of the actual donning and inflation of a life-jacket, together with a demonstration or film of the inflation of life-rafts. Crews should board the same (or similar) life-rafts from the water whilst wearing a life-jacket. Training should include the use of all survival equipment carried on board life-rafts and any additional survival equipment carried separately on board the aircraft.

(b) Consideration should be given to the provision of further specialist training such as underwater escape training.

Note: Wet practice drill is always to be given in initial training unless the crew member concerned has received similar training provided by another operator and such an arrangement is acceptable to the Authority.

GM OPS-3.965 Recurrent training and checking

(See CAR OPS-3.965)

(a) Line checks, route and heliport competency and recent experience requirements are intended to ensure the crew member's ability to operate efficiently under normal conditions, whereas other checks and emergency and safety equipment training are primarily intended to prepare the crew member for abnormal/emergency procedures.

(b) The line check is performed in the Helicopter. All other training and checking should be performed in the Helicopter of the same type or an STD or, an approved flight simulator or, in the case of emergency and safety equipment training, in a representative training device. The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the Helicopter type operated by the flight crew member.

(c) Line checks

  (a) The line check is considered a particularly important factor in the development, maintenance and refinement of high operating standards, and can provide the operator with a valuable indication of the usefulness of his training policy and methods. Line checks are a test of a flight crew member's ability to perform a complete line operation satisfactorily, including preflight and post-flight procedures and use of the equipment provided, and an opportunity for an overall assessment of his ability to perform the duties required as specified in the Operations

Manual. The route chosen should be such as to give adequate representation of the scope of a pilot's normal operations. When weather conditions preclude a manual landing, an automatic landing is acceptable. The line check is not intended to determine competence on any particular route. The commander, or any pilot who may be required to relieve the commander, should also demonstrate his ability to 'manage' the operation and take appropriate command decisions.

(d) Proficiency Training and Checking
   (a) When an STD is used, the opportunity should be taken, where possible, to use Line Oriented Flying Training (LOFT).
   (b) Proficiency training and checking for System Panel Operators should, where practicable, take place at the same time a pilot is undergoing proficiency training and checking.

GM OPS 3.965(b)(2) Pilot Proficiency

(See CAR OPS-3.965(b)(2))

(a) The six (6) calendar months in addition to the remainder of the month means if the pilot performs the proficiency check on 5th January 2013, the validity will expire by 23:59 hrs on 31 July 2013.
(b) If the applicant performs the proficiency check three (3) months before the expiry (31 July 2013), the next proficiency check will expire by 31st January 2014 at 23:59 hrs.

Appendix 1 to CAR–OPS 3.965 Recurrent training and checking – Pilots

(See AMC OPS-3.943/3.945(a)(9)/3.955(b)(6)/3.965(e))
(See IEM OPS-3.943/3.945(a)(9)/3.955(b)(6)/ 3.965(e))
(See AMC OPS-3.965(d)) (See AMC to Appendix 1 to CAR OPS-3.965(b)(1)(iv))

(a) Recurrent Training – Recurrent training shall comprise:
   (1) Ground and refresher training
      (i) The ground and refresher training programme shall include:
         (A) Helicopter systems;
         (B) Operational procedures and requirements including ground de/anti- icing (See AC OPS-3.345) and pilot incapacitation (See AMC to Appendix 1 to CAR OPS-3.965(b)(1)(iv)); and
         (C) Accident/Incident and occurrence review.
      (ii) Knowledge of the ground and refresher training shall be verified by a questionnaire or other suitable methods.
   (2) Training using Simulator Training Devices
      (i) The STD training programme shall be established such that all major failures of Helicopter systems and associated procedures will have been covered in the preceding three (3) year period.
      (ii) When engine-out manoeuvres are carried out in a Helicopter, the engine failure shall be simulated.
      (iii) STD training may be combined with the operator proficiency check.
   (3) Emergency and Safety Equipment Training
      (i) Emergency and safety equipment training may be combined with emergency and safety equipment checking and shall be conducted in a suitable alternative training device.
      (ii) Every year the emergency and safety equipment training programme must include the following:
         (A) Actual donning of a lifejacket where fitted;
         (B) Actual donning of protective breathing equipment where fitted;

(C) Actual handling of fire extinguishers;
(D) Instruction on the location and use of all emergency and safety equipment carried on the Helicopter;
(E) Instruction on the location and use of all types of exits; and
(F) Security procedures.

(iii) Every three (3) years the programme of aircraft crew member training must include the following:
(A) Actual operation of all types of exits;
(B) Demonstration of the method used to operate a slide where fitted;
(C) Actual fire-fighting using equipment representative of that carried in the Helicopter on an actual or simulated fire except that, with Halon extinguishers, an alternative method acceptable to the Authority may be used;
(D) The effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;
(E) Actual handling of pyrotechnics, real or simulated, where fitted; and
(F) Demonstration in the use of the life-raft(s) where fitted.

(4) Crew Resource Management (CRM)
(i) Elements of CRM shall be integrated into all appropriate phases of recurrent training; and
(ii) A specific modular CRM training programme shall be established such that all major topics of CRM training are covered over a period not exceeding 3 years, as follows:
(A) Human error and reliability, error chain, error prevention and detection;
(B) Company safety culture, SOPs, organisational factors;
(C) Stress, stress management, fatigue and vigilance;
(D) Information acquisition and processing, situation awareness, workload management;
(E) Decision making;
(F) Communication and co-ordination inside and outside the cockpit;
(G) Leadership and team behaviour, synergy;
(H) Automation and philosophy of the use of Automation (if relevant to the type);
(I) Specific type-related differences;
(J) Case based studies;
(K) Additional areas which warrant extra attention, as identified by the accident prevention and flight safety programme (see CAR OPS3.037(f)).

(b) **Recurrent checking.** Recurrent checking shall comprise:
(1) Operator proficiency checks
(i) Where applicable, operator proficiency checks shall include the following manoeuvres:
(A) Rejected take-off when a Flight Simulator is available to represent that specific Helicopter, otherwise touch drills only;
(B) Take-off with engine failure between V1 and V2 or as soon as safety considerations permit;
(C) Precision instrument approach to minima with, in the case of multiengine Helicopters, one engine inoperative;
(D) Non-precision approach to minima;
(E) Missed approach on instruments from minima with, in the case of multi-engine Helicopters, one engine inoperative; and
(F) Landing with one engine inoperative. For single-engine

Helicopters, a practice forced landing is required.

(ii) When engine out manoeuvres are carried out in a Helicopter, the engine failure must be simulated.

(iii) In addition to the checks prescribed in sub-paragraphs (i)(A) to (F) above, the requirements applicable to the revalidation or renewal of the aircraft Type or Class Rating must be completed every twelve (12) months and may be combined with the operator proficiency check.

(iv) Pilot incapacitation

Note: See AMC OPS-3.965(b)(1)(iv) pilot incapacitation

(i) For a pilot operating VFR only, the checks prescribed in sub-paragraphs (i)(C) to (E) above may be omitted except for an approach and go-around in a multi-engine Helicopter with one engine inoperative.

(ii) Operator proficiency checks must be conducted by a Type Rating Examiner.

(2) **Emergency and safety equipment checks.** The items to be checked shall be those for which training has been carried out in accordance with sub-paragraph (a)(3) above.

(3) **Line checks;**

(i) Line checks must establish the ability to perform satisfactorily a complete line operation including pre-flight and post-flight procedures and use of the equipment provided, as specified in the Operations Manual.

(ii) The flight crew must be assessed on their CRM skills in accordance with a methodology acceptable to the AUTHORITY and published in the Operations Manual. The purpose of such assessment is to:

(A) Provide feedback to the crew collectively and individually and serve to identify retraining; and

(B) Be used to improve the CRM training system.

(i) CRM assessments alone shall not be used as a reason for a failure of the line check.

(ii) When pilots are assigned duties as pilot flying and pilot non-flying, they must be checked in both functions.

(iii) Line checks must be completed in a Helicopter.

(iv) Line checks must be conducted by commanders nominated by the operator and acceptable to the Authority. The person conducting the line check, who is described in CAR OPS-3.965(a)(4)(ii), shall be trained in CRM concepts and the assessment of CRM skills and shall occupy an observer's seat where installed. In the case of long-haul operations where additional operating flight crew are carried, the person may fulfil the function of a cruise relief pilot and shall not occupy either pilot's seat during take-off, departure, initial cruise, descent, approach and landing. His CRM assessments shall solely be based on observations made during the initial briefing, cabin briefing, cockpit briefing and those phases where he occupies the observer's seat.

AMC to Appendix 1 to CAR OPS-3.965(b)(1)(iv) Pilot incapacitation training

(See Appendix 1 to CAR OPS-3.965(b)(1)(iv))

(1) Procedures should be established to train flight crew to recognise and handle pilot incapacitation. This training should be conducted every year and can form part of other recurrent training. It should take the form of classroom instruction, discussion or video or other similar means.

(2) If a Flight Simulator is available for the type of Helicopter operated, practical training on pilot incapacitation should be carried out at intervals not exceeding three (3) years.

Appendix 2 to CAR OPS-3.965 Recurrent training and checking – System Panel Operators

(a) The recurrent training and checking for System Panel Operators shall meet the requirements for pilots and any additional specific duties, omitting those items that do not apply to System Panel Operators.

(b) Recurrent training and checking for System Panel Operators shall, whenever possible, take place concurrently with a pilot undergoing recurrent training and checking.

(c) A line check shall be conducted by a commander nominated by the operator and acceptable to the Authority or by a System Panel Operator Type Rating Instructor or Examiner.

Appendix 1 to CAR OPS-3.968 Pilot qualification to operate in either pilot's seat

(a) Commanders whose duties also require them to operate in the right-hand seat and carry out the duties of co-pilot, or commanders required to conduct training or examining duties from the right-hand seat, shall complete additional training and checking as specified in the Operations Manual, concurrent with the operator proficiency checks prescribed in CAR OPS3.965(b). This additional training must include at least the following:
   (a) An engine failure during take-off;
   (b) A one engine inoperative approach and go-around; and
   (c) A one engine inoperative landing.

(b) When engine-out manoeuvres are carried out in a Helicopter, the engine failure must be simulated.

(c) When operating in the right-hand seat, the checks required by CAR OPS-3 for operating in the left-hand seat must, in addition, be valid and current.

(d) A pilot relieving the commander shall have demonstrated, concurrent with the operator proficiency checks prescribed in CAR OPS-3.965(b), practice of drills and procedures which would not, normally, be the relieving pilot's responsibility. Where the differences between left and right seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.

(e) A pilot other than the commander occupying the left-hand seat shall demonstrate practice of drills and procedures, concurrent with the operator proficiency checks prescribed in CAR OPS3.965(b), which would otherwise have been the commander's responsibility acting as pilot non-flying. Where the differences between left and right seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.

AMC OPS-3.970 Recency

(See CAR OPS-3.970)

When using a Flight Simulator for meeting the landing requirements in CAR OPS3.970(a)(1) and (a)(2), complete visual traffic patterns or complete IFR procedures starting from the Initial Approach Fix should be flown.

IEM OPS-3.970(a)(2) Co-pilot proficiency

(See CAR OPS-3.970(a)(2))

A co-pilot serving at the controls means that that pilot is either pilot flying or pilot non-flying. The only required take-off and landing proficiency for a co-pilot is the operator's and type-rating proficiency checks.

AMC OPS-3.975 Route/Role/Area Competence Qualification

(See CAR OPS-3.975)

(a) ***Route/Role /Area competence training***
   (1) Route competence training shall include knowledge of:
      (i) Terrain and minimum safe altitudes;
      (ii) Seasonal Meteorological conditions;

(iii) Meteorological, communication, Surveillance and air traffic management (CNS/ATM), and security aspects;
(iv) Search and rescue procedures; and
(v) Navigational facilities associated with the route along which the flight is to take place; and
(vi) Obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures and applicable operating minima.

(b) Depending on the complexity of the route, as assessed by the operator, the following methods of familiarisation shall be used:
(1) For the less complex routes, familiarisation by self-briefing with route documentation, or by means of programmed instruction; and
(2) For the more complex routes, in addition to sub-paragraph (a)(ii))(i) above, inflight familiarisation as a commander, co-pilot or observers under supervision, or familiarisation in a Synthetic Training Device using a database appropriate to the route concerned.

(c) Route competence may be revalidated by operating on the route within the previous period of validity instead of the procedure given in paragraph 2 above.

AC OPS-3.978 Terminology

(See CAR OPS 3.978 and Appendix 1 to CAR OPS-3.978)

(a) Terminology
(1) *Line Oriented Evaluation (LOE).* LOE is an evaluation methodology used in the ATQP to evaluate trainee performance, and to validate trainee proficiency. LOEs consist of flight simulator scenarios that are developed by the operator in accordance with a methodology approved as part of the ATQP. The LOE should be realistic and include appropriate weather scenarios and in addition should fall within an acceptable range of difficulty. The LOE should include the use of validated event sets to provide the basis for event-based assessment. See paragraph 1.4 below.
(2) *Line Oriented Quality Evaluation (LOQE).* LOQE is one of the tools used to help evaluate the overall performance of an operation. LOQEs consist of line flights that are observed by appropriately qualified operator personnel to provide feedback to validate the ATQP. The LOQE should be designed to look at those elements of the operation that are unable to be monitored by FDM or Advanced FDM programmes.
(3) *Skill based training.* Skill based training requires the identification of specific knowledge and skills. The required knowledge and skills are identified within an ATQP as part of a task analysis and are used to provide targeted training.
(4) *Event based Assessment.* This is the assessment of flight crew to provide assurance that the required knowledge and skills have been acquired. This is achieved within an LOE. Feedback to the flight crew is an integral part of event-based assessment.

Appendix 1 to CAR OPS-3.978 Alternative Training and Qualification Programme (ATQP)

(See AC-1 to Appendix 1 to CAR OPS-3.978(b)(1)) (See AC-2 to Appendix 1 to CAR OPS-3.978(b)(2)) (See AC-3 to Appendix 1 to CAR OPS-3.978(b)(3)) (See AC-4 to Appendix 1 to CAR OPS-3.978(b)(4)) (See AC-5 to Appendix 1 to CAR- OPS-3.978(b)(5)) (See AC-6 to Appendix 1 to CAR OPS-3.978(b)(6)) (See AC-7 to Appendix 1 to CAR OPS-3.978(b)(9)) (See AC-8 to Appendix 1 to CAR OPS 3.978(c)(1)(i))

(a) An operator's ATQP may apply to the following requirements that relate to training and qualifications:
(1) CAR OPS-3.450 and Appendix 1 to CAR OPS-3.450 - Low Visibility Operations – Training and Qualifications;

(2) CAR OPS-3.945 Conversion training and checking and Appendix 1 to CAR OPS- 3.945;
(3) CAR OPS-3.950 Differences training and familiarisation training;
(4) CAR OPS-3.955 paragraph (b) - Nomination as commander;
(5) CAR OPS-3.965 Recurrent training and checking and Appendices 1 and 2 to CAR OPS-3.965;
(6) CAR OPS-3.980 Operation on more than one type or variant and Appendix 1 to CAR- OPS 3.980.

(b) Components of the ATQP - An Alternative Training and Qualification Programme shall comprise the following:
(1) Documentation that details the scope and requirements of the programme;
(2) A task analysis to determine the tasks to be analysed in terms of:
(i) knowledge;
(ii) the required skills;
(iii) the associated skill-based training; and,
(iv) where appropriate, the validated behavioural markers.
(3) Curricula – the curriculum structure and content shall be determined by task analysis, and shall include proficiency objectives including when and how those objectives shall be met. The process for curriculum development shall be acceptable to the Authority;
(4) A specific training programme for:
(i) each Helicopter type/class within the ATQP;
(ii) the instructors (CRI/SFI/TRI), and other personnel undertaking flight crew instruction;
(iii) the examiners (CRE/SFE/TRE); to include a method for the standardization of the instructors and examiners;
(5) A feedback loop for the purpose of curriculum validation and refinement, and to ascertain that the programme meets its proficiency objectives;
(6) A method for the assessment of flight crew both during conversion and recurrent training and checking. The assessment process shall include event-based assessment as part of the LOE. The method of assessment shall comply with the provisions of CAR OPS-3.965;
(7) An integrated system of quality control, that ensures compliance with all the requirements processes and procedures of the programme;
(8) A process that describes the method to be used if the monitoring and evaluation programmes do not ensure compliance with the established proficiency and qualification standards for flight crew;
(9) A Data Monitoring/Analysis programme.

(c) Implementation – The operator shall develop an evaluation and implementation strategy acceptable to the Authority; the following requirements shall be fulfilled:
(1) The implementation process shall include the following stages:
(i) A safety case that substantiates the validity of:
(A) The revised training and qualification standards when compared with the standards achieved under CAR OPS-3 prior to the introduction of ATQP.
(B) Any new training methods implemented as part of ATQP.

Note: If approved by the Authority the operator may establish an equivalent method other than a formal safety case.

(ii) Undertake a task analysis as required by paragraph (b)(2) above in order to establish the operator's programme of targeted training and the associated training objectives.
(iii) A period of operation whilst data is collected and analysed to ensure the efficiency of the safety case or equivalent and validate the task analysis. During this period

the operator shall continue to operate to the pre- ATQP CAR OPS-3 requirements. The length of this period shall be agreed with the Authority;

(2) Authority: The operator may then be approved to conduct training and qualification as specified under the ATQP.

AC-1 to Appendix 1 to CAR OPS-3.978(b)(1) Requirements, Scope and Documentation of the Programme

(See Appendix 1 to CAR OPS-3.978(b)(1))

(1) The documentation should demonstrate how the operator should establish the scope and requirements of the programme. The documentation should include:

(a) How the ATQP should enable the operator to establish an alternative training programme that substitutes the requirements as listed in CAR OPS-3 Subparts E and

N. The programme should demonstrate that the operator is able to improve the training and qualification standards of flight crew to a level that exceeds the standard prescribed in CAR OPS-3.

(b) The operator's training needs and established operational and training objectives.

(c) How the operator defines the process for designing of and gaining approval for the operator's flight crew qualification programmes. This should include quantified operational and training objectives identified by the operator's internal monitoring programmes. External sources may also be used. (d) How the programme will:

(i) Enhance safety;

(ii) Improve training and qualification standards of flight crew;

(iii) Establish attainable training objectives;

(iv) Integrate CRM in all aspects of training;

(v) Develop a support and feedback process to form a self-correcting training system;

(vi) Institute a system of progressive evaluations of all training to enable consistent and uniform monitoring of the training undertaken by flight crew;

(vii) Enable the operator to be able to respond to the new Helicopter technologies and changes in the operational environment;

(viii) Foster the use of innovative training methods and technology for flight crew instruction and the evaluation of training systems;

(ix) Make efficient use of training resources, specifically to match the use of training media to the training needs.

AC-2 to Appendix 1 to CAR OPS-3.978(b)(2) Task Analysis

(See Appendix 1 to CAR OPS-3.978(b)(2))

(1) For each Helicopter type/class to be included within the ATQP the operator should establish a systematic review that determines and defines the various tasks to be undertaken by the flight crew when operating that type(s)/class.

(2) Data from other types/class may also be used. The analysis should determine and describe the knowledge and skills required to complete the various tasks specific to the Helicopter type/class and/or type of operation.

(3) In addition, the analysis should identify the appropriate behavioural markers that should be exhibited. The task analysis should be suitably validated in accordance with Appendix 1 to CAR OPS-3.978(c)(iii).

(4) The task analysis, in conjunction with the data gathering programme(s) permit the operator to establish a programme of targeted training together with the associated training objectives described in AC to Appendix 1 to CAR OPS-3.978(b)(3) paragraph (2)(c)(iii) below.

AC-3 to Appendix 1 to CAR OPS-3.978(b)(3) Training Programme

(See Appendix 1 to CAR OPS-3.978(b)(3))

(1) The training programme should have the following structure:

(a) Curriculum.

(b) Daily lesson plan.

(2) The curriculum should specify the following elements:

(a) Entry requirements: A list of topics and content, describing what training level will be required before start or continuation of training.

(b) Topics: A description of what will be trained during the lesson;

(c) Targets/Objectives

(i) Specific target or set of targets that have to be reached and fulfilled before the training course can be continued.

(ii) Each specified target should have an associated objective that is identifiable both by the flight crew and the trainers.

(iii) Each qualification event that is required by the programme should specify the training that is required to be undertaken and the required standard to be achieved. (See paragraph (1)(d) below)

(3) Each lesson/course/training or qualification event should have the same basic structure. The topics related to the lesson have to be listed and the lesson targets should be unambiguous.

(4) Each lesson/course or training event whether classroom, CBT or simulator should specify the required topics with the relevant targets to be achieved.

AC-4 to Appendix 1 to CAR OPS-3.978(b)(4) Training Personnel

(See Appendix 1 to CAR OPS-3.978(b)(4))

(1) Personnel who perform training and checking of flight crew in an operator's ATQP should receive the following additional training on:

(a) ATQP principles and goals;

(b) Knowledge/skills/behaviour as learned from task analysis;

(c) LOE/ LOFT Scenarios to include triggers / markers / event sets / observable behaviour;

(d) Qualification standards;

(e) Harmonisation of assessment standards;

(f) Behavioural markers and the systemic assessment of CRM;

(g) Event sets and the corresponding desired knowledge/skills and behaviour of the flight crew;

(h) The processes that the operator has implemented to validate the training and qualification standards and the instructor's part in the ATQP quality control; and (i) LOQE.

AC-5 to Appendix 1 to CAR OPS-3.978(b)(5) Feedback Loop

(See Appendix 1 to CAR OPS-3.978(b)(5))

(1) The feedback should be used as a tool to validate that the curricula are implemented as specified by the ATQP; this enables substantiation of the curriculum, and that proficiency and training objectives have been met. The feedback loop should include data from operations flight data monitoring, advanced FDM programme and LOE/LOQE programmes. In addition, the evaluation process shall describe whether the overall targets/objectives of training are being achieved and shall prescribe any corrective action that needs to be undertaken.

(2) The programmes established quality control mechanisms should at least review the following:

(a) Procedures for approval of recurrent training;

(b) ATQP instructor training approvals;

(c) Approval of event set(s) for LOE/LOFT;
(d) Procedures for conducting LOE and LOQE

AC-6 to Appendix 1 to CAR OPS-3.978(b)(6) Crew Performance Measurement and Evaluation
(See Appendix 1 to CAR OPS-3.978(b)(6))

(1) The qualification and checking programmes should include at least the following elements:
   (a) A specified structure;
   (b) Elements to be tested/examined;
   (c) Targets and/or standards to be attained;
   (d) The specified technical and procedural knowledge and skills, and behavioural markers to be exhibited.

(2) An LOE event should comprise of tasks and sub-tasks performed by the crew under a specified set of conditions. Each event has one or more specific training targets/objectives, which require the performance of a specific manoeuvre, the application of procedures, or the opportunity to practice cognitive, communication or other complex skills. For each event the proficiency that is required to be achieved should be established. Each event should include a range of circumstances under which the crews' performance is to be measured and evaluated.

(3) The conditions pertaining to each event should also be established and they may include the prevailing meteorological conditions (ceiling, visibility, wind, turbulence etc.); the operational environment (navigation aid inoperable etc.); and the operational contingencies (non-normal operation etc.).

(4) The markers specified under the operator's ATQP should form one of the core elements in determining the required qualification standard. A typical set of markers are shown in the table below:

EVENT	MARKER
Awareness of Helicopter Systems:	1. Monitors and reports changes in automation status.
	2. Applies closed loop principle in all relevant situations.
	3. Uses all channels for updates.
	4. Is aware of remaining technical resources.

(5) The topics / targets integrated into the curriculum have to be measurable and progression on any training/course is only allowed if the targets are fulfilled.

AC-7 to Appendix 1 to CAR OPS-3.978(b)(9) Data Monitoring/Analysis Programme
(See Appendix 1 to CAR OPS-3.978(b)(9))

(1) The data analysis programme should consist of:
   (a) *A Flight Data Monitoring (FDM) programme:* This programme should include systematic evaluation of operational data derived from equipment that is able to record the flight profile and relevant operational information during flights conducted by the operator's Helicopter. Data collection should reach a minimum of 60% of all relevant flights conducted by the operator before ATQP approval is granted. This proportion may be increased at the discretion of the Authority.
   (b) *An Advanced FDM when an extension to the ATQP is requested:* An advanced FDM programme is determined by the level of integration with other safety initiatives implemented by the operator, such as the operator's Quality System. The programme should include both systematic evaluations of data from an FDM programme and flight crew training events for the relevant crews. Data collection should reach a minimum of 80% of all relevant flights and training conducted by the operator. This proportion may be varied at the discretion of the Authority.

(2) The purpose of either an FDM or advanced FDM programme is to enable the operator to:

(a) Provide data to support the programmes implementation and justify any changes to the ATQP;

(b) Establish operational and training objectives based upon an analysis of the operational environment;

(c) Monitor the effectiveness of flight crew training and qualification.

(3) Data Gathering.

(a) FDM programmes should include a system that captures flight data, and then transforms the data into an appropriate format for analysis. The programme should generate information to assist the operations safety personnel in analysing the data. The analysis should be made available to the ATQP post-holder.

(b) The data gathered should:

(i) Include all fleets that plan to operate under the ATQP;

(ii) Include all crews trained and qualified under the ATQP;

(iii) Be established during the implementation phase of ATQP; and

(iv) Continue throughout the life of the ATQP.

(4) Data Handling.

(a) The operator should establish a process, which ensures the strict adherence to any data handling protocols, agreed with flight crew representative bodies, to ensure the confidentiality of individual flight crew members.

(b) The data handling protocol should define the maximum period of time that detailed FDM or advanced FDM programme data, including exceedances, should be retained. Trend data may be retained permanently.

(5) An operator that has an acceptable operations flight data monitoring programme prior to the proposed introduction of ATQP may, with the approval of the Authority, use relevant data from other fleets not part of the proposed ATQP.

AC-8 to Appendix 1 to CAR OPS-3.978(c)(1)(i) Safety Case

(See Appendix 1 to CAR OPS-3.978(c)(1)(i))

(1) Safety Case

(a) A documented body of evidence that provides a demonstrable and valid justification that the programme (ATQP) is adequately safe for the given type of operation. The safety case should encompass each phase of implementation of the programme and be applicable over the lifetime of the programme that is to be overseen.

(b) The safety case should:

(i) Demonstrate the required level of safety;

(ii) Ensure the required safety is maintained throughout the lifetime of the programme;

(iii) Minimise risk during all phases of the programme's implementation and operation.

(2) Elements of a Safety Case:

(a) Planning: Integrated and planned with the operation (ATQP) that is to be justified;

(b) Criteria: Develop the applicable criteria – see paragraph (3) below;

(c) Documentation: Safety related documentation – including a safety checklist;

(d) Programme of implementation: To include controls and validity checks;

(e) Oversight: Review and audits.

(3) Criteria for the establishment of a Safety Case.

(a) The Safety Case should:

(i) Be able to demonstrate that the required or equivalent level of safety is maintained throughout all phases of the programme, including as required by paragraph (c) below;

(ii) Be valid to the application and the proposed operation (ATQP);

(iii) Be adequately safe and ensure the required regulatory safety standards or approved equivalent safety standards are achieved;

(iv) Be applicable over the entire lifetime of the programme;

(v) Demonstrate Completeness and Credibility of the programme;

(vi) Be fully documented;

(vii) Ensure integrity of the operation and the maintenance of the operations and training infra-structure;

(viii) Ensure robustness to system change;

(ix) Address the impact of technological advance, obsolescence and change;

(x) Address the impact of regulatory change.

(4) In accordance with Appendix 1 to CAR OPS-3.978 paragraph (c) the operator may develop an equivalent method other than that specified above.

AMC-1 OPS-3.980 Operation on more than one type or variant

(See CAR OPS-3.980)

(1) Terminology

(a) The terms used in the context of the requirement for operation of more than one type or variant have the following meaning:

(i) Base Helicopter. A Helicopter, or a group of Helicopters, designated by an operator and used as a reference to compare differences with other Helicopter types/variants within an operator’s fleet.

(ii) Helicopter variant. A Helicopter, or a group of Helicopters, with the same characteristics but which have differences from a base Helicopter which require additional flight crew knowledge, skills, and or abilities that affect flight safety.

(iii) Credit. The acceptance of training, checking or recent experience on one type or variant as being valid for another type or variant because of sufficient similarities between the two types or variants.

(iv) Differences training. See CAR OPS 3.950(a)(1).

(v) Familiarisation training. See CAR OPS 3.950(a)(2).

(vi) Major change. A change, or changes, within a Helicopter type or related type, which significantly affect the flight crew interface with the Helicopter (e.g. flight characteristics, procedures, design/number of propulsion units, change in number of required flight crew).

(vii) Minor change. Any change other than a major change.

(viii) Operator Difference Requirements (ODRs). A formal description of differences between types or variants flown by a particular operator.

(b) Training and checking difference levels

(i) Level A

(A) Training. Level A training can be adequately addressed through self- instruction by a crew member through page revisions, bulletins or differences handouts. Level A introduces a different version of a system or component which the crew member has already shown the ability to use and understand. The differences result in no, or only minor, changes in procedures.

(B) Checking. A check related to differences is not required at the time of training.

However, the crew member is responsible for acquiring the knowledge and may be checked during proficiency checking.

(ii) Level B

(A) Training. Level B training can be adequately addressed through aided instruction such as slide/tape presentation, computer-based instruction which may be interactive, video or classroom instruction. Such training is typically used for part-task systems requiring knowledge and training with, possibly, partial application of procedures (e.g. fuel or hydraulic systems etc.).

(B) Checking. A written or oral check is required for initial and recurrent differences training.

(iii) Level C

(A) Training. Level C training should be accomplished by use of “hands on” FSTDs qualified according to CAR-ORA (Subpart FSTD). The differences affect skills, abilities as well as knowledge but do not require the use of “real time” devices. Such training covers both normal and non-normal procedures (for example for flight management systems).

(B) Checking. An STD used for training level C or higher is used for a check of conversion and recurrent training. The check should utilise a “real time” flight environment such as the demonstration of the use of a flight management system. Manoeuvres not related to the specific task do not need to be tested.

(iv) Level D

(A) Training. Level D training addresses differences that affect knowledge, skills and abilities for which training will be given in a simulated flight environment involving, “real time” flight manoeuvres for which the use of an FSTD qualified according to CAR-ORA (Subpart-FSTD).110 would not suffice, but for which motion and visual clues are not required. Such training would typically involve an STD as defined in CAR-ORA (Subpart-FSTD).

(B) Checking. A proficiency check for each type or variant should be conducted following both initial and recurrent training. However, credit may be given for manoeuvres common to each type or variant and need not be repeated. Items trained to level D differences may be checked in STDs qualified according to CAR-ORA (Subpart-FSTD). Level D checks will therefore comprise at least a full proficiency check on one type or variant and a partial check at this level on the other.

(v) Level E

(A) Training. Level E provides a realistic and operationally oriented flight environment achieved only by the use of Level C or D Flight Simulators or the Helicopter itself. Level E training should be conducted for types and variants which are significantly different from the base Helicopter and/or for which there are significant differences in handling qualities.

(B) Checking. A proficiency check on each type or variant should be conducted in a level C or D Flight Simulator or the Helicopter itself. Either training or checking on each Level E type or variant should be conducted every 6 months. If training and checking are alternated, a check on one type or variant should be followed by training on the other so that a crew member receives at least one check every 6 months and at least one check on each type or variant every twelve (12) months.

AMC-2 OPS-3.980(b) Methodology - Use of Operator Difference Requirement (ODR) Tables

(See CAR OPS-3.980(b)) (See also IEM OPS-3.980(b))

(1) General

(a) Use of the methodology described below is acceptable to the Authority as a means of evaluating Helicopter differences and similarities to justify the operation of more than one type or variant, and when credit is sought.

(2) ODR Tables

(a) Before requiring flight crew members to operate more than one type or variant, operators should first nominate one Helicopter as the Base Helicopter from which to show differences with the second Helicopter type or variant, the 'difference Helicopter', in terms of technology (systems), procedures, pilot handling and Helicopter management. These differences, known as Operator Difference Requirements (ODR), preferably presented in tabular format, constitute part of the justification for operating more than one type or variant and the basis for the associated differences/familiarisation training for the flight crew.

(3) The ODR Tables should be presented as follows:

Table 1 – ODR 1 – General

BASE HELICOPTER		DIFFERENCE HELICOPTER:		COMPLIANCE METHOD		
GENERAL	**DIFFERENCES**	**FLT CHAR**	**PROCEDURE CHANGES**	**TRAINING**	**CHECKING**	**RECENT EXPERIENCE**
General description of aircraft (dimensions weight, limitations, etc.)	Identification of The relevant differences between the base Helicopter and The difference Helicopter.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

Table 2 – ODR 2 – Systems

BASE HELICOPTER:		DIFFERENCE HELICOPTER:		COMPLIANCE METHOD		
SYSTEM	**DIFFERENCES**	**FLT CHAR**	**PROCEDURE CHANGES**	**TRAINING**	**CHECKING**	**RECENT EXPERIENCE**
Brief description of systems and Sub-systems classified according to the ATA 100 index.	list of differences for each relevant subsystem between the base Helicopter and the difference Helicopter.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

Table 3 – ODR – Manoeuvres

BASE HELICOPTER:		DIFFERENCE HELICOPTER:		COMPLIANCE METHOD		
MANOEUVRES	**DIFFERENCES**	**FLIGHT CHARACTERISTICS**	**PROCEDURE CHANGES**	**TRAINING**	**CHECKING**	**RECENT EXPERIENCE**
Described According to phase of flight (gate, taxi, flight, taxi, gate)	List of relevant Differences for each manoeuvre between the base Helicopter and the difference Helicopter.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

(4) Compilation of ODR Tables

(a) ODR 1 – Helicopter general

(i) The general characteristics of the difference Helicopter should be compared with the base Helicopter with regard to:

(A) General dimensions and Helicopter design;

(B) Flight deck general design;

(C) Cabin layout;

(D) Engines (number, type and position);

(E) Limitations (flight envelope).

(b) ODR 2 – Helicopter systems

(i) Consideration should be given to differences in design between the difference Helicopter and the base Helicopter. This comparison should be completed using the ATA 100 index to establish system and subsystem classification and then an analysis performed for each index item with respect to main architectural, functional and/or operations elements, including controls and indications on the systems control panel.

(c) ODR 3 - Helicopter manoeuvres (operational differences)

(i) Operational differences encompass normal, abnormal and emergency situations and include any change in Helicopter handling and flight management. It is necessary to establish a list of operational items for consideration on which an analysis of differences can be made. The operational analysis should take the following into account:

(A) Flight deck dimensions (e.g. size, cut-off angle and pilot eye height);

(B) Differences in controls (e.g. design, shape, location, function);

(C) Additional or altered function (flight controls) in normal or abnormal conditions;

(D) Procedures;

(E) Handling qualities (including inertia) in normal and abnormal configurations;

(F) Performance in manoeuvres;

(G) Helicopter status following failure;

(H) Management (e.g. ECAM, EICAS, NAVIAD selection, automatic checklists).

(d) Once the differences for ODR 1, ODR 2 and ODR 3 have been established, the consequences of differences evaluated in terms of Flight Characteristics (FLT CHAR) and Change of Procedures (PROC CHNG) should be entered into the appropriate columns.

(e) Difference Levels – crew training, checking and currency

(i) The final stage of an operator's proposal to operate more than one type or variant is to establish crew training, checking and currency requirements. This may be established by applying the coded difference levels from Table 4 to the Compliance Method column of the ODR Tables.

(5) Differences items identified in the ODR systems as impacting flight characteristics, and/or procedures, should be analysed in the corresponding ATA section of the ODR manoeuvres. ***Normal, abnormal and emergency situations should be addressed accordingly.***

(6) Differences Level versus Training.

Table 4 - Difference Levels versus training

Difference Level	Method/Minimum Specification for Training Device
A: Represents knowledge requirement.	Self-Instruction through operating bulletins or differences handouts
B: Aided instruction is required to ensure crew understanding, emphasise issues, aid retention of information, or aided instruction with partial application of procedures	Aided instruction e.g. computer based training (CBT), class room Instruction or video tapes. Interactive CBT
C: For variants having part task differences affecting skills or abilities as well as knowledge. Training device required to ensure attainment and retention of crew skills	STD (CAR-ORA (SUBPART-FSTD)
D: Full task differences affecting knowledge, skills and/or abilities using STDs capable of performing flight manoeuvres.	STD (CAR-ORA (SUBPART-FSTD)
E: Full tasks differences requiring high fidelity environment to attain and maintain knowledge skills and abilities.	STD (CAR-ORA (SUBPART-FSTD)

Note: Levels A and B require familiarisation training, levels C, D and E require differences training. For Level E, the nature and extent of the differences may be such that it is not possible to fly both types or variants with a credit in accordance with Appendix 1 to CAR OPS-3.980, subparagraph (d)(7).

IEM OPS-3.980(b) Operation on more than one type or variant – Philosophy and Criteria

(See CAR OPS-3.980(b))

(1) Philosophy

(a) The concept of operating more than one type or variant depends upon the experience, knowledge and ability of the operator and the flight crew concerned.

(b) The first consideration is whether or not the two Helicopter types or variants are sufficiently similar to allow the safe operation of both.

(c) The second consideration is whether or not the types or variants are sufficiently similar for the training, checking and recent experience items completed on one type or variant to replace those required on the similar type or variant. If these Helicopters are similar in these respects, then it is possible to have credit for training, checking and recent experience. Otherwise, all training, checking and recent experience requirements prescribed in Subpart N should be completed for each type or variant within the relevant period without any credit.

(2) Differences between Helicopter types or variants

(a) The first stage in any operator’s submission for crew multi-type or variant operations is to consider the differences between the types or variants. The principal differences are in the following three areas:

(i) Level of technology. The level of technology of each aircraft type or variant under consideration encompasses at least the following design aspects:
   (A) Flight deck layout (e.g. design philosophy chosen by a manufacturer);
   (B) Mechanical versus electronic instrumentation;
   (C) Presence or absence of Flight Management System (FMS);
   (D) Conventional flight controls (hydraulic, electric or manual controls) versus fly-by-wire;
   (E) Side-stick versus conventional control column;
   (F) Pitch trim systems;
   (G) Engine type and technology level (e.g. jet/turboprop/piston, with or without automatic protection systems.

(ii) Operational differences. Consideration of operational differences involves mainly the pilot machine interface, and the compatibility of the following:
   (A) Paper checklist versus automated display of checklists or messages (e.g. ECAM, EICAS) during all procedures;
   (B) Manual versus automatic selection of NAVAIDS;
   (C) Navigation equipment;
   (D) Aircraft weight and performance.

(iii) Handling characteristics. Consideration of handling characteristics includes control response, crew perspective and handling techniques in all stages of operation. This encompasses flight and ground characteristics as well as performance influences (e.g. number of engines). The capabilities of the autopilot and auto-thrust systems may affect handling characteristics as well as operational procedures.

(3) Training, checking and crew management. Alternating training and proficiency checking may be permitted if the submission to operate more than one type or variant shows clearly that there are sufficient similarities in technology, operational procedures and handling characteristics.

(4) An example of completed ODR tables for an operator's proposal for flight crews to operate more than one type or variant may appear as follows:

Table 1 – ODR 1 – HELICOPTER GENERAL

BASE HELICOPTER: 'X' DIFFERENCE HELICOPTER: 'Y'				COMPLIANCE METHOD		
GENERAL	**DIFFERENCES**	**Flight Characteristics**	**Procedure Changes**	**Training**	**Checking**	**Recent Experience**
Flight Deck	Same flight deck arrangement, 2 observer's seats on 'Y'	NO	NO	A	/	/
Cabin	'Y' max certificated passenger capacity: 335, 'X': 179	NO	NO	A	/	/

Table 2 – ODR 2 – SYSTEMS

BASE HELICOPTER: 'X' DIFFERENCE HELICOPTER: 'Y'				COMPLIANCE METHOD		
Systems	**Differences**	**Flight Characteristics**	**Procedure Changes**	**Training**	**Checking**	**Recent Experience**
21 Air Conditioning	- Trim air system -packs - cabin temperature	NO NO NO	YES NO YES	B	B	B
22 Auto flight	- FMGS architecture - FMGES functions - reversion modes	NO NO NO	NO YES YES	B C D	B C D	B B D
23 Communications						

Table 3 – ODR 3 – MANOEUVERS

BASIC HELICOPTER: 'X' DIFFERENCE HELICOPTER: 'Y'				COMPLIANCE METHOD		
Manoeuvers	**Differences**	**Flight Characteristics**	**Procedure Changes**	**Training**	**Checking**	**Recent Experience**
Taxi	- Pilot eye height, turn radius,	YES	NO	D	D	/
	- two engine taxi (1&4)	NO	NO	A	/	/
Take-off	Flight Characteristics in ground law	YES	NO	E	E	E
Rejected takeoff	Reverser actuation logic	YES	NO	D	D	D
Take-off engine failure	- V1/Vr split - Pitch attitude/ lateral control	YES (P)* YES (H)*	NO NO	B E	B E	B

*P = Performance, *H = Handling

AMC OPS 3.980 Operation on More than one Type or Variant

(See OPS 3.980)

(a) Operators of more than one helicopter variant or type should provide in the Operations Manual:

(1) Flight crew members minimum experience level;

(2) The process whereby flight crew qualified on one type or variant will be trained and qualified on another type or variant; and

(3) Any additional recency requirements that may be required.

(b) If a flight crew member operates more than one type or variant the following provisions should be satisfied:

(1) The recency requirements specified in OPS 3.970 should be met and confirmed prior to commercial air transport operations on any type, and the minimum number of flights on each

type within a three month period specified in the Operations Manual;

(2) OPS 3.965 requirements with regard to recurrent training;

(3) OPS 3.965 requirements with regard to proficiency checks may be satisfied by a 6 monthly check on any one type or variant operated. However, a proficiency check on each type or variant operated should be completed every 12 months;

(4) For helicopters with a maximum certificated take-off mass (MCTOM) exceeding 5 700 kg, or with a maximum approved passenger seating configuration (MAPSC) of more than 19:

(i) The flight crew member should not fly more than two helicopter types;

(ii) A minimum of 3 months and 150 hours experience on the type or variant should be achieved before the flight crew member should commence the conversion course onto the new type or variant;

(iii) 28 days and/or 50 hours flying should then be achieved exclusively on the new type or variant; and

(iv) A flight crew member should not be rostered to fly more than one type or significantly different variant of a type during a single duty period.

(5) In the case of all other helicopters, a flight crew member should not operate more than three helicopter types or significantly different variant.

(6) For a combination of helicopter and aeroplane:

(i) A flight crew member may fly one helicopter type or variant and one aeroplane type irrespective of their maximum certificated take-off mass (MCTOM) or the maximum approved passenger seating configuration (MAPSC) that may be carried.

(ii) ii. If the helicopter type is covered by paragraph b.4. then paragraphs b.4.ii., b.4.iii. and b.4.iv. should also apply in this case.

IEM OPS-3.985 Training records

(See CAR OPS-3.985)

A summary of training should be maintained by the operator to show a flight crew member’s completion of each stage of training and checking.

SECTION 1 - SUBPART O – CABIN CREW

CAR OPS-3.988 Applicability

(a) The operator shall establish, to the satisfaction of the Authority, the minimum number of cabin crew required for each type of Helicopter, based on seating capacity or the number of passengers carried, in order to affect a safe and expeditious evacuation of the Helicopter, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation. The operator shall assign these functions for each type of Helicopter.

(b) An operator shall ensure that all cabin crew members comply with the requirements of this Subpart and any other safety requirements applicable to cabin crew.

(c) For the purpose of this Regulation, "cabin crew member" means an appropriately qualified crew member, other than a flight crew member, who performs, in the interests of safety of passengers, duties assigned to him/her by the operator or the commander in the cabin of a Helicopter.

CAR OPS-3.989 Identification

(See GM OPS-3.989)

(a) An operator shall ensure that all cabin crew members wear the operator's cabin crew uniform and are clearly identifiable to the passengers as a cabin crew member.

(b) The uniform to be worn by operating cabin crew shall be such as not to impede the performance of their duties, as required for the safety of passengers and flight during operations, and shall allow passengers to identify the operating cabin crew in an emergency situation.

(c) Other personnel, such as medical staff, security staff, child minders, escorts, technical staff, entertainers, interpreters, who undertake tasks in the cabin, shall not wear a uniform which might identify them to passengers as a cabin crew member, unless they comply with the requirements of this Subpart and any other applicable requirements of this Regulation.

CAR OPS-3.990 Determining the Number and composition of cabin crew

(See IEM OPS-3.990, GM 1 OPS-3.990, GM 2 OPS-3.990, AMC OPS-3.1000(e))

(a) An operator shall not operate a Helicopter with a maximum approved passenger seating configuration of more than nineteen (19), when carrying one or more passengers, unless at least one cabin crew member is included in the crew for the purpose of performing duties, specified in the Operations Manual, in the interests of the safety of passengers.

(b) When complying with sub-paragraph (a) above, an operator shall ensure that the minimum number of cabin crew is the greater of:

   (1) One cabin crew member for every fifty (50), or fraction of fifty (50), passenger seats installed on the same deck of the Helicopter; or

   (2) The number of cabin crew who actively participated in the Helicopter cabin during the relevant emergency evacuation demonstration, or who were assumed to have taken part in the relevant analysis, except that, if the maximum approved passenger seating configuration is less than the number evacuated during the demonstration by at least fifty (50) seats, the number of cabin crew may be reduced by one (1) for every whole multiple of fifty (50) seats by which the maximum approved passenger seating configuration falls below the certificated maximum capacity.

(c) During ground operations only, the minimum number of cabin crew shall be determined by the number of floor level exits on aircraft types in the operator's fleet to provide the most effective response in the event of an emergency situation unless otherwise approved by the Authority to operate with a reduced cabin crew complement.

(d) The Authority may under exceptional circumstances require an operator to include in the crew, additional cabin crew members.

(e) In unforeseen circumstances the required minimum number of cabin crew may be reduced provided that:

  (1) The number of passengers has been reduced in accordance with procedures specified in the Operations Manual; and

  (2) A report is submitted to the Authority after completion of the flight.

(f) An operator shall ensure that when engaging the services of cabin crew members who are self-employed and/or working on a freelance or part-time basis, the requirements of Subpart O are complied with. In this respect, particular attention must be paid to the total number of aircraft types or variants that a cabin crew member may fly for the purposes of commercial air transportation, which must not exceed the requirements in CAR OPS-3.1030, including when his services are engaged by another operator.

(g) When scheduling cabin crew for a flight, an operator should establish procedures which take account of the experience of each cabin crew member such that the required cabin crew includes a minimum of two (2) cabin crew members of which one (1) shall have more than twelve (12) months type approval operating experience as a cabin crew member and the second senior cabin crew member shall have at least three (3) months experience as an operating cabin crew member

CAR OPS-3.992 Assignment of Emergency Duties

The operator shall establish, to the satisfaction of the Authority, the minimum number of cabin crew required for each type of helicopter, based on seating capacity or the number of passengers carried, which shall not be less than the minimum number established during certification, in order to effect a safe and expeditious evacuation of the helicopter, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation. The operator shall assign these functions for each type of helicopter.

CAR OPS-3.995 Minimum requirements

(See GM OPS-3.995(g))

An operator shall ensure that each cabin crew member:

(a) Is at least 18 years of age;

(b) Has passed a medical examination or assessment at regular intervals as required by the Authority so as to check the medical fitness to discharge his/her duties;

(c) Has successfully completed initial training in accordance with CAR OPS-3.1005 and holds an attestation of safety training;

(d) Has completed the appropriate conversion and/or differences training covering at least the subjects listed in CAR OPS-3.1010;

(e) Shall undergo recurrent training in line with the provisions of CAR OPS-3.1015;

(f) Is competent to perform his/her duties in accordance with procedures specified in the Operations Manual.

(g) The ability to read, speak, write and understand English (to an acceptable level stated within the Operations Manual, approved by the CAA) that shall ensure the appropriate communication with other cabin crew members, flight crew and passengers.

(h) The ability to retrieve safety and emergency equipment on the helicopter;

(i) The ability and strength to operate equipment/systems, as applicable to the operator’s procedures during normal, abnormal and emergency situations and to the Helicopter type(s) to which the cabin crew member will be assigned duties;

CAR OPS-3.1000 In-charge cabin crew members

(See AMC OPS-3.1000(e)) AMC OPS-3.1025)

(a) When more than one cabin crew member is assigned to a flight, the operator shall nominate one cabin crew member as the in-charge cabin crew member to be responsible to the commander.

(b) The In-charge cabin crew member shall have responsibility to the commander for the conduct and coordination of normal and emergency procedure(s), including discontinuing non-safety related duties for the continued safety or security of the flight as specified in the Operations Manual.

(c) During turbulence, in the absence of any instructions from the flight crew, the In-charge cabin crew member shall be entitled to discontinue non-safety related duties and advise the flight crew of the level of turbulence being experienced and the need for the fasten seat belt signs to be switched on. This should be followed by the cabin crew securing the passenger cabin and other applicable areas, unless otherwise advised by the commander.

(d) Where required by CAR OPS-3.990 to carry more than one cabin crew member, an operator shall appoint a person to the post of In-charge cabin crew member who has at least:

(1) one year's experience as an operating cabin crew member; and

(2) has undergone at least (1) one line check as per CAR OPS-3.1025 (a); and

(3) has successfully completed the "In-charge Training course"; and The In-charge training programme shall cover the following as a minimum

(i) Operating as a leader (leadership skills):

(A) One crew concept;

(B) Team building and maintenance; and

(C) Planning and workload management.

(ii) Flight preparation – Pre-Flight Briefing:

(A) allocation of cabin crew stations and responsibilities;

(B) confirm operational knowledge of crew member responsibilities associated with that allocated position;

(C) consideration of the particular flight, including

a. Helicopter type,

b. equipment,

c. area and type of operation, and

d. categories of passengers with particular attention to disabled, infants and stretcher cases; and

(iii) Cooperation within the crew:

(A) discipline, responsibilities and chain of command,

(B) importance of coordination and communication,

(C) security threats

(D) announcements,

(E) pilot and cabin crew incapacitation.

(iv) Review of operator's and regulatory requirements:

(A) passenger safety briefing,

(B) safety information cards,

(C) Passenger compliance to seat belts (signage and PA) and infant seat belt or child restraint device,

(D) securing of galleys, lavatories and cabin,

(E) stowage of cabin baggage,

(F) electronic equipment,

(G) procedures when fuelling with passengers on board,

(H) turbulence,

(I) documentation; including cabin logbook entries

(v) Familiarization flight supervision requirements and assessment training.

(vi) Human factors and crew resource management; and

(vii) Accident and incident reporting; and

(viii) Flight and duty time limitations and rest requirements.

(e) An operator shall establish procedures to select the next most suitably qualified cabin crew member to operate as in-charge cabin crew member in the event of the in-charge cabin crew member becoming unable to operate. Such procedures must be acceptable to the Authority and take account of the cabin crew member's operational experience.

(f) *CRM Training:* An operator shall ensure that all relevant elements in Appendix 2 to CAR OPS 3.1005/3.1010/3.1015 Table 1, Column (a) are integrated into the training and covered to the level required by Column (f), In-charge Cabin Crew Course.

(1) CRM Training programme for In-Charge Cabin Crew Member provides specialized competencies and skills relevant to becoming a qualified cabin crew in-charge. It is an enhanced training programme which is specific to the duties and responsibilities of an in-charge cabin crew. The training provides him/her with competencies and skills required to assume this role.

(2) This shall include the application of knowledge gained in previous CRM training and operational experience relevant to the specific duties and responsibilities of In- Charge Cabin Crew Member.

(3) The In-Charge cabin crew member shall demonstrate the ability to manage all areas of operations within the aircraft (except Flight Crew duties) and take the appropriate leadership/management decisions during the day-to-day operations and normal, abnormal and emergency situations in order to participate in the safe operation of the flight.

CAR OPS-3.1002 Single cabin crew member operations

An operator shall ensure that each cabin crew member who does not have previous comparable experience completes the following, before operating as a single cabin crew member.

(a) Training in addition to that required by CAR OPS-3.1005 and CAR OPS-3.1010 shall include particular emphasis on the following to reflect single cabin crew member operations:

(i) responsibility to the commander for the conduct of cabin safety and emergency procedure(s) specified in the Operations Manual;

(ii) importance of coordination and communication with the flight crew, management of unruly or disruptive passengers;

(iii) review of operator's requirements and legal requirements;

(iv) documentation;

(v) accident and incident reporting;

(vi) flight and duty time limitations

(b) An operator shall ensure, the cabin crew member assigned to operate as a single cabin crew member, is competent to perform his/her duties in accordance with the procedures specified in the Operations Manual.

(c) Suitability for single cabin crew operations shall be addressed in the criteria for cabin crew selection, recruitment, training and assessment of competence.

(d) Cabin crew members shall complete a recurrent training programme annually. (See CAR OPS3.1015 and Appendix 1 to CAR OPS-3.1015)

(e) Cabin crew members shall complete the training with familiarisation flights as per CAR OPS-3.1012.

CAR OPS-3.1005 Initial safety training

(See Appendix 1 to CAR OPS-3.1005 and Appendix 3 to CAR OPS-3.1005/3.1010/3.1015. See CAR OPS 3.1039 and CAR OPS 3.1040)

(a) An operator shall ensure that initial training for each cabin crew member is conducted by suitably qualified persons, on the following, but not limited to:
   (1) Aviation indoctrination;
   (2) Cabin crew tasks;
   (3) Normal, abnormal and Emergency procedures;
   (4) Aircraft type rating;
   (5) Dangerous goods;
   (6) Human performance (CRM);
   (7) Cabin health and first aid;
   (8) Aviation security;
   (9) Identifying and responding to trafficking in persons.

   Note: See additional required subjects listed in Appendix 1 to CAR OPS-3.1005.

(b) Training courses shall, at the discretion of the Authority, and subject to its approval, be provided: either
   (1) by the operator
      (i) directly, or
      (ii) indirectly through a training organisation acting on behalf of the operator; or
   (2) by an approved training organisation.

(c) The programme and structure of the initial training courses shall be in accordance with the applicable requirements and shall be subject to prior approval of the Authority.

(d) At the discretion of the Authority, the operator or the approved training organisation providing the training course, shall deliver an attestation of safety training if applicable to a cabin crew member after he has completed the initial safety training and successfully passed the check referred to in AMC OPS-3.1025.

(e) Where the Authority authorises an operator or an approved training organisation to deliver the attestation of safety training if applicable, to a cabin crew member, such attestation shall clearly state a reference to the acceptance granted by the Authority.

(f) All instructors who provide cabin crew training (SEP, First Aid, CRM, DGR and In-flight Cabin Security) shall be monitored and accepted by CAA prior to conduct of safety training.

CAR OPS-3.1007 Training Facilities

(See AMC OPS 3.1007 and GM OPS-3.1007)

(a) Training facilities shall comprise of classroom and or representative training devices provided with the appropriate furnishings, audio visuals and training aids.

(b) The range of recommended space for each adult in a classroom varies from 1.4 m² to 6.7 m² in order to provide a conducive learning environment as approved by the CAA.

   Note: The wide range in recommended figures is due to the different classroom environments envisioned by designers, or the variance in allocation for certain spaces within the classroom, such as aisles and front setback. (See ICAO Doc 10002 – Cabin Crew Training Chapter 15).

CAR OPS-3.1010 Conversion and Differences training

(See Appendix 1 to CAR OPS-3.1010 and IEM to Appendix 1 to CAR OPS-3.1010/1015)

(a) An operator shall ensure that each cabin crew member has completed appropriate training, as specified in the Operations Manual, before undertaking assigned duties as follows:

(1) *Conversion training;* A conversion course shall be completed before being:
(i) First assigned by the operator to operate as a cabin crew member; or
(ii) Assigned to operate another Helicopter type; and
(2) *Differences training.* Differences training shall be completed before operating:
(i) On a variant of a Helicopter type currently operated; or
(ii) With different safety equipment, safety equipment location, or normal and emergency procedures on currently operated aircraft types or variants.

(b) An operator shall determine the content of the conversion or differences training taking account of the cabin crew member's previous training as required by CAR OPS-3.1035.

(c) An operator shall ensure that:
(1) Conversion training is conducted in a structured and realistic manner, in accordance with Appendix 1 to CAR OPS-3.1010;
(2) Differences training is conducted in a structured manner; and
(3) Conversion training, and if necessary, differences training, includes the use of all safety equipment, normal and emergency procedures applicable to the type or variant of Helicopter and involves training and practice on a representative aircraft type training device or on the actual Helicopter.
(4) Elements of CRM training are integrated into the conversion course.
(5) Crew members, when serving on helicopters operated above 3 000 m (10 000 ft), are knowledgeable as regards the effect of lack of oxygen and, in the case of pressurised helicopters, as regards physiological phenomena accompanying a loss of pressurisation.

(d) Conversion and Differences training programmes, in accordance with Appendix 1 to CAR OPS3.1010, shall be approved by the Authority.

(e) An operator shall ensure that each cabin crew member before being first assigned to duties, completes the Operator's CRM Training and Helicopter Type Specific CRM, in accordance with Appendix 1 to CAR OPS-3.1010 subparagraph (j) and Familiarisation flights as per para (k).

CAR OPS-3.1012 Familiarisation

(See AMC OPS-3.1012)

An operator shall ensure that, following completion of initial training, each cabin crew member undertakes familiarisation flights. The supervised familiarization flight experience is part of the cabin crew initial qualification process before being assigned unsupervised duties as a cabin crew member prior to operating as one of the minimum numbers of cabin crew required by CAR OPS- 3.990. Supervised line flight experience shall be completed as below and shall require a cabin crew member to demonstrate an understanding of all responsibilities and competency to perform the duties and execute the procedures associated with cabin operations

(a) Familiarisation flying of a minimum twelve (12) hours or six (6) sectors whichever is first achieved.

Note: For example, this may be 12 hours flying over four (4) sectors or 9 hours over six (6) sectors.

(b) Familiarisation flights shall be conducted under the supervision of a suitably qualified in- charge cabin crew member on the Helicopter type to be operated.

(c) The person conducting the supervision has received training and understands the responsibilities for the cabin crew position(s) being observed as approved by the CAA.

(d) The familiarisation flights shall be conducted within fourteen (14) days from completion of the training course of issuance of licence.

CAR OPS-3.1015 Recurrent training

(See Appendix 1 to CAR OPS–3.1015) (See AMC to Appendix 1 to CAR OPS-3.1005(e)(3))
(See AMC-1 OPS-3.1005/3.1010/3.1015) (See IEM to AMC-1 OPS-3.1005/3.1010/3.1015/3.1020)

(a) An operator shall ensure that each cabin crew member undergoes recurrent training, every twelve (12) months to ensure maintenance of competency, knowledge, skills through a series of practical exercises, oral and or written exam, assigned to each crew member in normal and emergency procedures relevant to the type(s) and/or variant(s) of aircraft on which they operate in accordance with Appendix 1 to CAR OPS-3.1015.

(b) An operator shall ensure that the recurrent training and checking programme, approved by the Authority, includes theoretical and practical instruction, together with individual practice, as prescribed in Appendix 1 to CAR OPS-3.1015 and will include the following:

    (1) Annual first aid, emergency and safety equipment training and checking must cover all requirements for each type.

(c) These training programmes shall ensure that each person:

    (1) Continues to meet the standards of proficiency to execute safety duties and functions assigned to the cabin crewmember in the event of an emergency or in a situation requiring emergency evacuation. They may also acquire new competency necessary to perform his or her duties.

    (2) Is able to maintain competency in the use of emergency and life-saving equipment required to be carried, such as life jackets, life rafts, evacuation slides, emergency exits, portable fire extinguishers, oxygen equipment, first-aid and universal precaution kits and automated external defibrillators;

    (3) Is knowledgeable with regards to the effect of lack of oxygen and, in the case of pressurized aircrafts, on physiological phenomena accompanying a loss of pressurization; when serving on aircrafts operated above 3 000 m (10 000 ft.),

    (4) aware of other crew members' assignments and functions in the event of an emergency as it is necessary for the fulfilment of the cabin crew member's own duties;

    (5) general awareness of the types of dangerous goods which may, and may not, be carried in a passenger cabin;

    (6) Knowledgeable about human performance as related to passenger cabin safety duties including flight crew/cabin crew coordination.

(d) The period of validity of recurrent training and the associated checking required by CAR OPS3.1025 shall be twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous check.

CAR OPS-3.1020 Refresher training

(See Appendix 1 to CAR OPS-3.1020) (See AMC OPS-3.1020) (See AMC-1 OPS-3.1005/3.1010/3.1015/3.1020)

(a) An operator shall ensure that each cabin crew member who has been absent from all flying duties for more than 180 Days and still remains within the period of validity of the previous check required by CAR OPS-3.1025(b)(3) completes refresher training specified in the Operations Manual as prescribed in Appendix 1 to CAR OPS-3.1020 (See AMC OPS-3.1020).

(b) The operator may replace refresher training by recurrent training if the reinstatement of the cabin crew member's flying duties commences within the validity period of the last recurrent training and checking. If that validity period has expired, refresher training may only be replaced by aircraft type specific and operator conversion training as specified in CAR OPS- 3.1010.

(c) An operator shall ensure that when a cabin crew member has been on flying duties, but has not, for a period greater than ninety (90) days and less than 180 days, undertaken duties on another specific type of Helicopter as required by CAR OPS-3.990 (b). Before undertaking such duties on that specific type, the cabin crew member, either:
   (1) Completes refresher training on that type; or
   (2) Operates two (2) re-familiarisation sectors as defined in AMC OPS-3.1012 para(c).

CAR OPS-3.1025 Checking

(See AMC OPS-3.1025, GM 1 OPS 3.1025)

(a) An operator shall develop an annual periodic line check programme to ensure that each cabin crew member is continuously competent to perform their duties during line operations after initial qualification as follows:
   (1) Minimum requirement of (1) one line check every year on either a wide bodied or narrow-bodied aircraft.
   (2) The annual periodic line check conducted shall include a verbal competency check on the differences between types.
   (3) Each line check revalidates the line check for the other variants.
   (4) These checks must be performed by personnel acceptable to the Authority.

(b) An operator shall ensure that each cabin crew member undergoes checks covering the training received in order to verify his proficiency in carrying out normal and emergency safety duties as follows:
   (1) ***Initial training.*** All Cabin crew trainees shall complete the training programme as listed in Appendix 1 to CAR OPS-3.1005 before being assigned duties as a cabin crewmember.
   (2) ***Conversion and Differences training.*** The items listed in Appendix 1 to CAR OPS- 3.1010; and
   (3) ***Recurrent training.*** The items listed in Appendix 1 to CAR OPS-3.1015 as appropriate.
   (4) ***Refresher training.*** The items listed in Appendix 1 to CAR OPS-3.1020.

(c) Competency and checking records for checks conducted under para (a):
   (1) The Operator shall maintain accurate and up-to-date records of all competency assessments and testing including annual perodic line check for every person who may be or assigned duty as a crewmember on a Helicopter.
   (2) For each person whom the Operator maintains a competency and testing record in accordance with paragraph (1) above, the record shall include the following details:
      i. The date that the competency test or assessment including annual periodic line check was carried out;
      ii. The details of the check or assessment including annual periodic line check if completed;
      iii. The name and qualifications of the qualified assessor responsible for carrying out the check or assessment;
      iv. The Operator shall determine remedial measures on crew who is found incompetent.

CAR OPS-3.1030 Operation on more than one type or variant

(See AC OPS-3.1030)

(a) An operator shall ensure that each cabin crew member does not operate on more than three Helicopter types except that, with the approval of the AUTHORITY, the cabin crew member may operate on four Helicopter types, provided that for at least two of the types:
   (1) Non-type specific normal and emergency procedures are identical; and
   (2) Safety equipment and type specific normal and emergency procedures are similar.

(b) For the purposes of sub-paragraph (a) above, variants of a Helicopter type are considered to be different types if they are not similar in each of the following aspects:
  (1) Emergency exit operation;
  (2) Location and type of portable safety equipment; and
  (3) Type specific emergency procedures.

CAR OPS-3.1035 Training records

(See IEM OPS-3.1035)

(a) An operator shall:
  (1) Maintain records of all training and checking required by CAR OPS-3.1005, 3.1010, 3.1015, 3.1020 and 3.1025; and
  (2) Retain a copy of the attestation of safety training if applicable conducted by another operator or an approved training organization; and
  (3) Keep the training records and records of medical examinations or assessments up to date, showing in the case of the training records the dates and contents of the conversion, differences and recurrent training received; and
  (4) Make the records of all initial, conversion and recurrent training and checking available, on request, to the applicable cabin crew and/or to the Authority.

CAR OPS-3.1037 Safety & Emergency Procedures (SEP) Examiner and First Aid Examiner

(See Appendix 1 to CAR OPS-3.1037, AMC-1 OPS-3.1037 & AMC-2 OPS-3.1037)

Note: The Authority will designate and authorise as examiners, suitably qualified persons of integrity to conduct on its behalf examinations and competency checks. The Authority will determine the number of examiners required, against the number of crew members employed.

(a) Operators in the Sultanate of Oman under the Civil Aviation Authority (CAA), may nominate suitably qualified personnel of recognized integrity as a Safety & Emergency Procedures (SEP) Examiner and First Aid Examiner to evaluate training conducted within this section.

(b) All candidates shall hold a cabin crew qualification with the exception of First Aid Examiner, for which the privilege to examine is being sought. These approvals are conditional on continuing employment with the same operator.

(c) Designated Examiners must be constantly aware that they perform their checking duties as delegates of the CAA.

(d) The number of Designated Examiners, and their conduct of tests and checks, are closely monitored by, and at the option of the Authority.

(e) The Operator shall forward the following information for each nominee to the Authority:
  (1) the Nominee background;
  (2) experience and copies of his/her license(s);
  (3) medical certificate; and
  (4) copies of the last two years Certificate of Test reports.

(f) SEP and or First Aid Examiner minimum qualification include the following:
  (1) Served for a minimum of two (2) years as a Senior SEP or Senior First Aid Instructor, unless waived by the CAA
  (2) An SEP nominee has or has had been an operating in-Charge Crew member for a minimum of three (3) years or have demonstrated the ability and knowledge which provides an equivalent level of experience.
  (3) Demonstrate thorough knowledge of the contents and interpretation of the Civil Aviation Regulations.

(4) Demonstrate a thorough knowledge of the contents of the Operator's operation manual, First Aid manual and cabin safety manual.

(5) Demonstrate familiarity and conversant with the Operator's approved procedures.

(6) Have achieved and maintained a favourable record as a crewmember.

(g) The SEP and or First Aid Examiner shall ensure:

(1) Reports and CAA documentation are duly completed and accurate before submission to the Authority;

(2) The checks conducted are covering the required areas of expertise (SME) as per the Operator's checklist;

(3) Conducting of checks is fair and in conformance with the standards and procedures stipulated in Operation Manual;

(4) They are representing and acting within the limits of the Authority.

(5) Brief, evaluate, debrief and motivate the SEP or First Aid Instructor being checked

(6) Attend and observed all safety theoretical and practical related classes. Identify challenges and provide solutions which the operator will submit as a report annually, to the Authority

(7) Evaluate and submit the detailed performance reports for all Cabin Safety or First Aid instructors not exceeding twelve (12) months.

(8) SEP or First Aid (FA) Examiners shall monitor the SEP /FA Instructor's training is adhering to the syllabus information delivered.

(9) SEP or First Aid Examiner must ensure all documents pertaining to new introductions, review manuals updates, bulletins in respect to the changes are being communicated to the respective Custodian for scrutiny on a regular basis.

(10) SEP or First Aid Examiner must ensure all examination papers are regularly updated. Examinations may include a combination of multiple choice and written questions.

(11) Any other instructions and directions given by the Authority to implement accordingly.

(h) The Authority shall observe the Designated SEP/FA Examiner performance and proficiency every twelve (12) months and revalidate or revoke the designated examiner's approval.

(i) All Designated examiner authorisation's expire three (3) years from the last day of the month on which they were effective. The following procedures will be followed for the Periodic Renewal of Authorised SEP/ First Aid Examiner Designations:

(1) At least one (1) month prior to the expiration date of a particular designation, the operator must submit to the CAA a letter requesting renewal of that designation.

(2) Attached to the renewal request will be a numerical record of checks that the designated examiner has:

(i) conducted during the preceding twelve (12) months as per para (g)(6); and

(ii) a copy of the Approved Examiner's Current license(s) or approved examiner authorisation and medical certificate (if license held).

(3) The Operator shall specify in the letter as to when the designated examiner will be available for observation during the next thirty (30) days in the course of conducting a check. At least one primary and alternative date should be provided.

(4) CAA will review the letter and attached documentation, giving particular attention to the number of checks that the designated examiner has conducted within the designation sought over the previous year.

(5) CAA will schedule an inspector to observe the designated examiner conduct the type of check for which renewal is sought.

(6) In the event the renewal evaluation of the designated examiner's performance is found to be unsatisfactory, the Designated Examiner and Operator shall be informed immediately with a letter of disapproval within seven (7) days from the date of performance check.

(7) The Authority shall retain the right to revoke the privilege of Examiner in the event of a breach of any statutory penal code promulgated by the Sultanate of Oman.

Note 1: In this case, as with the original authorised examiner designation, the CAA inspector must then approve or disapprove the check which is in progress for the purpose of evaluating the Designated Examiner.

Note 2: Revalidation is the administrative action taken by an Examiner within the period of validity of a rating that allows the holder to continue to exercise the privileges of a rating or authorisation for a further period, consequent upon the fulfillment of specified revalidation requirements.

(j) Validity of SEP/First Aid Examiner authorisation

(1) SEP/First Aid Examiner authorisation will be invalid whenever one of the following conditions apply:

(i) More than twelve (12) calendar months have lapsed since completion of an SEP /First Aid Examiner refresher course or workshop conducted by, or acceptable, to the Authority, such a workshop shall cover assessments, standards and practices, SEP/FA syllabus requirements and current regulations; or

(ii) More than twelve (12) calendar months have elapsed since the SEP Examiner has been monitored by the Authority, or by the approved Designated SEP Examiner as approved by the Authority; or

(iii) The SEP/FA Examiner authorization is withdrawn by the Authority.

(k) Withdrawal of Designated Examiner Privileges

(1) Designated Examiner privileges may be withdrawn by the Authority, in part or in whole, for due cause. In these cases, the CAA Flight Safety Department will issue a written notification of withdrawal of examiner privileges to the Designated Examiner concerned, and also inform the applicable Operator(s). Where there is an immediate threat to safety, this privilege will be withdrawn immediately.

(2) The Authority may withdraw a Designated Examiner's Authority if evidence shows that an Examiner has acted in a manner which is in contravention of the guidelines contained within this regulation:

(i) Placed a personal interest, or the interest of the company, ahead of the interest of the Authority, and the travelling public;

(ii) Failed to attend the required refresher training

(iii) Failed to follow the applicable instructions to maintain the required standards, or to follow proper procedures;

(iv) Fraudulently miss-used Designated Examiner Authority, or acted in any other way that would discredit the Authority;

(v) Breached the Civil Aviation Rules and Regulations of the Sultanate of Oman;

(vi) During the course of a Proficiency Check, Skill Test or DE Monitor Check, failed to meet the required CAA Standards. The Designated Examiner will be informed verbally, immediately upon completion of the Proficiency Check or Skill Test, or the Inspector may discontinue the check based on unsatisfactory performance;

(vii) Exercised poor judgment in assessing a candidate's performance, in relation to the standards contained herein; or

(viii) Failed to represent the CAA in a manner acceptable to the Authority.

(ix) Except where there is an immediate threat to safety, the Authority, prior to making a final decision in the matter of withdrawal of a Designated Examiner's Authority, shall ensure:

(A) The matter has been investigated thoroughly; and

(B) The Designated Examiner and, where applicable, the concerned Operator, have been given a formal opportunity to respond to the allegations in writing.

CAR OPS-3.1039 Cabin Safety and Emergency Procedures (SEP) Instructor

(See AMC OPS-3.1039)

(a) The following pre-requisite qualifications are required prior to the acceptance granted by the Authority to perform the duties of SEP instructor:

(1) Applicable Cabin Crew line operational experience for a minimum of five (5) years' in the capacity of an In-Charge Cabin crew; or

i. a minimum of continuous three (3) years' experience in a training role within the aviation industry.

(2) Recognized relevant qualification in Training (Train the Trainer), or preferably holds an instructor qualification in Cabin Crew CRM and/or Human Factors.

(3) Have achieved and maintained a favourable record as a crewmember.

(4) Proven training background experience in course development, delivery and assessment.

(5) Proficient in computer skills and the ability to use multimedia as a training tool including experience in course design.

(6) High standard of written and spoken English (preferably ICAO Level 5 or higher) and a high level of interpersonal skills.

(7) Having good knowledge and skills in line with aviation industry standards and Civil Aviation Regulations.

SEP Instructor Responsibilities:

(1) Conducts initial, aircraft type training, aircraft visit, differences training, recurrent and In-Charge cabin crew promotion training.

(2) Responsible to impart effective and efficient SEP training to flight and cabin crew members.

(3) Responsible for the instructional design of training courses, including their delivery, development, regulatory compliances, standards, remedial, devices and training material.

(4) Conducting a training needs analysis on the effectiveness of the course material to the Training Manager.

(5) Ensure completion of required documentation and maintaining accurate records of all trainees.

(b) Continuation of SEP Instructor acceptance authorisation

(1) This training should consist of a minimum of thirty-five (35) hours of training classes within the twenty-four (24) month period;

(2) Training personnel shall remain conversant with in the latest revision of the CAR's, AMC's, Guidance Material and CAN's.

(3) They shall also be conversant with the relevant parts of the Operations Manual and associated training procedures.

(4) The organizations shall ensure that personnel training records, including records of qualifications, training update and experience is retained for each Instructor.

(5) When a new aircraft type is added to the operator's AOC use of special resources for introduction may be required, such as:

(i) Cabin Safety Instructors rated on the aircraft from the manufacturer;

(ii) Cabin Safety Instructor from another operator using the same type of aircraft;

(iii) Other instructing personnel (e.g. Ground instructor):

(A) Being authorised as SEP, compliance with the requirements stated in paras (a) and (b) above tailored to the operator's needs as required;

(B) Proof of qualifications and training shall be reported to the CAA;

(C) An operator's Cabin Safety Instructor may extend the function to the new aircraft type after having undergone training according to CAR OPS3.1010 Conversion and Differences Training.

(c) Cabin Safety Instructor changing operator while maintaining Helicopter type:

(1) A Cabin Safety Instructor who is changing operator with the same Helicopter type with the intention to continue the Cabin Safety Instructor activity must undergo the regular training according to CAR OPS-3.995, 3.1010, 3.1012 and 3.1030 for changing operator.

(d) Cabin Safety Instructor changing operator and Helicopter type**:**

(1) A Cabin Safety Instructor who is changing operator and aircraft type with the intention to continue the Cabin Safety Instructor activity must undergo the regular training according CAR OPS-3 Subpart O for changing operator and aircraft type.

CAR OPS-3.1040 Aviation Medical and First Aid Instructor Requirements

(a) The following pre-requisite qualifications are required prior to the granting of acceptance granted by the Authority to perform the duties of Aviation Medical and First Aid Instructor:

(1) Hold an acceptable Registered Nurse Certificate,

(2) Hold a recognized First Aid Instructor Certificate, preferably in Aviation medicine; or

(3) Evidence of previous possession of a license stating they have operated as a first responder EMT, Paramedic or nurse;

(b) The following skills are required in addition to the qualifications stated above:

(1) Proficient in computer skills and the ability to use multimedia as a training tool including experience in course design.

(2) Hold an OJT certification.

(3) High standard of written and spoken English (preferably ICAO Level 5 or higher) and a high level of interpersonal skills.

(4) Having good knowledge and skills in line with aviation industry standards and Civil Aviation Regulations.

(5) Additional advantage is to have a recognized Bachelor Degree of Nursing (recognised or accepted within Oman)

(6) To attend a cabin crew initial and conversion training to have exposure of the working environment

(c) The Aviation Medical and First Aid Instructor and or FA Examiner responsibilities include:

(1) To provide training on general first aid and aviation medicine relevant to the flight and cabin crew in accordance with regulatory requirements.

(2) To design, develop and update training materials.

(3) To review all inflight medical emergencies and update training accordingly.

(4) The FA examiner shall review instructional methods and techniques annually, especially lifesaving procedures in compliance to the internationally recognized Aviation Medical practices.

(5) To monitor and assess the performance of the Cabin Crew continuous competence and skills to apply first aid and lifesaving procedures during recurrent training.

(6) Upon completion of each training session, all required documentation shall be completed accurately for all trainees.

Appendix 1 to CAR OPS-3.1005 Initial Training

(See IEM-1 & IEM-2 to Appendix 1 to CAR OPS-3.1005/3.1010/3.1015/3.1020)

(See AMC to Appendix 1 to CAR OPS-3.1005(e)(3)) (See Appendix 3 to CAR OPS-3.1005/3.1010/3.1015)

The subjects that must be covered as a minimum by a course of initial safety training referred to in CAR OPS-3.1005 are:

(a) ***Safety and Emergency Training***. An operator shall ensure that the following training includes:

(1) Pilot incapacitation. An operator shall ensure that, unless the minimum flight crew is more than two, each cabin crew member is trained in the procedure for flight crew member incapacitation and shall operate the seat and harness mechanisms. Training in the use of flight crew members' oxygen system and use of the flight crew members' check lists, where required by the operator's SOP's, shall be conducted by a practical demonstration.

(2) Touch-drills by each cabin crew member for opening normal and emergency exits for passenger evacuation,

(3) The location and handling of emergency equipment, including oxygen systems, and the donning by each cabin crew member of lifejackets, portable oxygen and protective breathing equipment (PBE);

(4) Incident and accident review;

(5) Operation and opening of exits

(6) Demonstration of the operation of all other exits;

(7) Demonstration in the use of life rafts and slide rafts.

(8) Pyrotechnic

(9) Emergency exit training, covering:

(i) Normal and emergency exit door operations (Including failure of power assist systems where fitted) and action and forces required to operate and deploy evacuation slides in a Helicopter or representative training device and flight deck windows (where fitted) or other escape hatch;

(ii) Evacuation slide training: descends an evacuation slide in a Helicopter or a representative training device from a height representative of the Helicopter main deck sill height;

(iii) Use of pyrotechnics (Actual or representative devices); and

(iv) Demonstration of the use of the life-raft, or slide-raft, where fitted.

(b) ***Fire and Smoke Training.*** An operator shall ensure that fire and smoke training includes:

(1) Emphasis on the responsibility of cabin crew to deal promptly with emergencies involving fire and smoke and, in particular, emphasis on the importance of identifying the actual source of the fire;

(2) The importance of informing the flight crew immediately, as well as the specific actions necessary for co-ordination and assistance, when fire or smoke is discovered;

(3) The necessity for frequent checking of potential fire-risk areas including toilets, and the associated smoke detectors;

(4) The classification of fires and the appropriate type of extinguishing agents and procedures for particular fire situations, the techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space; and

(5) The general procedures of ground-based emergency services at heliports.

(c) ***Water Survival Training.*** An operator shall ensure that water survival training includes the actual donning and use of personal flotation equipment in water by each cabin crew member. Before first operating on a Helicopter fitted with life-rafts or other similar equipment, training must be given on the use of this equipment, as well as actual practice in water.

(d) ***Survival Training.*** An operator shall ensure that survival training is appropriate to the areas of operation, (e.g. polar, desert, jungle or sea).

(e) ***Medical aspects and First Aid.*** An operator shall ensure that medical and first aid training includes: *(See Appendix 3 to CAR OPS-3.1005/3.1010/3.1015 Medical Aspects and First aid training)*

(1) Instruction on first aid and the use of first-aid kits;

(2) First aid associated with survival training and appropriate hygiene; and

(3) The physiological effects of flying and with particular emphasis on hypoxia;

(4) Procedure for the crew to evaluate a passenger with a suspected communicable disease, based on the presence of a fever and certain other signs or symptoms.

(f) ***Passenger handling.*** An operator shall ensure that training for passenger handling includes the following:

(1) Advice on the recognition and management of passengers who are, or become, intoxicated with alcohol or are under the influence of drugs or are aggressive;

(2) Methods used to motivate passengers and the crowd control necessary to expedite a Helicopter evacuation;

(3) Regulations covering the safe stowage of cabin baggage (including cabin service items) and the risk of it becoming a hazard to occupants of the cabin or otherwise obstructing or damaging safety equipment or Helicopter exits;

(4) The importance of correct seat allocation with reference to Helicopter mass and balance. Particular emphasis shall also be given on the seating of disabled passengers, and the necessity of seating able-bodied passengers adjacent to unsupervised exits;

(5) Duties to be undertaken in the event of encountering turbulence including securing the cabin;

(6) Precautions to be taken when live animals are carried in the cabin;

(7) Dangerous Goods training as prescribed in Subpart R and CAR-92; and

(8) Security procedures, including the provisions of Subpart S.

(9) Identifying and responding to human trafficking.

(g) ***Communication.*** An operator shall ensure that, during training, emphasis is placed on the importance of effective communication between cabin crew and flight crew including technique, common language (English – to the acceptable level stated in the Operations Manual approved by the CAA) and terminology.

(h) ***Discipline and responsibilities.*** An operator shall ensure that each cabin crew member receives training on:

(1) The importance of cabin crew performing their duties in accordance with the Operations Manual;

(2) Continuing competence and fitness to operate as a cabin crew member with special regard to flight and duty time limitations and rest requirements;

(3) An awareness of the aviation regulations relating to cabin crew and the role of the Authority;

(4) General knowledge of relevant aviation terminology, theory of flight, passenger distribution, meteorology and areas of operation;

(5) Pre-flight briefing of the cabin crew and the provision of necessary safety information with regard to their specific duties;

(6) The importance of ensuring that relevant documents and manuals are kept up-to- date with amendments provided by the operator;

(7) The importance of identifying when cabin crew members have the Authority and responsibility to initiate an evacuation and other emergency procedures; and

(8) The importance of safety duties and responsibilities and the need to respond promptly and effectively to emergency situations.

(i) ***Crew Resource Management*.** An operator shall ensure that CRM training satisfies the requirements of Table 1 in Appendix 2 to CAR OPS-3.1005, 3.1010 & 3.1015.

Appendix 2 to CAR OPS-3.1005/3.1010/3.1015 CRM Training

(See AMC-1 OPS-3.1005/3.1010/3.1015)

(a) The CRM training syllabi, together with CRM methodology and terminology, shall be included in the Operations Manual.

(b) Table 1 below indicates which elements of CRM shall be included in each type of training.

Table 1. – CRM Training

Training Elements (a)	Operator's Initial CRM Training (b)	Operator's Conversion CRM Training (c)	Helicopter Type Specific CRM (d)	Annual Recurrent CRM Training (e)	In-Charge Cabin Crew Course (f)
General Principles					
Human factors in aviation, General instructions on CRM principles and objectives Human performance & limitations Threat and error management	In depth	Not required (covered under Operator's SOPs)	Required	Required	Required
Relevant to the individual cabin crew member					
Personality awareness, human error and reliability, attitudes and behaviours, self-assessment and self- critique Stress and stress management Fatigue and vigilance Assertiveness and Situation awareness Information acquisition and processing	In depth	Not required (covered under Operator's SOPs)	Required	Required (3year cycle)	Required
Relevant to the entire aircraft crew					
Shared situation awareness, information acquisition and processing	Not required	In-depth	Required when relevant to the type(s)	Required (3-year cycle)	In-depth

Training Elements (a)	Operator's Initial CRM Training (b)	Operator's Conversion CRM Training (c)	Helicopter Type Specific CRM (d)	Annual Recurrent CRM Training (e)	In-Charge Cabin Crew Course (f)
Relevant to the Operator and Organisation					
Workload management					
Effective communication and coordination between all crew members including the flight crew as well as inexperienced cabin crew members,					
Leadership, cooperation, synergy, decision-making, delegation,					
Cultural differences Identification and management of the passenger human factors, crowd control, passenger stress, conflict management, medical factors					
Resilience development, Surprise and startle effect					
Specifics related to Helicopter types (narrow/ wide bodies, single/ multi deck), flight crew and cabin crew composition and number of passengers)		Required	In-depth	Required (3-year cycle)	In-depth
Operator's safety culture and company culture, SOPs, organisational factors, factors linked to the type of operation					
Effective communication and coordination with other operational personnel and ground services	Not required	In- depth	Required when relevant to the type(s)	Required (3-year cycle)	In-depth
Participation in cabin safety incident & accident reporting	Not required				
Case Studies *(See note 2)*		In- depth	Required when relevant to the type(s)	In-depth	In-depth

*Note 1: **CRM training requirements***

(1) Table 1 above, specifies which CRM training subjects should be covered in each type of training.

(2) The levels of training in Table 1 can be described as follows:

(a) 'required' means training that should be instructional or group activity (being interactive in style) to meet the objectives specified in the CRM training programme or to refresh and strengthen knowledge gained from previous training.

(b) 'in-depth' means training that should be instructive or group participation (being interactive in style) taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills and attitudes.

(3) The CRM training elements should be tailored to the specific needs of the training phase being undertaken.

*Note 2: **Case Studies***

(1) CRM training should cover aircraft type – specific case studies, based on the information available within the operator's management system, including:

(a) Accident and serious incident reviews to analyze and identify any associated non-technical casual and contributory factors and instances of examples of lack of CRM; and

(b) Analysis of occurrences that were well managed.

(2) If relevant aircraft type-specific or Operator - specific case studies are not available, the Operator should consider other case studies relevant to the scale and scope of its operations.

Appendix 3 to CAR OPS-3.1005/3.1010/3.1015 Medical Aspects and First Aid Training

(See Appendix 1 to CAR-OPS3.1005) (See Appendix 1 to CAR-OPS3.1010)

(See Appendix 1 to CAR-OPS3.1015) (See AMC to Appendix 1to CAR OPS-3.1005(e)(3))

The provisions described herein are applicable only to commercial air transport operators and not private operators or operators involved in commercial activities defined General Aviation. Operators that are excluded, however, shall submit the first aid training details, commensurable with their type of operations, for CAA acceptance.

(a) Medical aspects and first aid training shall include the following subjects:

- (1) Physiology of flight including oxygen requirements and hypoxia;
- (2) First Aid Response Process including Basic Management;
- (3) Request for Medical Support;
- (4) Use of Medical Kits and their contents on board the aircraft;
- (5) Primary and Secondary Assessment;
- (6) Personal Protective Equipment (PPE);
- (7) Managing life threatening conditions:
  - (i) Unconscious Not Breathing Casualty (CPR for Adult/Child infant with AED);
  - (ii) Airway Problem (Choking Casualty);
  - (iii) Breathing Difficulties;
  - (iv) Severe Bleeding
  - (v) Medical Shock
- (8) Sudden Illness:
  - (i) Chest Pain/Heart Attacks
  - (ii) Asthma
  - (iii) Rapid Breathing (Hyperventilation)
  - (iv) Hypoxia
  - (v) Stroke

(vi) Seizure
(vii) Mild and Severe Allergic Reaction
(viii) Temporary loss of consciousness (Fainting)
(ix) Psychoactive substance overdose
(x) Communicable disease

(9) Sudden Injury
(i) Wounds
(ii) Burns
(iii) Fractures and soft tissue injuries
(iv) Swollen, Painful or deformed limb

(10) Emergency Child Birth
(11) Managing Death on Board
(12) Practical Skills:
(i) Cardio Pulmonary Resuscitation (CPR) + AED.
(ii) Primary and Secondary Assessment.
(iii) Control of Severe Bleeding.

(13) Other Medical emergencies such as:
(i) Stress reactions and allergic reactions;
(ii) Epilepsy;
(iii) Diabetes;
(iv) Barotrauma/Air sickness;
(v) Gastrointestinal disturbances;
(vi) Temperature/environmental related emergencies; and

(14) Travel health and hygiene including:
(i) The risk of contact with infectious diseases especially when operating into tropical and subtropical areas. Reporting of infectious diseases protection from infection and avoidance of waterborne and foodborne illness. Training shall include the means to reduce such risks;
(A) Hygiene on board;
(B) Handling of clinical waste;
(C) Aircraft disinfection; and
(D) Alertness management, physiological effects of fatigue, sleep physiology, circadian rhythm and time zone changes;
(E) The use of appropriate Helicopter equipment including first aid kits, emergency medical kits, first aid oxygen and emergency medical equipment.

Initial training would generally include all of the subject areas listed above.

(ii) Recurrent training should include a yearly review of the first aid response process, request for medical support, use of medical kits, primary and secondary assessment and PPE.
(iii) Refresher training would include, at a minimum, all subject areas that are addressed in the recurrent training.

(b) Medical aspects and first aid training shall be delivered by a qualified trainer and the following requirement shall be met:
(1) The training center shall be managed by a person who will be responsible for:
(i) Ensuring that all First Aid Instructors adhere to the standards and guidelines contained in this CAR
(ii) Ensuring that all First Aid Instructors or equivalent and Senior First Aid Instructors or

equivalent are properly qualified, accepted and authorized by the CAA.

(iii) Ensuring that appropriate equipment is available in sufficient quantities to allow the student adequate hands-on practice of required psychomotor skills.

(iv) Ensuring adherence to health and safety measures to prevent injury and minimize the risk of disease transmission.

(v) Ensure First Aid Instructors are not involved in dishonest, unprofessional, unethical or illegal conduct, including but not limited to, issuing unearned certificate or withholding properly earned certificate and notify the CAA of the removal of any instructor.

(2) The training center shall have policies and procedures that address, at a minimum:

(i) The means to comply with the applicable regulation developed in accordance with Appendix 3 to CAR OPS-3.1005/3.1010/3.1015;

(ii) Certificate and final exam security

(iii) Classroom and Instructor quality assurance

(iv) Equipment maintenance and decontamination

(v) Professional conduct

(3) The training center shall have comprehensive and legally sound document retention practices to protect their employees and managers in case of litigation or investigation; retain all records pertaining to all training center Instructors, courses and course evaluations for no less than three (3) years.

(4) All appropriate first aid and resuscitation training equipment shall be available clean, operable and ready for use in adequate quantities at each required course conducted. Equipment needed for the cabin crew training may include the following:

(i) Infant, child and adult CPR manikins with protective and sanitizing accessories.

(ii) CPR barrier devices (e.g.: face shields, masks)

(iii) Automated External Defibrillator trainer

(iv) Supplemental oxygen delivery devices.

(v) First aid kits and supplies

Note: Equipment needs may vary according to the airline protocol. The use of any equipment not listed above must be added to the organization/airline manual, and the cabin crew must be trained to use them (e.g. telemedicine, pulse oximeter, spacers).

(5) The training center shall acquire:

(i) An up-to-date version of the Aviation First Aid Provider Manual and provide it to each candidate prior to attending the course

(ii) An accepted version of the Aviation First Aid Instructor Manual

(iii) The training center shall ensure that each Instructor has access to the latest version of the operator's training center Instructor manual

(6) The training center shall have adequate facilities for effective learning with appropriate space for optimal learning. In general, the following parameters shall be adhered to:

(i) Classroom size of no less than 400 square feet (37 square metres).

(ii) Furniture to accommodate each participant and Instructor.

(iii) For courses involving CPR, appropriate equipment and furniture for practical training.

(iv) Appropriate audio-visual equipment

(v) Appropriate lighting, heating, cooling and ventilation

(7) The training center shall implement and maintain measures to ensure the health and safety of the participants and instructors

(i) Follow all manufacturer recommendations, or an equally acceptable procedure, for the cleaning and decontamination of training equipment.

(ii) Provide the participants access to personal protective equipment, including but not limited to face shields, masks and gloves. (iii) Practice and encourage hygiene.

(iv) Ensure universal manual handling practices are followed.

(v) Skills practice such as abdominal thrusts, rescue breathing, and chest compression must be performed on training manikins designed for that purpose.

(vi) Ensure that potential hazards are addressed and mitigated and should include the procedures to be followed in the event of an emergency. e.g.

(A) Location of nearest telephone.

(B) Location of fire/emergency exits, fire alarm pull stations and evacuation route.

(C) The location of first aid kits, AEDs and fire extinguishers.

(8) The training center shall have at least one instructor who meets the compliance requirements of CAR OPS-3.1040.

(9) The training center shall pass an evaluation by the CAA to:

(i) Ensure that all instructors who deliver the cabin crew first aid training are appropriately trained and qualified

(ii) Ensure the continued integrity, credibility, and quality of training course and materials and compliance with these rules.

(iii) Ensure fair and consistent quality assurance practices.

(iv) Provide recommendations to the training center to improve their services.

(10) The training center may have at least one authorized Senior Aviation First Aid Instructor who shall be competent to teach, evaluate and certify Aviation First Aid instructors. A Senior Aviation First Aid Instructor shall meet the compliance requirements of CAR OPS3.1040.

Appendix 1 to CAR OPS-3.1010 Conversion and Differences training

(See IEM-1 to Appendix 1 to CAR-OPS-3.1005/3.1010/3.1015/3.1020)

(a) ***General.*** An operator shall ensure that:

(1) Conversion and differences training is conducted by suitably qualified persons; and

(2) During conversion and differences training, training is given on the location, removal and use of all safety and survival equipment carried on the Helicopter, as well as all normal and emergency procedures related to the Helicopter type, variant and configuration to be operated.

(b) ***Fire and smoke training.*** An operator shall ensure that:

(1) Each cabin crew member is given realistic and practical training in the use of all firefighting equipment including protective clothing representative of that carried in the Helicopter. This training must include:

(i) Each cabin crew member extinguishing a fire characteristic of a Helicopter interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and

(ii) The donning and use of protective breathing equipment by each cabin crew member in an enclosed, simulated smoke-filled environment.

(c) ***Operation of doors and exits.*** An operator shall ensure that:

(1) Each cabin crew member operates and actually opens each type or variant of all normal and emergency exits for passenger evacuation in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted in an approved representative training device; and

(2) The operation of all other exits, such as flight deck windows is demonstrated.

(d) ***Evacuation slide training.*** An operator shall ensure that:

(1) Each cabin crew member descends an evacuation slide from a height representative of the Helicopter main deck sill height;

(2) The slide is fitted to a Helicopter or a representative training device.

(e) Evacuation procedures and other emergency situations. An operator shall ensure that:

(1) Emergency evacuation training includes the recognition of planned or unplanned evacuations on land or water. This training must include recognition of when exits are unusable or when evacuation equipment is unserviceable; and

(2) Each cabin crew member is trained to deal with the following:

(i) An in-flight fire, with particular emphasis on identifying the actual source of the fire;

(ii) Severe air turbulence;

(iii) Sudden decompression, including the donning of portable oxygen equipment by each cabin crew member; and

(iv) Other in-flight emergencies.

(f) ***Crowd control.*** An operator shall ensure that training is provided on the practical aspects of crowd control in various emergency situations, as applicable to the Helicopter type.

(g) ***Pilot incapacitation.*** An operator shall ensure that, unless the minimum flight crew is more than two, each cabin crew member is trained in the procedure for flight crew member incapacitation and shall operate the seat and harness mechanisms. Training in the use of flight crew members' oxygen system and use of the flight crew members' check lists, where required by the operator's SOP's, shall be conducted by a practical demonstration.

(h) ***Safety equipment.*** An operator shall ensure that each cabin crew member is given realistic training on, and demonstration of, the location and use of safety equipment including the following:

(1) Slides, and where non-self-supporting slides are carried, the use of any associated ropes;

(2) Life-rafts and slide-rafts, including the equipment attached to, and/or carried in, the raft (conduct practical training on a body of water);

(3) Lifejackets, infant lifejackets and flotation cots;

(4) Dropout oxygen system;

(5) First-aid oxygen;

(6) Fire extinguishers;

(7) Fire axe or crow-bar;

(8) Emergency lights including torches;

(9) Communications equipment, including megaphones;

(10) Survival packs, including their contents;

(11) Pyrotechnics (Actual or representative devices);

(12) First-aid kits, their contents and emergency medical equipment; and

(13) Other cabin safety equipment or systems where applicable.

(i) ***Passenger Briefing/Safety Demonstrations.*** An operator shall ensure that training is given in the preparation of passengers for normal and emergency situations in accordance with CAR OPS-3.285 and;

(1) An operator shall ensure that all appropriate CAR–OPS requirements are included in the training of cabin crew members.

(j) ***Crew Resource Management.*** An operator shall ensure that:

(1) Each cabin crew member completes the Operator's CRM Training covering the training elements in Appendix 2 to CAR OPS-3.1005/3.1010/3.1015 Table 1, Column
(a) to the level required in Column (c) before undertaking subsequent Helicopter Type Specific CRM and/or recurrent CRM Training.

(2) When a cabin crew member undertakes a conversion course on another Helicopter type, the training elements in Appendix 2 to CAR OPS-3.1005/3.1010/3.1015 Table 1, Column (a) shall be covered to the level required in Column (d), Helicopter Type Specific CRM.

(3) The Operator's CRM Training and Helicopter Type Specific CRM shall be conducted by a least one cabin crew CRM instructor.

(k) ***Familiarisation flights.*** An operator shall ensure that on completion of the conversion course that cabin crew member shall complete two (2) supervised line flights before being assigned online duty.

Appendix 1 to CAR OPS-3.1015 Recurrent training

(a) An operator shall ensure that recurrent training is conducted by suitably qualified persons.

(b) An operator shall ensure that every twelve (12) calendar months the programme of practical training includes the following:

(1) Emergency procedures including pilot incapacitation;

(2) Evacuation procedures including crowd control techniques;

(3) Full simulation using approved training devices by each cabin crew member for opening normal and emergency exits for passenger evacuation;

(4) The location and handling of emergency equipment, including oxygen systems, and the donning by each cabin crew member of lifejackets, portable oxygen and protective breathing equipment (PBE);

(5) First aid and the contents of the first-aid kit(s);

(6) Stowage of articles in the cabin;

(7) Security procedures;

(8) Incident and accident review; and

(9) Awareness of the effects of surface contamination and the need to inform the flight crew of any observed surface contamination, and

(10) *Crew Resource Management*. An operator shall ensure that CRM training satisfies the following:

(i) the training elements in Appendix 2 to OPS 3.1005, 3.1010 & 3.1015 Table 1, Column (a) shall be covered within a three-year cycle to the level required by Column (d), Annual Recurrent CRM Training;

(ii) the definition and implementation of this syllabus shall be managed by in crew CRM instructor;

(iii) when CRM training is provided by stand-alone modules, it shall be conducted by at least one cabin crew CRM.

(c) An operator shall ensure that, at intervals not exceeding three (3) years, recurrent training includes:

(1) Each cabin crew member operating and actually opening each type or variant of normal and emergency exit in the normal and emergency modes. This can be conducted in a representative training device;

(2) All Emergency training scenarios, covering failure of power assist systems where fitted, and including the action and forces required to operate and deploy evacuation slides. This training shall be conducted in a representative training device;

(3) Demonstration of the operation of all other exits including flight deck windows (This can be conducted in a representative training device);

(4) Each cabin crew member being given realistic and practical training in the use of all fire-fighting equipment, including protective clothing, representative of that carried in the Helicopter. This training must include:

(i) Each cabin crew member extinguishing a fire characteristic of a Helicopter interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and

(ii) The donning and use of protective breathing equipment by each cabin crew member in an enclosed, simulated smoke-filled environment.

(5) Use of pyrotechnics (Actual or representative devices); and

(6) Conduct practical training on the use of the life-raft, or slide-raft, where fitted (as per AMC- 1 OPS-3.1007 para (e) and Appendix 1 to CAR OPS-3.1010 para (h)(2)).

(d) An operator shall ensure that all appropriate CAR OPS-3 requirements are included in the training of cabin crew members.

Appendix 1 to CAR OPS-3.1037 Safety & Emergency Procedure Examiner (SEP) and/or First Aid Examiner

(See AMC-2 to Appendix 1 to CAR OPS-3.1037)

(a) The Authority shall acknowledge the acceptability of each nominee.

(b) The nominated personnel shall then attend an examination to determine his/her knowledge, capability and competency are suitable for the examiner's role and to determine the person's motivation.

(c) The selection of an examiner shall also be based on criteria intended to define a proven capability in the subject for which he/she intends to examine or evaluate.

(d) Upon passing the exam, the successful nominee shall then proceed with the Examiner training course.

(e) The applicant will be issued an approval letter that contains the following information:

(1) Designated examiner name;

(2) CAA license number;

(3) Specified aircraft;

(4) Effective date of designation.

(f) In the event the nominated examiner is unsatisfactory, the Authority will advise in writing to the operator of disapproval.

(g) CAA may also nominate suitably qualified personnel employed by an Operator to act as Designated Examiner for the Operator's programme.

(h) SEP or First Aid Examiner in each organization shall be able to evaluate the competency level of all operating crew members, new and online categories of cabin crew with regard to cabin safety or First Aid procedures.

(i) The Examiner is able to ensure continuous improvement and effectiveness of training programmes, to check on trainees' knowledge, competency and skill set as per the syllabus, meeting the Authority's requirements.

(j) SEP or First Aid Examiner shall be entrusted to monitor, evaluate and assess the SEP or First Aid Instructor's tutorial to ensure compliance and adhering to the training syllabus.

(k) The Examiner shall be able to conduct a proficiency check of the SEP or First Aid Instructor's knowledge, delivery in theoretical as well as the practical training through the results of the checks.

(l) The SEP or First Aid Examiner must be thoroughly familiar and conversant with the operator's methods and procedures. This enables the SEP or First Aid Examiner to conduct a check, consistent with the operator's approved procedures and regulatory requirements.

(m) The nominated Senior SEP or First Aid Examiner shall monitor the overall performance of the SEP or First Aid Examiners to ensure there is no ***conflict of interest***.

(n) The nominated Senior SEP or First Aid Examiner's prime job function is to supervise the examiners and instructors working within the section and are responsible as the accountable person approved by the Authority.

Appendix 1 to CAR OPS-3.1020 Refresher training

(See IEM-1 & IEM-2 to Appendix 1 to CAR–OPS 3.1005/3.1010/3.1015/3.1020 – Training Methods)

(a) An operator shall ensure that refresher training for each cabin crew member is conducted by suitably qualified persons and includes at least the following:

(1) Emergency procedures including pilot incapacitation;

(2) Evacuation procedures including crowd control techniques;

(3) The operation and actual opening of each type or variant of normal and emergency exit in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted in a Helicopter or an Authority approved training device;

(4) Demonstration of the operation of all other exits and the flight crew compartment security door in the normal and emergency modes; including flight deck door and windows; and

(5) The location and handling of emergency equipment, including oxygen systems, and the donning of lifejackets, portable oxygen and protective breathing equipment.

SECTION 2 – SUBPART O – CABIN CREW

ADVISORY CIRCULARS, ACCEPTABLE MEANS OF COMPLIANCE AND INTERPRETATIVE/ EXPLANATORY MATERIAL (AMC & IEM)

GM OPS-3.989 Identification

(a) In the event that there is a similarity of uniforms between the technical crew and the cabin crew then it is recommended that identifying Velcro patches are worn clearly identifying the status of the crew member;

(b) The wearing of sharp metal objects (such as pins) without shielding of the needle point should be avoided at all times;

IEM OPS-3.990 Determining the Number and Composition of Cabin Crew

(See CAR OPS-3.990, GM 1 OPS-3.990, GM 2 OPS-3.990, AMC OPS-3.1000(e))

(a) The demonstration or analysis referred to in CAR OPS-3.990(b)(2) should be that which is the most applicable to the type, or variant of that type, and the seating configuration used by the operator.

(b) With reference to CAR OPS-3.990(b), the Authority may require an increased number of cabin crew members in excess of the requirements of CAR OPS-3.990 on certain types of Helicopter or operations. Factors which should be taken into account include:

(1) The number of exits;
(2) The type of exits and their associated slides;
(3) The location of exits in relation to cabin crew seats and the cabin layout, special interior features e.g. suite installation, monument relocation which may impede the evacuation route;
(4) The seating layout which uses new types of seats (oblique-facing seats, side-facing seats, etc.).
(5) The location of cabin crew seats taking into account cabin crew duties in an emergency evacuation including:
  (i) Opening floor level exits and initiating stair or slide deployment;
  (ii) Assisting passengers to pass through exits; and
  (iii) Directing passengers away from inoperative exits, crowd control and passenger flow management;
(6) Actions required to be performed by cabin crew in ditching, including the deployment of slide-rafts and the launching of life-rafts.
(7) Cabin management during designated in-flight crew rest.
(8) Flights operated with special categories of passengers on board; and
(9) Cabin crew incapacitation

(c) The role of the cabin crew member involves much more than being prepared to respond in an evacuation. First aid, safety, security-related duties, customer service and other commercial responsibilities.

(1) Workload should be taken into consideration when establishing minimum crew requirements as their role has become increasingly challenging and includes, but is not limited to:
  (i) Applying safety procedures, including continuous surveillance of the cabin, unstaffed galleys, lavatories, and catering supplies;
  (ii) Managing and assisting passengers, for example during in-flight medical emergencies;
  (iii) Preventing and managing incidents from escalating in the cabin, such as smoke or fire;

(iv) Informing the flight crew of abnormal situations observed in the cabin or relating to the aircraft, such as pressurization problems, engine anomalies, and contamination of critical surfaces; and

(v) Preventing unlawful interference and managing events that can compromise safety and security of the flight, such as hijackings or unruly passengers.

(d) When establishing the minimum number of cabin crew members required, the operator should have procedures for cabin crew to manage the following potential situations while carrying out their duties and responsibilities: -

(1) monitor conditions inside and outside of the aircraft (maintain situational awareness);

(i) respond to an emergency situation (e.g. fire or smoke);

(ii) manage an evacuation;

(iii) manage a medical situation on board;

(iv) manage an unruly passenger event;

(v) attend to special categories of passengers on board;

(vi) verify that passengers comply with "no-smoking" regulations and portable electronic devices (PED) usage requirements;

(vii) apply communication protocols with flight and ground crew;

(viii) conduct lavatory and/or stowaway checks; and

(ix) perform security-related duties.

(e) The operator should have procedures for cabin crew members to manage the following situations while carrying out their duties and responsibilities covering the following ground operations:

(1) Passenger boarding:

(i) monitor carry-on baggage and stowage; and

(ii) verify that exits, aisles and cross aisles are clear of obstructions;

(iii) monitor passengers who may display suspicious behavior and raise security concerns, may be under the influence of psychoactive substances or display unruly behavior.

(2) Disembarkation:

(i) verify that all passengers have disembarked; and

(ii) perform security checks;

(3) Transit stops:

(i) control access to stairs and aerobridge, as applicable;

(ii) perform security checks; and

(iii) manage disembarkation and boarding processes.

(iv) refueling with passengers on board.

(f) The operator should have procedures for cabin crew members to manage the following potential situations during aircraft refueling with passengers on board:

(1) monitor conditions inside and outside of the aircraft (maintain situational awareness);

(i) report the smell of fuel vapor; and

(ii) manage an evacuation in the event of fire or significant fuel spillage

(iii) conduct safety announcements;

(2) ensure that passengers:

(i) are seated with their seat belts unfastened;

(ii) do not smoke;

(iii) keep aisles and exits clear; and

(iv) do not use PEDs, when indicated;

(v) maintain clear area adjacent to designated emergency exit;

(g) When the number of cabin crew is reduced below the minimum required by CAR OPS-3.990(b), for example in the event of incapacitation or non-availability of cabin crew, the procedures to be specified in the Operations Manual should result in consideration being given to at least the following:
   (1) Reduction of passenger numbers;
   (2) Re-seating of passengers with due regard to exits and other applicable Helicopter limitations; and
   (3) Relocation of cabin crew and any change of procedures.

GM-1 OPS-3.990 Determining the Number and Composition of Cabin Crew

(c) When an operator is required to operate a non-revenue flight e.g. ferry flight, maintenance flight with personnel on board (e.g. aircraft maintenance technicians). The flight may allow non-commercial operations be conducted without cabin crew members on board aircraft where they are otherwise required for commercial passenger flights on the same aircraft type. The State should only provide relief from minimum cabin crew requirements if the operator meets specific conditions: -
   (1) establish procedures for the transport of persons on board non-revenue flights;
   (2) ensure authorized persons carried have unobstructed access to the flight deck or to an emergency exit from their seats;
   (3) provide a means of two-way communication between persons carried in the cabin and the flight crew members;
   (4) verify that the pilot-in-command has a means of notifying persons in the cabin when seat belts must be fastened;
   (5) ensure that a crew member provides a safety briefing to all persons travelling in the cabin before every take-off, and in accordance with national regulations; and
   (6) establish who will be responsible for:
      (i) the arming/disarming of doors;
      (ii) safety checks (safety and emergency equipment);
      (iii) securing the cabin and galley; and
      (iv) opening exits during normal operations and in the event of an emergency.

GM-2 OPS-3.990 Determining the Number and Composition of Cabin Crew

An operator should establish procedures to address non-commercial operations (i.e. non-revenue flights), including the specifics of the kind of persons who may be carried on such flights. Non- commercial operations include the following:

(a) flight crew training/instructional flights;
(b) test flights (design/approval tests, acceptance checks, post maintenance functional checks);
(c) relocation flights (ferry, delivery, positioning, recovery);
(d) flying displays; and
(e) demonstration flights.

GM OPS-3.995(g) Minimum requirements

(a) ICAO decreed that all operational crew members shall be proficient using the English language in general.
(b) This was implemented to increase safety standards and help pilots and cabin crew to understand each other.

Note: Lack of the comprehension of the language has been cited as a contributing factor in incidents/accidents where miscommunication happened between flight crew /cabin crew.

(c) Oral language proficiency refers to:

(1) reproduction or display of learned knowledge;
(2) the performance of a complex skill resulting from the integration in real time of a number of subskills constituting communicative competence.
(3) These subskills include (among others):
  (i) the activation of stored words and phrases belonging to the language's lexicon;
  (ii) the application of learned grammatical rules;
  (iii) the perception and articulation of the sounds and tones that constitute a meaningful sound-stream; and
  (iv) the adjustment, in the context of interactive communication, to numerous discourse, social, cultural and professional norms.

Note: See ICAO Doc 9835, Manual on the Implementation of ICAO Language Proficiency Requirements Chapter 2, para 2.3.1.2

(d) The successful integration of these subskills constitutes communicative competence, which is very closely linked to, and to a great extent built upon, general knowledge and general skills (social, occupational, cultural, etc.).
(e) Language proficiency does not exist in isolation from other abilities.

AMC OPS-3.1000(e) Replacement of incapacitated or unavailability of In-Charge Cabin Crew member

(a) Replacement of incapacitated or unavailable In-charge cabin crew member
  (1) An In-charge cabin crew member, who becomes incapacitated during a flight or series of flights, or unavailable at a stopover (layover) point, should be replaced without undue delay by another qualified cabin crew member (second in-charge) on the concerned aircraft type/variant. He should be assigned to act as an In-charge cabin crew in order to reach a base of the operator.
  (2) If during the series of flights, the aircraft transits via a base of the operator, the assigned second in-charge shall be replaced by an In-charge cabin crew member.
(b) Replacement of incapacitated or unavailable In-charge cabin crew member by another qualified cabin crew ~~me~~
  (1) To ensure that In-charge cabin crew member is assigned without undue delay, the operator should take appropriate measures. These include, but are not limited to, the following:
    (i) to ensure that a flight or series of flights do not depart from an heliport where an In-charge cabin crew is available or can be made available, the operator may:
      (A) appoint an In-charge cabin crew member originally assigned to another flight and who is available at the concerned base or stopover (layover) point if the reporting time for that flight provides sufficient time to find a replacement; or
      (B) assign an In-charge cabin crew member who is on standby to operate the flight or to position to the destination where the In-charge cabin crew has become incapacitated or unavailable to operate;
    (ii) the operator should utilize another qualified cabin crew member that is among the operating crew on the same flight;
    (iii) in case of unavailable In-charge cabin crew member, the operator should use the available time and resources to replace him/her at the stopover (layover) point with another qualified cabin crew member;
    (iv) the operator should consider including the identification of the most appropriately qualified cabin crew member in pre-flight briefings.
(c) Most appropriately qualified cabin crew
  (1) Selection of the most appropriately qualified cabin crew member should take into account if the individual's experience as operating cabin crew member is adequate for the conduct of

duties required of an In-charge cabin crew member. The selected cabin crew member should have operational experience on the concerned aircraft type/variant.

IEM-1 to Appendix 1 to CAR OPS-3.1005/3.1010/3.1015/3.1020 Training Methods

(See Appendix 1 to CAR OPS-3.1005/3.1010/3.1015/3.1020)

Training may include the use of mock-up facilities, including all training equipment/tools and complemented by audio visual presentations, computer-based training and any other types of training (e.g. e-learning or online training). A reasonable balance between the different training methods should be achieved.

IEM-2 to Appendix 1 to CAR OPS-3.1005/3.1010/3.1015/3.1020 Passenger and Crowd Control

(See Appendix 1 to CAR OPS-3.1005/3.1010/3.1015/3.1020)

(a) Passenger and Crowd control

(1) Operators should provide training on the practical aspects of passenger preparation and handling, as well as crowd control, in various emergency situations as applicable to the Operator's specific cabin configuration and will cover the following:

(i) Communications between flight crew and cabin crew and use of all communications equipment, including the difficulties of co-ordination in a smoke-filled environment;

(ii) Verbal commands;

(iii) The physical contact that may be needed to encourage people out of a door/exit and onto a slide;

(iv) The re-direction of passengers away from unusable doors/exits;

(v) The marshalling of passengers away from the Helicopter;

(vi) The evacuation of disabled passengers; and

(vii) Authority and leadership.

AMC to Appendix 1 to CAR OPS-3.1005(e)(3) Medical aspects and first aid training

1.0 Management of on-board medical events.

The crew shall have the ability to perform duties and responsibilities related to the management of on-board medical events and cabin health issues as below:

(a) Monitor the cabin to identify ill passengers;

(1) identify ill or injured passengers. This may include, but is not limited to, a person:

(i) appearing obviously unwell;

(ii) with persistent cough;

(iii) frequently going to the washroom;

(iv) with breathing difficulties;

(v) vomiting;

(vi) with a visible rash;

(vii) bleeding;

(viii) with confusion; and

(ix) having a seizure;

(2) apply active listening and seek additional information. This may include, but is not limited to:

(i) being attentive and receptive to comments from passengers regarding their or other passenger's health status; and

(ii) asking additional questions about passenger's health history, (e.g. allergies, medications, their last meal and events leading up to illness);

(b) Recognize an on-board medical event

(i) determining if the event is life-threatening;
(ii) identifying typical presenting signs and/or symptoms of illness in-flight;
(iii) recognizing ways that passengers may signal an in-flight medical event in themselves or others;
(iv) recognizing medical events which can be immediately life-threatening (e.g. obstructed airway, cardiac arrest, and loss of consciousness).

(c) Determine if the event is life-threatening;
(i) assessing airway/breathing;
(ii) performing CPR, if required;
(iii) performing abdominal thrusts;
(iv) controlling bleeding;
(v) administering oxygen;
(vi) immobilizing a fracture; and
(vii) applying burn dressing;

(d) Respond immediately to a life-threatening on-board medical event;
(1) demonstrate the use of available medical equipment appropriate to the event, as applicable. This may include, but is not limited to:
(i) AED; and
(ii) artificial respiration masks;

(e) Respond to other non-life-threatening events using appropriate first-aid techniques;
(1) assess and manage potential communicable disease. This may include, but is not limited to:
(i) demonstrating knowledge and use of universal precautions e.g. personal protective equipment, cleaning up spilled body fluids, etc.;
(ii) demonstrating how to elicit proper information from the ill passenger;
(iii) demonstrating how to take body temperature with a thermometer if available, or by other means if not available;
(iv) describing the signs and symptoms compatible with a communicable disease;
(v) describing when a face mask will be offered to an ill passenger, to other passengers, and to one or more cabin crew;
(vi) describing basic advice to a passenger with gastrointestinal symptoms (e.g. vomiting, diarrhea);
(vii) isolating a lavatory for the use of the ill passenger, if possible;
(viii) showing when and where to move a passenger suspected of having a communicable disease; and
(ix) advising the pilot-in-command;

(f) Assess and manage suspect cases of communicable disease;

(g) Apply communication procedures;
(1) This may include, but is not limited to:
(i) describing communication procedure with in-charge cabin crew and/or pilot-in-command;
(ii) describing procedure for obtaining assistance from:
(A) qualified on-board health professional, if available;
(B) other crew members; and
(C) ground-based medical assistance provider, if available;
(iii) describing crew coordination procedures;
(iv) describing how to reassure an ill passenger and any accompanying family members;

(h) Apply procedures for seeking ground-based medical and/or on-board volunteer health professional assistance

(i) Use first-aid and medical equipment, as appropriate;

  (1) retrieving FAK, EMK, UPK, BFK telemedicine device, or AED as appropriate;
  (2) operating the telemedicine device and/or the AED, if available; and
  (3) describing the main contents of the EMK;

(j) Manage assistance from an on-board volunteer health professional, if available. This may include, but is not limited to:

  (1) demonstrating how to elicit credentials of the volunteer health professional if it is company policy;
  (2) advising the volunteer health professional of the equipment available on board;
  (3) stating the airline's indemnity/liability provisions for the volunteer health professional;
  (4) staying with the volunteer health professional to provide assistance;
  (5) requesting contact details and clinical notes from the volunteer health professional; and
  (6) applying operator policy on **"Do Not Resuscitate"** (DNR), if required; and

(k) Support the on-board volunteer health professional, as appropriate;

(l) Apply operator policy on "Do Not Resuscitate" (DNR), if appropriate;

(m) Manage a death procedure on board. This may include, but is not limited to:

  (1) describing how to recognize death;
  (2) stating who can pronounce someone dead;
  (3) describing the situations in which CPR may be ceased;
  (4) describing the communication procedure with the pilot-in-command;
  (5) describing the company policy on how to take care of a dead;
  (6) describing the communication procedure for an accompanying person(s).

(n) Complete the applicable documentation.

1.1 Knowledge:

To develop knowledge, skills and competencies in the management of the above is further enhanced by the below:

(a) difference between a sign and a symptom;
(b) common signs and symptoms of passenger illness in-flight;
(c) signs and symptoms of immediately life-threatening medical events, e.g. signs of choking, collapse, unconsciousness, severe allergic reaction;
(d) general first-aid principles;
(e) signs and symptoms of hyperventilation;
(f) signs and symptoms of panic attack;
(g) precautions before giving any medication to passengers with alcohol intoxication;
(h) signs and symptoms of communicable diseases;
(i) regulations concerning communicable diseases, e.g. World Health Organization (WHO) International Health Regulations (IHR 2005);
(j) policies concerning a death on board; contents of First-Aid Kit, EMK, and UPK or Body Fluid Kit (BFK);
(k) contents of first-aid kit, EMK, and UPK;
(l) operator indemnity/liability provisions; and
(m) Procedures for completing the applicable documentation, such as an incident report form.

1.2 Skills

(a) Communications;

(b) teamwork and leadership;
(c) workload and time management;
(d) decision-making;
(e) situational awareness;
(f) delegation (for in-charge cabin crew member);
(g) empathy (for in-charge cabin crew member); and
(h) planning and coordinating resources (for in-charge cabin crew member).

2.0 Food safety and sanitation

Procedures for food safety and sanitation

(a) Minimize or prevent the contamination of food and related service items;
(b) Ensure safe practices for food safety;
(c) Manage suspected food poisoning;
(d) Complete the applicable documentation;
(e) Practical scenario:
    (1) simulated exercise in a representative training device capable of reproducing the appropriate environment/equipment characteristics (e.g. galley) where the cabin crew will apply procedures for recognizing unsafe/safe practices.

2.1 Performance standard

(a) Describe ways to minimize or prevent the contamination of food and related service items. This may include, but is not limited to:
    (1) food and beverage service operations should be conducted in accordance with operator policies to minimize contamination;
    (2) perishable food and beverages should be maintained at appropriate cold or hot temperatures; and
    (3) galleys, pantries, and other places where food is prepared, served, or stored should be clean to maintain their surfaces in a sanitary condition;
(b) recognize unsafe practices that can affect food safety;
(c) assess possible food poisoning. This may include, but is not limited to:
    (1) describing the symptoms of possible food poisoning;
    (2) describing the information to be collected from the ill passenger(s); and
    (3) describing the basic criteria for considering airline catering as a suspected cause of food poisoning (i.e. if during a reasonably long flight, more than one person having consumed food served on board have similar symptoms, food poisoning from catering can be suspected);
(d) assist the ill passenger(s) as described in the first-aid response; and
(e) preserve evidence. This may include, but is not limited to:
    (1) describing the procedure for preserving and storing passenger and/or crew meal(s) for subsequent testing; and
    (2) describing appropriate actions to take if the airline catering is the suspected cause of the illness.

***2.2 Knowledge*:**

(a) general principles of food contamination prevention;
(b) signs of food contamination;
(c) signs and symptoms of food poisoning;
(d) criteria by which food poisoning can be suspected (e.g. multiple passengers becoming ill after eating the same meal choice);
(e) Principles of first aid to manage suspected food poisoning; and

(f) Details of food poisoning protocol.

2.3 Skills

(a) Situational awareness;
(b) decision-making;
(c) communication; and
(d) teamwork and leadership.

3.0 Cabin dis-insection

Applying procedures for cabin dis-insection, if applicable:

(a) Advise passengers on dis-insection procedures, if applicable
(b) Carry out dis-insection, as per operator procedures.

Training requirement

(a) Hands -on exercise on retrieving the first-aid kit (FAK), emergency medical kit (EMK), universal precautions kit (UPK) or Body Fluid Kit (BFK), automated external defibrillator (AED), and telemedicine device, as available;
(b) video or demonstration of proper handling and spraying technique.
(c) discuss how to advise passengers on dis-insection, as per the operator procedures, if applicable;
(d) carry out dis-insection procedures, if applicable. This may include, but is not limited to:
    (1) discussing how to correctly spray dis-insectant, as per operator procedures; and
    (2) discussing proper hygiene for cabin crew members following dis-insection (e.g. hand washing).

Knowledge:

(a) definition of dis-insection and the difference between dis-insection and disinfection;
(b) reasons for dis-insection of aircraft cabins;
(c) who sets the requirements for dis-insection (e.g. national authorities);
(d) description of the operator's procedures for dis-insection, including when, where, how to spray and the potential effect on smoke detectors;
(e) understanding that while dis-insection should not cause undue discomfort to any person, or injury to his/her health, some dis-insection procedures may cause health complaints from individuals who have a possible predisposition or assumed hypersensitivity to chemicals; and
(f) description of ways in which crew or passengers can limit their exposure to chemical dis- insectants.

Training scenarios

Training related to on-board medical events and their management may be more effective if classroom instructions are concurrently augmented by hands-on exercises and simulated exercises. Practicing scenario-based event management and first-aid techniques during training is very valuable and facilitates retention.

When participating in simulated exercises, trainees may be evaluated individually or as part of a team as to ensure competency required for the duties and responsibilities.

The operator shall ensure that the following training includes:

(a) hands-on exercise on retrieving the first-aid kit (FAK), emergency medical kit (EMK), universal precautions kit (UPK), automated external defibrillator (AED), and telemedicine device, as available;
(b) hands-on exercise on using the FAK;
(c) hands-on exercise on retrieving and using the portable oxygen bottle;
(d) hands-on exercise on using the EMK, UPK, telemedicine device, if applicable;
(e) hands-on exercise on demonstrating cardiopulmonary resuscitation (CPR) and operating the AED, if applicable;
(f) simulated exercise of an ill passenger/crew member where the cabin crew member demonstrates that he/she can recognize and respond to the situation using the appropriate first-aid techniques to the

specific illness or injury; and

(g) simulated exercise in a representative training device capable of reproducing the appropriate environment/equipment characteristics (e.g. cabin, flight deck, crew rest area) where the cabin crew will apply the operator’s procedures for responding to an in-flight medical event

In addition to the requirements stated in Appendix 3 to CAR OPS-3.1005/3.1010/3.1015 *Medical aspects and first aid training*, the following subjects shall be included:

(1) Aeromedical emergencies in aviation including:
- (i) choking;
- (ii) heart attacks;
- (iii) shock; and
- (iv) hyperventilation;

(2) Practical cardio-pulmonary resuscitation by each cabin crew member having regard to the Helicopter environment and using a specifically designed dummy;

(3) Basic aeromedical first aid and survival training including care of:
- (i) the unconscious;
- (ii) burns;
- (iii) wounds; and
- (iv) fractures and soft tissue injuries;

(4) Travel health and hygiene including reporting of infectious diseases, protection from infection and avoidance of water-borne and food-borne illness:
- (i) Procedure for the crew to evaluate a passenger with a suspected communicable disease, based on the presence of a fever and certain other signs or symptoms.

AMC-1 OPS-3.1007 Training Facilities

(See CAR OPS-3.1007)

(a) **Safety and emergency equipment:**

(1) **‘Safety equipment’** means equipment installed/carried to be used during day-to-day normal operations for the safe conduct of the flight and protection of occupants (e.g. seat belts, child restraint devices, safety card, safety demonstration kit).

(2) ***‘Emergency equipment’*** means equipment installed/carried to be used in case of abnormal and emergency situations that demand immediate action for the safe conduct of the flight and protection of occupants, including life preservation (e.g. drop-down oxygen, crash axe, fire extinguisher, protective breathing equipment, manual release tool, slide-raft).

(3) Training for each piece of equipment should be based on the following:
- (i) General description
- (ii) Purpose of use
- (iii) Pre-flight serviceability check(s)
- (iv) Location(s)
- (v) Removal from stowage
- (vi) Operation
- (vii) Conditions for operation
- (viii) Operational limitations and duration of use
- (ix) Operation under adverse conditions
- (x) Precautions for use
- (xi) Post use procedures (including relocation of equipment, if applicable) and documentation

(b) Cabin emergency evacuation trainer shall be as follows:

(1) It is a partial life-sized mock-up model of an aircraft fuselage and wing;

(2) Be representative of the passenger cabin of the aircraft type in use;

(3) Contain seats for all of the evacuees participating in the demonstration;

(4) Be equipped with the same survival equipment that is installed on the aircraft type, including a life jacket for each evacuee participating in the demonstration;

(5) The direction of movement, associated forces and travel of all controls for all equipment, including the weight of emergency exits when operated without power assist, where applicable; and

(6) Have enough wing area installed outside the window emergency exits to simulate the portion of the wing of the aircraft type that would be used in a ditching scenario;

(7) The cabin training device should be able to provide realistic situations that can be used to enable realistic simulation of cabin crew duties without continuous need for use of actual aircraft training

(8) It is also able to provide effective training on safety and abnormal/emergency procedures e.g. creating a smoke filled cabin.

(9) The effectiveness of cabin crew communication using the communication system.

(10) The use of passenger safety seat belts and restraint systems, crew member safety belts and shoulder harness requirements.

(11) The cabin training device may also include the following:

(i) Lavatories;

(ii) Galleys;

(iii) Attendant panels and

(iv) Overhead bins.

(v) Meal cart or trolleys

(12) Dials, handles, switches, restraint brackets, and mounting devices to be operated and the force required for their operation;

(c) Emergency door/ exit trainers should:

(1) Replicate the size, weight and operating characteristics of the exit of the aircraft type on which the cabin crew member will operate; (e.g. direction of movement of handles); and

(2) Be designed so that the representative exit can be operated in normal and emergency modes, particularly in relation to method of operation and forces required to operate them.

(3) When a representative training device does not replicate the actual aircraft exit operating characteristics, any differences between the operating characteristics of the actual aircraft exits and those of the emergency exit trainer shall be highlighted during training.

(d) Fire Fighting:

(1) A simulated fire-fighting exercise should be conducted in a confined area, to simulate cabin fire, and under the supervision of an instructor.

(2) This device used for a simulated fire-fighting exercise should include aircraft furnishings as found on board an aircraft, such as seats, galley units, lavatories, panels, overhead bins and waste bins.

(3) Fire-fighting equipment and the restraints used should be representative to those installed on an aircraft with respect to weight, dimensions, controls, types and operations.

(4) Fire extinguishers used for live fire-fighting should be charged with the appropriate agent or with an environmentally friendly agent.

(5) Smoke evacuation training prepares the crew member for their duties in a smoke- filled environment with poor visibility e.g. in the cabin in which they will demonstrate effective communication while combatting a fire or guiding passengers to the nearest available exit.

(e) Water survival:

(1) When the operator is required by the Authority to conduct wet drills, these shall be carried out in a body of water or pool of sufficient depth to realistically perform the simulated exercise.

(2) A life raft exercise shall be conducted using life-saving equipment that is representative of that installed on the aircraft with respect to weight, dimensions, appearance, features and operation.

(3) The rafts may be substituted if the equipment used is similar with respect to weight, dimensions, appearance, and features. In such cases, training must address any differences in the operation of the raft.

(4) The crew member will receive theoretical and practical training in ditching procedures, including Survival procedures techniques in the water.

(5) Practical exercises in the water such as:

(i) Use and management of raft

(ii) Boarding the raft

(iii) Rescue in water

(iv) Demonstrate effective passenger management techniques.

(v) Sea survival techniques

(f) Use of other operator or Approved Training Organisation (ATO) training devices

(1) Where an operator arranges to use training devices owned by another operator, or by an approved training organisation (ATO).

(i) the training must comply with the approved training programme and operating procedures of the operator whose crew are being trained.

(ii) if significant differences exist in terms of cabin layout and equipment, such training should be restricted accordingly.

(g) Trainee to instructor ratio:

(1) When facilitating computer-based training, the trainee to instructor ratio may be more flexible. A maximum of thirty (30) trainees per instructor is recommended, assuming that the presence of the instructor is limited to providing support.

(2) The trainee to instructor ratio shall be more restrictive when conducting practical instruction such as hands-on exercises, to allow for better supervision. This also includes in assessing and evaluating a trainee's competency. The maximum number of students undergoing practical training or evaluation during any training course shall not exceed ten (10) per instructor or examiner.

(3) When conducting hands-on type exercise training, such as Pilot incapacitation, first aid, CPR, safety and emergency equipment, these group simulated exercises will prompt an adjustment of the proposed trainee to instructor ratio should not exceed a 4:1 ratio, except for CRM training, a maximum of twenty (20) trainees is permitted.

(4) To provide sufficient supervision and control for theoretical training, a maximum of fifteen (15) trainees per instructor in a classroom environment.

(h) Maintenance of training facilities and equipment

(1) Safety equipment installed or carried on aircraft depicted for use within any training device shall be maintained in working order and applicable maintenance checks conducted to an established maintenance program to ensure the following:

(i) A safe training environment;

(ii) Equipment is in working order;

(iii) Equipment used in water training are stowed in a manner that will allow ventilation for drying.

(iv) Fixed equipment on training devices e.g. doors, emergency hatches etc. shall be serviced and maintained in full working order

GM-1 OPS-3.1007 Training Facilities

(See CAR OPS-3.1007)

(a) The training facilities provided should include the following but not limited to:

(1) the temperature should be comfortable;
(2) ventilation should be adequate;
(3) lighting should be of adequate level for work or viewing;
(4) distracting sound should be kept to a minimum;
(5) work areas should be visually pleasing;
(6) work stations, including chairs, should be comfortable;
(7) work space should be adequate;
(8) work area should be clean;
(9) training equipment should be adequate and in good condition;
(10) visual media should be visible from all angles and seats;
(11) audio media should be audible to all present.
(12) Security of storage for the trainee's personal belongings.
(13) Training practical examination area.
(14) Examination rooms adequate for purpose.

(b) Representative training devices include:

(1) Safety and emergency equipment
(2) Cabin emergency evacuation trainer (for each aircraft type)
(3) Emergency exit trainers
(4) Facilities used for firefighting and smoke evacuation
(5) Water survival training.

(c) Mockup/Cabin Emergency Evacuation Trainer *(*CEET)/Door Trainer Records, to include but not limited to:

(1) Maintenance records
(2) Technical logs
(3) Maintenance programs

(d) The approval procedure should begin once documentation is submitted by the Operator advising that an emergency evacuation trainer will be required for their training program. Prior to granting approval, the emergency evacuation trainer or mock-up shall be inspected to ensure that the Helicopter type is accurately represented and the requirements of the Authority are met.

GM-2 OPS-3.1007 Training Facilities Renewal Process

(a) Applications for re-approval must be submitted a minimum sixty (60) working days before the expiry of the existing approval. This is to allow adequate time for the CAA to complete the renewal process which includes a pre-audit of the facilities to the same level of compliance as required for Initial Application Procedure – Inspection Phase (see AMC-2 OPS-3.1007) (b) The audit inspector will focus on:

(1) The conduct of training and the quality of theoretical knowledge, as applicable to the courses offered.
(2) The quality of cabin crew trainees' task completion and achievement in conjunction with the approved training programme.
(3) Coaching, facilitation and mentoring of individual trainee needs and flexibility of Instructor.
(4) Training facilities to be fully functional with updated maintenance records
(5) Action taken on any non-conformances raised at the previous audit findings;
(6) The operation of the organization's quality system;
(7) Any changes to the training management team and the current numbers of training staff;
(8) The training task since the last inspection and forecasts for the next approval period;

(9) Changes to the location of training facilities;

(10) Course structure and training aids;

(11) A Training Center/Organization must not commence, conduct or continue training courses requiring approval unless it has the relevant approval documentation in its possession.

(12) A Training Center/Organization Certificate remains valid for a period of two (2) years, or as stated on the certificate and will only be renewed provided there is a demonstrated compliance with the applicable CAA regulations.

(b) Revocation, Suspension or Variation of Approval. The CAA may at any time in accordance with its procedures take action to limit, suspend or revoke authorizations and approvals when:

(1) The training centre or Organization suffers financial failure or a serious noncompliance issue occurs, revocation action may be taken in conjunction with the legal department.

(2) Should there be a failure to meet the requirements or standards, the training centre or organization will be formally notified of the non-conformances and, if necessary, a restricted approval document issued to permit the remedial action to be taken within a specified time.

IEM to Appendix 1 to CAR OPS-3.1010/3.1015 Conversion and recurrent training

(See Appendix 1 to CAR OPS-3.1010/3.1015)

(a) A review should be carried out of previous initial training given in accordance with CAR OPS3.1005 in order to confirm that no item has been omitted. This is especially important for cabin crew members first transferring to Helicopters fitted with life-rafts or other similar equipment.

(b) Fire and smoke training requirements:

Training requirement/ interval	Required activity		Notes
First conversion to Helicopter type (e.g. new entrant)	Actual firefighting and handling equipment		(Note 1)
Every year during recurrent training	Handling equipment		
Every 3 years during recurrent training	Actual firefighting and handling equipment		(Note 1)
Subsequent a/c conversion	(Note 1)	(Note 1)	(Notes 2 & 3)
New firefighting equipment	Handling equipment		

NOTES 1: Actual firefighting during training must include use of at least one fire extinguisher and extinguishing agent as used on the Helicopter type. An alternative extinguishing agent may be used in place of Halon.

2. Firefighting equipment is required to be handled if it is different to that previously used.

3 Where the equipment between Helicopter types is the same, training is not required if within the validity of the three (3) year check.

AMC-1 OPS-3.1005/3.1010/3.1015 Crew Resource Management Training

(See CAR OPS-3.1005/3.1010/3.1015 and Appendix 2 to CAR OPS-3.1005/3.1010/3.1015)

(a) **Introduction**

(1) Crew Resource Management (CRM) shall be the effective utilisation of all available resources (e.g. crew members, Helicopter systems, and supporting facilities) to achieve safe and efficient

operation.

(2) The objective of CRM shall enhance communication and management skills of all the crew members, as well as the importance of effective co-ordination and two-way communication between all crew members.

(3) CRM training shall reflect the culture of the operator, the scale and scope of the operation together with associated operating procedures and areas of operation which produce particular difficulties.

(b) **General principles for CRM Training for all Cabin Crew:**

(1) Cabin crew CRM training shall focus on issues related to cabin crew duties, and therefore, will be different from flight crew CRM training. However, the co-ordination of the tasks and functions of flight crew and cabin crew shall be addressed.

(2) Whenever it is practicable to do so, operators should provide combined training for flight crew and cabin crew, including feedback, as appropriate to Appendix 2 to CAR OPS3.1005/3.1010/3.1015 Table 1, Columns (c), (d) and (e). This is of particular importance for In-Charge cabin crew members.

(3) Where appropriate, CRM principles shall be integrated into relevant parts of cabin crew training.

(4) CRM training will include group discussions and the review of accidents and incidents (case-based studies). (See Appendix 2 to CAR OPS-3.1005/3.1010/3.1015 Table 1).

(5) Whenever it is practicable to do so, relevant parts of CRM training shall form part of the training conducted in cabin training devices (See IEM to AMC-1 OPS-3.1005).

(6) The operator shall be responsible for the quality of all CRM training, including any training provided by sub-contractors/third parties (in accordance with CAR OPS-3.015 and AMC1 OPS-3.005/1010/1015, paragraph (5)(a)).

(7) CRM training for cabin crew shall include, Operator's CRM Training, and Helicopter Type Specific CRM, all of which may be combined.

(c) **The following subjects for CRM Training shall be included for all Cabin Crew:**

(1) **Resilience development:**

The CRM training should address the main aspects of the following:

(i) ***Mental flexibility.*** Cabin crew should be trained to:

(A) Understand that mental flexibility is necessary to recognize critical changes;

(B) Reflect on their judgement and adjust it to the current unique situation;

(C) Avoid fixed prejudices and over-reliance on standard solutions; and

(D) Remain open to changing assumptions and perceptions.

(ii) ***Performance adaptation.*** Cabin crew should be trained to:

A. Mitigate frozen behaviours, overreactions and inappropriate hesitation; and

B. Adjust actions to current conditions.

(2) **Surprise and startle effect:**

Cabin crew should be trained to:

(i) Address unexpected, unusual and stressful situations including interruptions and distractions.

(ii) CRM training should be designed to prepare cabin crew to master sudden events and associated uncontrolled reactions – Damage recovery.

(3) **Cultural differences:**

CRM training should cover cultural differences of multinational and cross-cultural crew. This includes recognizing that:

(i) Different cultures may have different communication specifics, ways of understanding and approaches to the same situation or problem;

(ii) Difficulties may arise when crew members with different mother tongue communicate in a common language which is not their mother tongue; and

(iii) Cultural differences may lead to different methods for identifying a situation and solving a problem.

(4) **Operator's safety culture and company culture:**

CRM training should cover the Operator's safety culture, its company culture, the type of operations and the associated procedures of the operator. This should include areas of operations that may lead to particular difficulties or involve unusual hazards.

(d) **Operator's CRM Training**

(1) Operator's CRM training should be the application of the knowledge gained within the applicable CRM Courses to enhance communication and co-ordination skills of cabin crew members relevant to the operator's culture and type of operation. (See Appendix 2 to CAR OPS-3.1005/3.1010/3.1015 Table 1)

(e) **Helicopter Type Specific CRM**

(1) Helicopter Type Specific CRM should be integrated into all appropriate phases of the operator's conversion training on the specific Helicopter type.

(2) Helicopter Type Specific CRM should be the application of the knowledge gained in previous CRM training on the specifics related to aircraft type, including, narrow/wide bodied Helicopters, single/multi deck Helicopters, and flight crew and cabin crew composition.

(f) **Annual Recurrent Training**

(1) When a cabin crew member undergoes annual recurrent training, CRM training should be integrated into all appropriate phases of the recurrent training and may include stand-alone modules.

(2) When CRM elements are integrated into all appropriate phases of the recurrent training, the CRM elements should be clearly identified in the training syllabus.

(3) Annual Recurrent CRM Training should include realistic operational situations for joint flight and cabin crew CRM including simulated exercises on situations during normal operations, abnormal and emergency situations.

(4) Annual Recurrent CRM Training should include areas as identified by the operator's accident prevention and flight safety programme (see Appendix 2 to CAR OPS3.005/1010/1015 Table 1. "Participation in Cabin safety incident and accident reporting".).

(g) **CRM Training for In-Charge Cabin Crew**

(1) CRM training for In-Charge Cabin Crew Members should be the application of knowledge gained in previous CRM training and operational experience relevant to the specific duties and responsibilities of an In-Charge Cabin Crew Member.

(2) The In-Charge cabin crew member should demonstrate ability:

(i) to manage the operation; and

(ii) take appropriate leadership/management decisions.

(h) **CRM Training for single cabin crew operations.**

For single cabin crew operations, the relevant training elements should be applied with the following enhancement:

(1) Situation awareness

(2) Workload management

(3) Decision making

(4) Resilience development

(5) Surprise and startle effect

(6) Effective communication and coordination with

(i) The flight crew;

(ii) Other operational personnel and ground services.

(i) **Cabin Crew CRM Facilitator/ Instructor Qualifications.**

(1) The operator shall ensure that all personnel conducting relevant training are suitably qualified to integrate elements of CRM into all appropriate training programmes.

(2) A training and standardisation programme for CRM instructors shall be established.

(3) Cabin crew CRM Facilitator/Instructors shall:

(i) Have suitable experience of commercial air transport as a cabin crew member; and

(ii) Have completed training on Human Factors Performance Limitations (HPL); and

(iii) Have completed the applicable CRM Course and the Operator's CRM training; and

(iv) Have received instructions in training skills in order to conduct the Cabin Crew CRM courses; and

(v) Be supervised by suitably qualified Cabin Crew CRM Facilitator/Instructors when conducting their first CRM training course.

(vi) Have received additional training in the fields of group management, group dynamics and personal awareness.

(vii) Have demonstrated the knowledge, skills and credibility required to train the CRM Training elements in the non-operational environment, as specified in Table 1.

(4) An experienced non-cabin crew CRM Facilitator/ Instructor may continue to be a cabin crew CRM instructor, provided that the provisions of paragraph 9(c) (ii) to (vii) are satisfied and that a satisfactory knowledge has been demonstrated of the nature of the operation and the relevant specific Helicopter types. In such circumstances, the operator shall ensure the instructor has a suitable knowledge of the cabin crew working environment.

(5) Facilitators/Instructors integrating elements of CRM into conversion, recurrent training, or In-Charge Cabin Crew Member training, should have acquired relevant knowledge of human factors and have completed the appropriate CRM training.

(j) **Training of Cabin Crew CRM Facilitator/Instructor:**

Training of Cabin Crew CRM facilitator/Instructor should be both theoretical and practical. Practical elements should include the development of specific trainer skills, particularly the integration of CRM into day-to-day operations.

The basic training of Cabin Crew CRM facilitator/Instructor should include the training elements for cabin crew as specified in Table 1, Appendix 2 to CAR OPS-3.1005/3.1010/ 3.1015. In addition, the basic training should include the following:

(1) Introduction to CRM training;

(2) Operator's management system; and

(3) Characteristics as applicable;

(i) Of the different types of CRM training (initial, recurrent, etc.);

(ii) Of combined training (cabin crew and flight crew); and

(iii) Related to the type of aircraft or operation

(4) The training of a nominated Cabin Crew CRM facilitator/instructor shall be conducted by a senior Cabin Crew CRM facilitator/ instructor with a minimum of three (3) years' experience.

(5) Assistance may be provided by experts in order to address specific areas.

(k) **Recency and renewal of qualification of Cabin Crew CRM Facilitator**

(1) For recency of the three (3) year validity period, the Cabin Crew CRM Facilitator should:

(i) Conduct at least 2 CRM training classes in any twelve (12) month period;

(ii) Be assessed within the last 12 months of the three (3) year validity period by the Operator; and

(iii) Complete CRM Facilitator refresher training within the three (3) year validity period.

(2) The next three (3) year validity period should start at the end of the previous period.

(3) For renewal, when a Cabin Crew CRM Facilitator does not fulfil the provisions in para (a), they should, before resuming as a Cabin Crew CRM Facilitator:

(i) Comply with the qualification stipulated (9) (c) and an assessment;

(ii) Complete CRM Facilitator refresher training.

(l) **Assessment of the Cabin Crew CRM Facilitator**

(1) A Cabin Crew CRM Facilitator should be assessed by the Operator when conducting the first training course. This first assessment should be valid for a period of 3 years.

(2) Assessment is the process of observing, recording, interpreting and debriefing the Cabin Crew CRM Facilitator. The Operator should describe the assessment process in the Operations Manual. All personnel involved in the assessment must be credible and competent in their role.

(m) **Cabin Crew CRM Facilitator CRM minimum training time (hours)**

(1) Definition – “training hours” means actual training time excluding breaks.

(2) Cabin Crew CRM Facilitator basic training:

(i) Eighteen (18) hours when the Operator can justify that the trainee already has received sufficient and suitable instruction on training skills in order to conduct CRM training courses; or

(ii) Thirty (30) hours for trainees not fulfilling A; and

(3) Refresher training:

(i) Six (6) hours and shall include new methodologies, procedures and lessons learned.

(n) **Co-ordination between flight crew and cabin crew training departments**

(1) There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew instructors to observe and provide feedback on the training module observed.

(2) Provision should be made for transfer of relevant knowledge and skills between flight crew and cabin crew CRM facilitators.

(3) Consideration should be given to creating flight deck scenarios on video for playback to all cabin crew during recurrent training, and to providing the opportunity for cabin crew, particularly In-Charge cabin crew, to participate in Flight Crew LOFT exercises.

(o) **Combined CRM training for flight crew and cabin crew**

(1) Whenever in a classroom, Operators should provide combined training for flight crew and cabin crew during recurrent CRM training.

(2) The combined training should address at least:

(i) Effective communication, coordination of tasks and functions of flight crew and cabin crew; and

(ii) Mixed multinational and cross-cultural flight crew and cabin crew, and their interaction, if applicable.

(3) Combined CRM training should be conducted by flight crew and or cabin crew CRM Facilitator.

IEM to AMC-1 OPS-3.1005/3.1010/3.1015/3.1020 Representative Training Devices

(See CAR OPS-3.1005/3.1010/3.1015/3.1020)

(1) An approved representative training device shall be used for the training of cabin crew.

(2) Ensure that those items relevant to the training and testing intended to be given, accurately represent the Helicopter in the following particulars:

(a) Layout of the cabin in relation to doors/exits, galley areas and stowage of safety and emergency equipment;

(b) Type and location of passenger and cabin crew seats;

(c) Doors/ exits in all modes of operation (particularly in relation to method of operation, their mass, balance and operating forces) including failure of power assist systems, where fitted.

(d) Safety and emergency equipment of the type provided in the aircraft (such equipment may be 'training use only' items and, for oxygen and protective breathing equipment, units charged with or without oxygen may be used).

(3) Assess the following factors when determining whether an door/exit can be considered to be a variant of another type:

(a) Door/Exit arming/disarming;

(b) Direction of movement of the operating handle (Left and right side of aircraft);

(c) Direction of exit opening (Left and right side of aircraft);

(d) Power assist door mechanisms;

(e) Escape means, e.g. evacuation slides and ropes

AMC OPS-3.1012 Familiarisation

(See CAR OPS-3.1012)

(a) New entrant cabin crew:

(1) Each new entrant cabin crew member having no previous comparable operating experience should:

(i) Participate in a visit to the Helicopter to be operated; and

(ii) Participate in familiarisation flights as described in paragraph (c) below.

(b) Cabin crew operating on a subsequent Helicopter type:

(1) A cabin crew member assigned to operate on a subsequent Helicopter type with the same operator should either:

(i) Participate in a familiarisation flight as described in paragraph (c) below; or

(ii) Participate in a visit to the Helicopter to be operated.

(c) Familiarisation Flights:

(1) During familiarisation flights, the cabin crew member should be additional to the minimum number of cabin crew required by CAR OPS-3.990.

(2) Familiarisation flights should be conducted under the supervision of the in-charge cabin crew member.

(3) Familiarisation flights should be structured and involve the cabin crew member in the participation of safety related pre-flight, in-flight and post-flight duties.

(4) Familiarisation flights shall be documented in the training record for each cabin crew member.

(5) Familiarisation flights should be operated with the cabin crew member in uniform.

(d) Helicopter visits

(1) The purpose of Helicopter visits is to familiarise each cabin crew member with the aircraft environment and its equipment. Accordingly, aircraft visits shall be conducted by suitably qualified persons and in accordance with a syllabus described in the Operations Manual, Part D. The aircraft visit should provide an overview of the aircraft's exterior, interior and systems including the following:

(i) Interphone and public address systems;

(ii) Evacuation alarm systems;

(iii) Emergency lighting;

(iv) Smoke detection systems;

(v) Safety/emergency equipment;

(vi) Flight deck;

(vii) Cabin crew stations;

(viii) Toilet compartments;
(ix) Galleys, galley security and water shut-off;
(x) Cargo areas if accessible from the passenger compartment during flight;
(xi) Circuit breaker panels located in the passenger compartment;
(xii) Crew rest areas;
(xiii) Exit location and its environment.

(2) An aircraft familiarisation visit may be combined with the conversion training required by CAR OPS-3.1010(c)(3).

AMC OPS-3.1020 Refresher training

(See CAR OPS-3.1020)

In developing the content of any refresher training programme prescribed in CAR OPS-3.1020, operators shall consider (in consultation with the Authority) whether, for Helicopters with complex equipment or procedures, refresher training may be necessary for periods of absence that are more than 90 days but less than the 180 Days prescribed in CAR OPS-3.1020(a). These variations will be stated in the Operations Manual, Part D.

AMC OPS-3.1025 Checking

(See CAR OPS-3.1025, GM 1 OPS-3.1025)

Checking is the method for evaluating crew demonstrating a required level of knowledge in a subject, and applying the knowledge and skills learned in instructional situations to practical situations.

(1) Elements of training which require individual practical participation should be combined with practical checks.
(2) Competency in use of safety/emergency equipment carried on the aircraft, the ability to demonstrate effective communication in simulated emergency scenarios.
(3) The checks required by CAR OPS-3.1025 should be accomplished by the method appropriate to the type of training, including:
    (a) Practical demonstration; and/or
    (b) Computer based assessment; and/or
    (c) Oral or written tests.
        (i) Annual line In-flight checks: to maintain proficiency/operational competency of each cabin crew
(4) The following definitions apply for the purpose of training programmes, syllabi and the conduct of training and checking on equipment and procedures:
    (a) ***'Safety equipment'*** means equipment installed/carried to be used during day-to-day normal operations for the safe conduct of the flight and protection of occupants (e.g. seat belts, child restraint devices, safety card, safety demonstration kit).
    (b) ***'Emergency equipment'*** means equipment installed/carried to be used in case of abnormal and emergency situations that demand immediate action for the safe conduct of the flight and protection of occupants, including life preservation (e.g. drop-down oxygen, crash axe, fire extinguisher, protective breathing equipment, manual release tool, slide-raft).
    (c) ***'Normal procedures'*** means all procedures established by the operator in the operations manual for day-to-day normal operations (e.g. pre-flight briefing of cabin crew, pre-flight checks, passenger briefing, securing of galleys and cabin, cabin surveillance during flight).
    (d) ***'Emergency procedures'*** means all procedures established by the operator in the operations manual for abnormal and emergency situations. For this purpose, 'abnormal' refers to a situation that is not typical or usual, deviates from normal operation and may result in an emergency.

GM-1 OPS-3.1025 Checking

(See CAR OPS-3.1025)

ICAO had developed guidance for a competency-based approach to cabin crew safety training so that cabin crew members could be proficient to perform their tasks, and with the goal of establishing an international baseline for cabin crew competencies.

Note: - Guidance on development for competency-based training and assessment including implementation of scenario based training for cabin crew members is contained in ICAO Doc. 10002 (Cabin Crew Safety Training Manual) and ICAO Doc 9868 Amendment 5 to the Procedures for Air Navigation Services (PANS TRG). It also provides guidance to transition from traditional to competency-based assessment.

AMC to CAR OPS-3.1030 Operation on more than one type or variant

(See CAR OPS-3.1030)

(1) For the purposes of CAR OPS 3.1030(b)(1), when determining similarity of exit operation, the following factors should be assessed to justify the finding of similarity:
  - (a) Exit arming/disarming;
  - (b) Direction of movement of the operating handle;
  - (c) Direction of exit opening;
  - (d) Power assist mechanisms;
  - (e) Assist means, e.g. evacuation slides.

Note: Self-help exits, for example Type III and Type IV exits, need not be included in this assessment.

(2) For the purposes of CAR OPS-3.1030(a)(2) and (b)(2), when determining similarity of location and type of portable safety equipment the following factors should be assessed to justify the finding of similarity:
  - (a) All portable safety equipment is stowed in the same, or in exceptional circumstances, in substantially the same location;
  - (b) All portable safety equipment requires the same method of operation;
  - (c) Portable safety equipment includes:
    - (i) Fire-fighting equipment;
    - (ii) Protective Breathing Equipment (PBE);
    - (iii) Oxygen equipment;
    - (iv) Crew lifejackets;
    - (v) Torches;
    - (vi) Megaphones;
    - (vii) First aid equipment;
    - (viii) Survival equipment and signaling equipment; or
    - (ix) Other safety equipment where applicable.

(3) For the purposes of sub-paragraph of CAR OPS-3.1030(a)(2) and (b)(3), type specific emergency procedures include, but are not limited, to the following:
  - (a) Land and water evacuation;
  - (b) In-flight fire;
  - (c) Decompression;
  - (d) Pilot incapacitation.

(4) When changing Helicopter type or variant during a series of flights, the cabin crew safety briefing required by AMC OPS-3.210(a), should include a representative sample of type specific normal and emergency procedures and safety equipment applicable to the actual Helicopter type to be operated.

IEM OPS-3.1035 Training records
(See CAR OPS-3.1035)
An operator shall maintain a summary of training to show a trainee's completion of every stage of training and checking.

AMC-1 OPS-3.1037 Designated SEP or First Aid Examiner

(a) The Designated SEP or First Aid Examiner shall focus on development of the competencies listed as below:
   (1) Upon completion of all Safety Emergency Training classes conducted by the SEP Instructors, a SEP or First Aid Examiner shall evaluate individual trainee proficiency through competency-based practical and written exams. Make recommendations for corrective action, if necessary.
   (2) The Designated SEP or First Aid Examiner shall be able to identify areas of weakness from the trainees, effectiveness of the training syllabus and shall be able to develop competency skill test measures that can be monitored against the objectives, that is having a highly qualified trained cabin crew members who are able to perform in a normal or in an emergency situation.
   (3) The implementation of a competency-based program shall enable operators to develop more effective training programs to improve operational safety.
   (4) Provide a continued evaluation of training programs to obtain quality training.
   (5) SEP or First Aid instructors shall upgrade their knowledge, maintain consistency and impart a high standard of competency level or skill sets to the trainees during theoretical and practical training.
   (6) All examination papers related to SEP and/or First Aid shall be prepared by the SEP or First Aid Examiner.
   (7) An examiner may terminate a test or check at any stage, if it is considered that the Cabin Crew's competency requires a complete re-test or re-check.

(b) Examiner Reliability shall ensure consistency in assessments conducted by Examiners:
   (1) When examiners use an assessment instrument, a process shall be implemented to ensure the consistency or stability of results given by a single examiner (intra- examiner reliability) to the same performances at different moments in time and the consistency or stability of results between different examiners (inter-examiner reliability).
   (2) If the examiners have to judge on competency-based training, the resultant outcome will determine if an effective recruitment selection process had been implemented.
   (3) An Examiner shall not conduct a competency check on a candidate for whom he has conducted the associated conversion course training, nor shall he conduct the re- check of a candidate who has failed a previous competency-based check, and for whom he has conducted the necessary remedial training.
   (4) An Examiner may conduct Recurrent or Remedial Training session conducted in conjunction with that check, for the same candidate(s).

(c) Conduct of an evaluation of Competency checks: - (refer to CAR OPS-3.1025 (b))
   (1) The trainee shall pass all sections of the competency check. If any item is assessed as UNSATISFACTORY on the first attempt, then training and re-sits may be conducted at the discretion of the Examiner, in order to restore and confirm proficiency.
   (2) Any trainee failing five (5) or less items shall only take the failed items.
   (3) Failure of more than five (5) items will require the trainee to take the entire Competency checks again.
   (4) Failure of more than five (5) items on the re-test/check including those items that have been passed at the previous attempt will require the trainee to take the entire Competency checks

again.

(5) The Examiner shall exercise his judgment in deciding how much additional training is appropriate to provide during the Competency checks, for a trainee having difficulty in achieving proficiency.

(6) However, if more than two (2) re-sits are required for any one item, or the scheduled time for the check has elapsed and there is no further opportunity to complete necessary re-sits, the Examiner shall award an UNSATISFACTORY grade for the applicable item(s), and rule the check as FAILED. Re-sits/repeats initiated by the crew as a result of their own decision making, shall be counted towards the maximum allowed.

(7) If the trainee's performance is such that several items need repeating, he is clearly not up to the required standard, and so the discretion to repeat should not be exercised any further.

(d) Renewal of Authorisation

(1) For an Instructor authorization to be renewed following expiry/withdrawal, the organisation shall implement a reinstating procedure that will cover the relevant training disciplines associated with the authorization concerned.

(2) The criteria for reinstating shall take into consideration the length of time the individual has been away from that specific training environment or discipline.

(3) Any Instructor who has passed a twenty-four (24) month period without exercising the privileges of this authorization, as a minimum, must comply with the table below.

Inactive Period	Recovery Action
24 to 30 months	35 hours training update + Continuation training + Training procedures and processes + monitored training sessions with another instructor.
30 months onwards	As above plus two sit-ins on the type course for the authorization being sought.

AMC-2 OPS-3.1037 Conflict of Interest

(See Appendix 1 to CAR OPS-3.1037 paragraph (m))

(a) Conflict of Interest is defined as any relationship that might influence a Designated Examiner to act, either knowingly or unknowingly, in a manner that does not hold the quality of training outcome that will affect the safety of the flying public as the primary and highest priority.

(b) In order to preclude an actual conflict of interest, the CAA shall, in conjunction with the Operator:

(1) investigate each nominee's background;

(2) character and motives; and

(3) resolve any conflict of interest found, prior to advising the acceptance of each nomination.

(c) In addition, each candidate shall declare on their resume, which accompanies their nomination form, any conflict of interest of which they have knowledge, and shall be prepared to discuss at each annual monitor thereafter any change to their status in this regard.

(d) The final Authority, for deciding whether there is any conflict of interest that might affect the Designated Examiner's ability to conduct tests and checks in an impartial manner, rests with the Authority.

(e) It must be emphasized that any effort by an Operator to influence or obstruct a Designated Examiner, in any way, in the course of fulfilling his obligations to the Authority, will result in the forfeiture of the Operator's Designated Examiner programme.

(f) The validity of any checks performed by the affected Designated Examiner will also be revoked.

(g) In the event, any Designated Examiner come into a situation of conflict of interest, a full report of the circumstances shall be immediately submitted to the Authority for review.

(h) Furthermore, the Operator shall review the status of each Designated Examiner once every calendar year, to ascertain that they are not in any conflict of interest, and shall record this Conflict-of-Interest Review on the Designated Examiner's file.

(i) The expiry of the Conflict-of-Interest Review shall be 31st December of the year following the latest review. This review will address all foreseeable issues, such as preferential scheduling of candidates with the examiner of their choice, family ties, business connections, etc.

AMC OPS-3.1039 Safety and Emergency Procedures (SEP) Instructor

(See CAR OPS-3.1039)

Acceptance process for Cabin SEP Instructor

(a) The candidates shall undergo a selection process by the Operator to assess that the individual's knowledge, capability and competency are suitable for the instructor's role and determine the person's motivation. The successful candidate shall undergo the Operator's training program.

(b) Prior to the issuance of an instructor qualification, all candidates shall successfully complete a formal competency assessment evaluated during the conducting of theoretical and practical training by the Authority. The final assessment of instructor competence shall be made against the following competency framework:

   (1) manage safety of the training environment;
   (2) prepare the training environment;
   (3) manage and support the trainee;
   (4) conduct training;
   (5) perform trainee assessment;
   (6) perform course evaluation; and
   (7) continuously improve performance

(c) All instructors shall receive yearly recurrent training and be re-assessed according to paragraph (b) using a documented training and assessment process acceptable to the Authority, implemented by the operator or approved training organisation.

(d) Recurrent Training Requirements

   (1) Applicants shall undergo:

      (i) Training in the area of "teaching and learning" as described in the Table 1.
      (ii) An operator internal training for operator specific elements according to Table2.
      (iii) An adequate syllabus for theoretical knowledge concerning teaching activity and learning behaviour of a Cabin Safety Instructor candidate should include at least:

AMC OPS-3.1040 Aviation Medical and First Aid Instructor

(See CAR OPS-3.1040)

Refer to AMC OPS-3.1039 for the acceptance process for the Aviation Medical and First Aid Instructor.

Table 1 Elements on teaching activity and learning

Topic	Content
Learning Process	Motivation Perception and understanding Learning methods
Teaching Process	Elements of effective teaching methods Planning of instructional activity
Training Philosophy	Importance of a planned syllabus Integration of theoretical knowledge
Techniques for Supervision	The cabin environment In-flight situational awareness Briefing structure (topics and targets) Candidate's self-assessment and self-critic
Topic	**Content**
Human Performance and Limitation	Physiological factors Psychological factors Human information processing behavioral attitudes
Feedback system	The drawing up of comments, recommendations and improvements. The need of concise communication.
Candidate's Evaluation	The role of a Cabin Crew Instructor during supervision and its analysis. Assessment of student performance Analysis of student's errors.

(i) Instructors shall undergo training update at least every twenty-four (24) months relevant to current technology, practical skills, human factors and the latest training techniques appropriate to the knowledge being trained or examined". (See Table 2)

Table 2. Operators' specific elements

Topic	Content
Requirements	Legal basis (OPS Subpart O etc.) Operator specific requirements (directives)
Training and Checking Administration	Records and Forms Control, analysis and storage of records Feedback system (Element of Quality system).
Handling of underperforming crew	Procedures to be applied in the event that candidates do not achieve or maintain the required standard.

CAR OPS-3.1041 General Rules for Operations Manuals

(See IEM CAR OPS-3.1041(b)) & (See IEM CAR OPS-3.1041(c))

(a) An operator shall ensure that the Operations Manual contains all instructions and information necessary for operations personnel to perform their duties and all crew member have been trained in, and are proficient to perform their duties.
(b) An operator shall ensure that the contents of the Operations Manual, including all amendments or revisions, do not contravene the conditions contained in the Air Operator Certificate (AOC) or any applicable regulations and are acceptable to, or, where applicable, approved by, the Authority. (See IEM CAR OPS-3.1041(b))
(c) Unless otherwise approved by the Authority, or prescribed by national law, an operator must prepare the Operations Manual in the English language. In addition, an operator may translate and use that manual, or parts thereof, into another language. (See IEM OPS- 3.1041(c).)
(d) Should it become necessary for an operator to produce new Operations Manuals or major parts/volumes thereof, he must comply with sub-paragraph (c) above.
(e) An operator may issue an Operations Manual in separate volumes.
(f) An operator shall ensure that all operations personnel have easy access to a copy of each part of the Operations Manual which is relevant to their duties. In addition, the operator shall supply crew members with a personal copy of, or sections from, Parts A and B of the Operations Manual as are relevant for personal study.
(g) An operator shall ensure that the Operations Manual is amended or revised so that the instructions and information contained therein are kept up to date. The operator shall ensure that all operations personnel are made aware of such changes that are relevant to their duties.
(h) Each holder of an Operations Manual, or appropriate parts of it, shall keep it up to date with the amendments or revisions supplied by the operator.
(i) An operator shall supply the Authority with intended amendments and revisions in advance of effective date. When the amendment concerns any part of the Operations Manual which must be approved in accordance with CAR OPS-3, this approval shall be obtained before the amendment becomes effective. When immediate amendments or revisions are required in the interest of safety, they may be published and applied immediately, provided that any approval required has been applied for.
(j) An operator shall incorporate all amendments and revisions required by the Authority.
(k) An operator must ensure that information taken from approved documents, and any amendment of such approved documentation, is correctly reflected in the Operations Manual and that the Operations Manual contains no information contrary to any approved documentation. However, this requirement does not prevent an operator from using more conservative data and procedures.
(l) An operator must ensure that the contents of the Operations Manual are presented in a form in which they can be used without difficulty The design of the Operations Manual shall observe Human Factors principles.
(m) An operator may be permitted by the Authority to present the Operations Manual or parts thereof in a form other than on printed paper. In such cases, an acceptable level of accessibility, usability and reliability must be assured.
(n) The use of an abridged form of the Operations Manual does not exempt the operator from the requirements of CAR OPS-3.130.

CAR OPS-3.1045 Operations Manual – Structure and Contents

(See Appendix 1 to CAR OPS-3.1045) (See AMC OPS-3.1045, IEM OPS-3.1045 (a) and 3.1045(c))

(a) The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe Human Factors principles.
Note: Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

(b) An operator shall ensure that the main structure of the Operations Manual is as follows:

Part A. ***General/Basic***

This part shall comprise all non-type related operational policies, instructions and procedures needed for a safe operation.

Part B. ***Helicopter Operating Matters***

This part shall comprise all type-related instructions and procedures needed for a safe operation. It shall take account of any differences between types, variants or individual Helicopters used by the operator.

Part C. ***Route and Heliport Instructions and Information***

This part shall comprise all instructions and information needed for the area of operation.

Part D. ***Training***

This part shall comprise all training instructions for personnel required for a safe operation.

(c) An operator shall ensure that the contents of the Operations Manual are in accordance with Appendix 1 to CAR OPS-3.1045 and relevant to the area and type of operation.

(d) An operator shall ensure that the detailed structure of the Operations Manual is acceptable to the Authority. (See IEM OPS-3.1045(c)).

(e) Shall include Instructions and training requirements for the use of automatic landing systems, a HUD or equivalent display and EVS, SVS or CVS equipment as applicable.

CAR OPS-3.1050 Helicopter Flight Manual

(a) An operator shall keep a current approved Helicopter Flight Manual or equivalent document for each Helicopter that it operates.

(b) The operator shall ensure that Operations Manuals Part B that is referred to Manufacture documentation are kept up-to-date.

(c) The flight manual shall be updated by implementing changes made mandatory by the State of Registry.

CAR OPS-3.1055 Journey log

(a) An operator shall retain the following information for each flight in the form of a Journey Log:

(1) Helicopter nationality and registration;
(2) Date;
(3) Name(s) of crew member(s);
(4) Duty assignment of crew member(s);
(5) Place of departure;
(6) Place of arrival;
(7) Time of departure (off-block time);
(8) Time of arrival (on-block time);
(9) Hours of flight;
(10) Nature of flight (private, aerial work, scheduled or non-scheduled);
(11) Incidents, observations (if any); and
(12) Commander's signature (or equivalent). (See IEM OPS-3.1055(a)(12))

(b) An operator may be permitted not to keep a Helicopter journey log, or parts thereof, by the Authority if the relevant information is available in other documentation. (See IEM OPS- 3.1055(b))

(c) An operator shall ensure that all entries are made concurrently and that they are permanent in nature.

(d) Completed journey log books should be retained to provide a continuous record of the last six months' operations.

CAR OPS-3.1060 Operational flight plan

(a) An operator shall ensure that the operational flight plan used and the entries made during flight contain the following items:

(1) Helicopter registration;
(2) Helicopter type and variant;
(3) Date of flight;
(4) Flight identification;

(5) Names of flight crew members;
(6) Duty assignment of flight crew members;
(7) Place of departure;
(8) Time of departure (actual off-block time, take-off time);
(9) Place of arrival (planned and actual);
(10) Time of arrival (actual landing and on-block time);
(11) Type of operation (VFR, Ferry flight, etc.);
(12) Route and route segments with checkpoints/waypoints, distances, time and tracks;
(13) Planned cruising speed and flying times between check-points/waypoints. Estimated and actual times overhead;
(14) Safe altitudes and minimum levels;
(15) Planned altitudes and flight levels;
(16) Fuel calculations (records of in-flight fuel checks);
(17) Fuel on board when starting engines;
(18) Alternate(s) for destination and, where applicable, take-off and en-route, including information required in sub-paragraphs (12), (13), (14), and (15) above;
(19) Initial ATS Flight Plan clearance and subsequent re-clearance;
(20) In-flight re-planning calculations; and
(21) Relevant meteorological information.

(b) Items which are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.
(c) An operator must ensure that the operational flight plan and its use are described in the Operations Manual.
(d) An operator shall ensure that all entries on the operational flight plan are made concurrently and that they are permanent in nature.
(e) The operational flight plan shall be completed for every intended flight and shall be approved by the pilot in command, and where applicable, by the flight operations officer/flight dispatcher.
(f) The operator shall determine the most efficient means of lodging the operational flight plan.

CAR OPS-3.1065 Document storage periods
(See Appendix 1 CAR OPS-3.1065)
An operator shall ensure that all records and all relevant operational and technical information for each individual flight, are stored for the periods prescribed in Appendix 1 to CAR OPS-3.1065.

CAR OPS-3.1070 Operator's Maintenance Management Exposition
The operator shall keep a current approved maintenance management exposition as prescribed in CAR M Subpart C.

CAR OPS-3.1071 Helicopter Technical Log
The operator shall keep a helicopter technical log as prescribed in CAR-M.A.306.

Appendix 1 to CAR OPS-3.1045 Operations Manual Contents
(See AMC Appendix 1 to OPS 3.1045)
The operator shall ensure that the Operations Manual contains the following:

A GENERAL/BASIC

0 ADMINISTRATION AND CONTROL OF OPERATIONS MANUAL

0.1 *Introduction*
(a) A statement that the manual complies with all applicable regulations and with the terms and conditions of the applicable Air Operator Certificate.
(b) A statement that the manual contains operational instructions that are to be complied with by the relevant personnel.
(c) A list and brief description of the various parts, their contents, applicability and use.
(d) Explanations and definitions of terms and words needed for the use of the manual.

0.2 *System of amendment and revision*

(a) Who is responsible for the issuance and insertion of amendments and revisions.
(b) A record of amendments and revisions with insertion dates and effective dates.
(c) A statement that handwritten amendments and revisions are not permitted except in situations requiring immediate amendment or revision in the interest of safety.
(d) A description of the system for the annotation of pages and their effective dates.
(e) A list of effective pages.
(f) Annotation of changes (on text pages and, as far as practicable, on charts and diagrams).
(g) Temporary revisions.
(h) A description of the distribution system for the manuals, amendments and revisions.

1 ORGANISATION AND RESPONSIBILITIES

1.1 *Organisational structure*. A description of the organisational structure including the general company organigram and operations department organigram. The organigram must depict the relationship between the Operations Department and the other Departments of the company. In particular, the subordination and reporting lines of all Divisions, Departments etc., which pertain to the safety of flight operations, must be shown.

1.2 *Nominated postholders*. The name of each nominated postholder responsible for flight operations, continuing airworthiness, crew training and ground operations, as prescribed in OPS 3 Subpart C. A description of their function and responsibilities must be included.

1.3 *Responsibilities and duties of operations management personnel*. A description of the duties, responsibilities and authority of operations management personnel pertaining to the safety of flight operations and the compliance with the applicable regulations.

1.4 *Authority, duties and responsibilities of the commander*. A statement defining the authority, duties and responsibilities of the commander.

1.5 *Duties and responsibilities of crew members other than the commander*

2 OPERATIONAL CONTROL AND SUPERVISION

2.1 *Supervision of the operation by the operator*. A description of the system for supervision of the operation by the operator (see OPS 3.175(g)). This must show how the safety of flight operations and the qualifications of personnel are supervised. In particular, the procedures related to the following items must be described:

(a) Licence and qualification validity;
(b) Competence of operations personnel; and
(c) Control, analysis, storage of records, flight documents, additional information and data.

2.2 System and responsibility for promulgation of additional operational instructions and information. A description of any system for promulgating information which may be of an operational nature, but which is supplementary to that in the OM. The applicability of this information and the responsibilities for its promulgation should be included.

2.3 Operational control. A description of the procedures and responsibilities necessary to exercise operational control with respect to flight safety.

2.4 Powers of the authority. A description of the powers of the competent authority and guidance to staff on how to facilitate inspections by authority personnel.

3 MANAGEMENT SYSTEM

A description of the management system, including at least the following:

(a) safety policy;
(b) the process for identifying safety hazards and for evaluating and managing the associated risks;
(c) compliance monitoring system;
(d) allocation of duties and responsibilities;
(e) documentation of all key management system processes.

4 CREW COMPOSITION

4.1 *Crew Composition*. An explanation of the method for determining crew compositions taking account of

the following:
(a) The type of helicopter being used;
(b) The area and type of operation being undertaken;
(c) The phase of the flight;
(d) The minimum crew requirement and flight duty period planned;
(e) Experience (total and on type), recency and qualification of the crew members; and
(f) the designation of the pilot-in-command/commander and, if necessitated by the duration of the flight, the procedures for the relief of the pilot-in-command/commander or other members of the flight crew;
(g) the designation of the senior cabin crew member and, if necessitated by the duration of the flight, the procedures for the relief of the senior cabin crew member and any other member of the cabin crew

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4.2 Designation of the pilot-in-command/commander. The rules applicable to the designation of the pilot-in-command/commander.

4.3 Flight crew incapacitation. Instructions on the succession of command in the event of flight crew incapacitation.

4.4 Operation on more than one type. A statement indicating which aircraft are considered as one type for the purpose of:
(a) flight crew scheduling; and
(b) cabin crew scheduling.

5 QUALIFICATION REQUIREMENTS

5.1 A description of the required licence, rating(s), qualification/competency (e.g. for routes and aerodromes), experience, training, checking and recency for operations personnel to conduct their duties. Consideration must be given to the helicopter type, kind of operation and composition of the crew.

5.2 Flight Crew
(a) pilot-in-command/commander,
(b) pilot relieving the pilot-in-command/commander,
(c) co-pilot,
(d) pilot relieving the co-pilot,
(e) pilot under supervision,
(f) system panel operator,
(g) operation on more than one type or variant.

5.3 *Cabin crew*
(a) Senior cabin crew member.
(b) Cabin crew member.
  (i) Required cabin crew member.
  (ii) Additional cabin crew member and cabin crew member during familiarisation flights.
(c) Operation on more than one type or variant.

5.4 *Training, checking and supervision personnel*
(a) For flight crew.
(b) For cabin crew.

5.5 *Other operations personnel*

6 CREW HEALTH PRECAUTIONS

Crew health precautions.

The relevant regulations and guidance to crew members concerning health, including the following:
(a) alcohol and other intoxicating liquids,
(b) narcotics,
(c) drugs,
(d) sleeping tablets,
(e) anti-depressants,
(f) pharmaceutical preparations,

(g) immunisation,
(h) deep-sea diving,
(i) blood/bone marrow donation,
(j) meal precautions prior to and during flight,
(k) sleep and rest,
(l) surgical operations.

7 FLIGHT TIME LIMITATIONS

7.1 Flight and duty time limitations and rest requirements.

7.2 Exceedance of flight and duty time limitations and/or reductions of rest periods. Conditions under which flight and duty time may be exceeded or rest periods may be reduced, and the procedures used to report these modifications.

7.3 A description of the fatigue risk management, including at least the following:
(a) the philosophy and principles;
(b) documentation of processes;
(c) scientific principles and knowledge;
(d) hazard identification and risk assessment processes;
(e) risk mitigation process;
(f) FRM safety assurance processes; and
(g) FRM promotion processes.

8 OPERATING PROCEDURES

8.1 Flight Preparation Instructions. As applicable to the operation:

8.1.1 Minimum flight altitudes. A description of the method of determination and application of minimum altitudes including:
(a) a procedure to establish the minimum altitudes/flight levels for visual flight rules (VFR) flights; and
(b) a procedure to establish the minimum altitudes/flight levels for instrument flight rules (IFR) flights.

8.1.2 Criteria and responsibilities for determining the adequacy of aerodromes to be used.

8.1.3 Methods and responsibilities for establishing aerodrome operating minima. Reference should be made to procedures for the determination of the visibility and/or runway visual range (RVR) and for the applicability of the actual visibility observed by the pilots, the reported visibility and the reported RVR.

8.1.4 En-route operating minima for VFR flights or VFR portions of a flight and, where single-engined aircraft are used, instructions for route selection with respect to the availability of surfaces that permit a safe forced landing.

8.1.5 Presentation and application of aerodrome and en-route operating minima.

8.1.6 Interpretation of meteorological information. Explanatory material on the decoding of meteorological (MET) forecasts and MET reports relevant to the area of operations, including the interpretation of conditional expressions.

8.1.7 Determination of the quantities of fuel, oil and water methanol carried. The methods by which the quantities of fuel, oil and water methanol to be carried are determined and monitored in-flight. This section should also include instructions on the measurement and distribution of the fluid carried on board. Such instructions should take account of all circumstances likely to be encountered on the flight, including the possibility of in-flight re-planning and of failure of one or more of the aircraft’s power plants. The system for maintaining fuel and oil records should also be described.

8.1.8 Mass and centre of gravity. The general principles of mass and centre of gravity including the following:
(a) definitions;
(b) methods, procedures and responsibilities for preparation and acceptance of mass and centre of gravity calculations;
(c) the policy for using standard and/or actual masses;
(d) the method for determining the applicable passenger, baggage and cargo mass; General instruction and information necessary for verification of the various types of mass and balance documentation in use;
(e) the applicable passenger and baggage masses for various types of operations and aircraft type;
(f) general instructions and information necessary for verification of the various types of mass and balance documentation in use;
(g) last-minute changes procedures;

(h) specific gravity of fuel, oil and water methanol;
(i) seating policy/procedures;
(j) for helicopter operations, standard load plans.

8.1.9 Air traffic services (ATS) flight plan. Procedures and responsibilities for the preparation and submission of the ATS flight plan. Factors to be considered include the means of submission for both individual and repetitive flight plans.

8.1.10 Operational flight plan. Procedures and responsibilities for the preparation and acceptance of the operational flight plan. The use of the operational flight plan should be described, including samples of the operational flight plan formats in use.

8.1.11 Operator's aircraft technical log. The responsibilities and the use of the operator's aircraft technical log should be described, including samples of the format used.

8.1.12 List of documents, forms and additional information to be.

8.1.13 For commercial air transport operations with single-engined turbine aeroplanes in instrument meteorological conditions or at night (CAT SET-IMC) specifically approved by CAA.
(a) the procedure for route selection with respect to the availability of surfaces, which permits a safe forced landing;
(b) the instructions for the assessment of landing sites (elevation, landing direction, and obstacles in the area); and
(c) the instructions for the assessment of the weather conditions at those landing sites.

8.2 Ground handling instructions. As applicable to the operation:

8.2.1 Fuelling procedures. A description of fuelling procedures, including:
(a) safety precautions during refuelling and defuelling including when an aircraft auxiliary power unit is in operation or, for helicopters, when rotors are turning or, for aeroplanes, when an engine is running;
(b) refuelling and defuelling when passengers are embarking, on board or disembarking; and
(c) precautions to be taken to avoid mixing fuels.

8.2.2 Aircraft, passengers and cargo handling procedures related to safety. A description of the handling procedures to be used when allocating seats, embarking and disembarking passengers and when loading and unloading the aircraft. Further procedures, aimed at achieving safety whilst the aircraft is on the ramp, should also be given. Handling procedures should include:
(a) special categories of passengers, including children/infants, persons with reduced mobility, inadmissible passengers, deportees and persons in custody;
(b) permissible size and weight of hand baggage;
(c) loading and securing of items in the aircraft;
(d) positioning of ground equipment;
(e) operation of aircraft doors;
(f) safety on aerodrome/operating site, including fire prevention and safety in blast and suction areas;
(g) start-up, ramp departure and arrival procedures, including, for aeroplanes, push-back and towing operations;
(h) servicing of aircraft;
(i) documents and forms for aircraft handling;
(j) special loads and classification of load compartments; and
(k) multiple occupancy of aircraft seats.

8.2.3 Procedures for the refusal of embarkation. Procedures to ensure that persons who appear to be intoxicated, or who demonstrate by manner or physical indications that they are under the influence of drugs, are refused embarkation. This does not apply to medical patients under proper care.

8.2.4 De-icing and anti-icing on the ground. A description of the de-icing and anti-icing policy and procedures for aircraft on the ground. These should include descriptions of the types and effects of icing and other contaminants on aircraft whilst stationary, during ground movements and during take-off. In addition, a description of the fluid types used should be given, including the following:
(a) proprietary or commercial names,
(b) characteristics,
(c) effects on aircraft performance,
(d) hold-over times,
(e) precautions during usage.

8.3 Flight Procedures:

8.3.1 VFR/IFR Policy. A description of the policy for allowing flights to be made under VFR, or for requiring flights to be made under IFR, or for changing from one to the other.

8.3.2 Navigation Procedures. A description of all navigation procedures, relevant to the type(s) and area(s) of operation. Special consideration should be given to:

(a) standard navigational procedures, including policy for carrying out independent cross-checks of keyboard entries where these affect the flight path to be followed by the aircraft; and
(b) required navigation performance (RNP), minimum navigation performance specification (MNPS) and polar navigation and navigation in other designated areas;
(c) in-flight re-planning;
(d) procedures in the event of system degradation; and
(e) reduced vertical separation minima (RVSM), for aeroplanes.

8.3.3 Altimeter setting procedures, including, where appropriate, use of:

(a) metric altimetry and conversion tables; and
(b) QFE operating procedures.

8.3.4 Altitude alerting system procedures for aeroplanes or audio voice alerting devices for helicopters.

8.3.5 Ground proximity warning system (GPWS)/terrain avoidance warning system (TAWS), for aeroplanes. Procedures and instructions required for the avoidance of controlled flight into terrain, including limitations on high rate of descent near the surface (the related training requirements are covered in OM-D 2.1).

8.3.6 Policy and procedures for the use of traffic collision avoidance system (TCAS)/airborne collision avoidance system (ACAS) for aeroplanes and, when applicable, for helicopters.

8.3.7 Policy and procedures for in-flight fuel management.

8.3.8 Adverse and potentially hazardous atmospheric conditions. Procedures for operating in, and/or avoiding, adverse and potentially hazardous atmospheric conditions, including the following:

(a) thunderstorms,
(b) icing conditions,
(c) turbulence,
(d) windshear,
(e) jet stream,
(f) volcanic ash clouds,
(g) heavy precipitation,
(h) sand storms,
(i) mountain waves,
(j) significant temperature inversions.

8.3.9 Wake turbulence. Wake turbulence separation criteria, taking into account aircraft types, wind conditions and runway/final approach and take-off area (FATO) location. For helicopters, consideration should also be given to rotor downwash.

8.3.10 Crew members at their stations. The requirements for crew members to occupy their assigned stations or seats during the different phases of flight or whenever deemed necessary in the interest of safety and, for aeroplane operations, including procedures for controlled rest in the flight crew compartment.

8.3.11 Use of restraint devices for crew and passengers. The requirements for crew members and passengers to use safety belts and/or restraint systems during the different phases of flight or whenever deemed necessary in the interest of safety.

8.3.12 Admission to flight crew compartment. The conditions for the admission to the flight crew compartment of persons other than the flight crew. The policy regarding the admission of inspectors from an authority should also be included.

8.3.13 Use of vacant crew seats. The conditions and procedures for the use of vacant crew seats.

8.3.14 Incapacitation of crew members. Procedures to be followed in the event of incapacitation of crew members in-flight. Examples of the types of incapacitation and the means for recognising them should be included.

8.3.15 Cabin safety requirements. Procedures:

(a) covering cabin preparation for flight, in-flight requirements and preparation for landing, including procedures for securing the cabin and galleys;

(b) to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aircraft;
(c) to be followed during passenger embarkation and disembarkation;
(d) when refuelling/defuelling with passengers embarking, on board or disembarking;
(e) covering the carriage of special categories of passengers;
(f) covering smoking on board;
(g) covering the handling of suspected infectious diseases.

8.3.16 Passenger briefing procedures. The contents, means and timing of passenger briefing. 8.3.17Procedures for aircraft operated whenever required cosmic or solar radiation detection equipment is carried.

8.3.18Policy on the use of autopilot for aircraft fitted with these systems.

8.4 Low visibility operations (LVO). A description of the operational procedures associated with LVO.

8.5 Reserved

8.6 Use of the minimum equipment and configuration deviation list(s).

8.7 Non-commercial operations. Information as required for each type of non-commercial flight performed by the AOC holder. A description of the differences from CAT operations. Procedures and limitations, for example, for the following:
(a) training flights,
(b) flights at the end of lease or upon transfer of ownership,
(c) delivery flights,
(d) ferry flights,
(e) demonstration flights,
(f) positioning flights,
(g) other non-commercial flights.

8.8 Oxygen requirements:

8.8.1 An explanation of the conditions under which oxygen should be provided and used.

8.8.2 The oxygen requirements specified for the following persons:
(a) flight crew;
(b) cabin crew;
(c) passengers.

8.9 Procedures related to the use of type B EFB applications.

9 DANGEROUS GOODS AND WEAPONS

9.1 Information, instructions and general guidance on the transport of dangerous goods, in accordance with CAR 92, including:
(a) operator’s policy on the transport of dangerous goods;
(b) guidance on the requirements for acceptance, labelling, handling, stowage and segregation of dangerous goods;
(c) special notification requirements in the event of an accident or occurrence when dangerous goods are being carried;
(d) procedures for responding to emergency situations involving dangerous goods;
(e) duties of all personnel involved; and
(f) instructions on the carriage of the operator’s personnel on cargo aircraft when dangerous goods are being carried.

9.2 The conditions under which weapons, munitions of war and sporting weapons may be carried.

10 SECURITY

10.1 Security instructions and guidance of a non-confidential nature which must include the authority and responsibilities of operations personnel. Policies and procedures for handling and reporting crime on board such as unlawful interference, sabotage, bomb threats, and hijacking must also be included.

10.2 A description of preventative security measures and training. Note: Parts of the security instructions and guidance may be kept confidential.

11 HANDLING, NOTIFYING AND REPORTING ACCIDENTS, INCIDENTS AND OCCURRENCES AND USING THE CVR RECORDING

Procedures for handling, notifying and reporting accidents, incidents and occurrences. This section should include the following:

(a) definition of accident, incident and occurrence and of the relevant responsibilities of all persons involved;
(b) illustrations of forms to be used for reporting all types of accident, incident and occurrence (or copies of the forms themselves), instructions on how they are to be completed, the addresses to which they should be sent and the time allowed for this to be done;
(c) in the event of an accident, descriptions of which departments, authorities and other organisations have to be notified, how this will be done and in what sequence;
(d) procedures for verbal notification to air traffic service units of incidents involving ACAS resolution advisories (RAs), bird hazards, dangerous goods and hazardous conditions;
(e) procedures for submitting written reports on air traffic incidents, ACAS RAs, bird strikes, dangerous goods incidents or accidents, and unlawful interference;
(f) reporting procedures. These procedures should include internal safety-related reporting procedures to be followed by crew members, designed to ensure that the pilot-in- command/commander is informed immediately of any incident that has endangered, or may have endangered, safety during the flight, and that the pilot-in-command/commander is provided with all relevant information.
(g) Procedures for the preservation of recordings of the flight recorders following an accident or a serious incident or when so directed by the investigating authority. These procedures should include:
    (i) Directions for following an accident, a serious incident or an occurrence identified by the investigating authority, the operator of an aircraft shall preserve the original recorded data of the flight recorders for a period of 60 days or until otherwise directed by the investigating authority.; and
    (ii) instructions and means to prevent inadvertent reactivation, repair or reinstallation of the flight recorders by personnel of the operator or of third parties, and to ensure that flight recorder recordings are preserved for the needs of the investigating authority.
(h) Procedures required for making the CVR recording or its transcript available to the competent authority.

12 RULES OF THE AIR

(a) Visual and instrument flight rules,
(b) Territorial application of the rules of the air,
(c) Communication procedures, including communication-failure procedures,
(d) Information and instructions relating to the interception of civil aircraft,
(e) The circumstances in which a radio listening watch is to be maintained,
(f) Signals,
(g) Time system used in operation,
(h) ATC clearances, adherence to flight plan and position reports,
(i) Visual signals used to warn an unauthorised aircraft flying in or about to enter a restricted, prohibited or danger area,
(j) Procedures for flight crew observing an accident or receiving a distress transmission,
(k) The ground/air visual codes for use by survivors, and description and use of signal aids,
(l) Distress and urgency signals.

13 LEASING/CODE-SHARE

A description of the operational arrangements for leasing and code-share, associated procedures and management responsibilities.

B AIRCRAFT OPERATING MATTERS — TYPE RELATED

Taking account of the differences between types/classes, and variants of types, under the following headings:

0 GENERAL INFORMATION AND UNITS OF MEASUREMENT

0.1 General information (e.g. aircraft dimensions), including a description of the units of measurement used for the operation of the aircraft type concerned and conversion tables.

1 LIMITATIONS

1.1 A description of the certified limitations and the applicable operational limitations should include the following:

(a) certification status (e.g. EASA (supplemental) type certificate, environmental certification, etc.);
(b) passenger seating configuration for each aircraft type, including a pictorial presentation;
(c) types of operation that are approved (e.g. VFR/IFR, CAT II/III, RNP, flights in known icing conditions, etc.);
(d) crew composition;
(e) mass and centre of gravity;
(f) speed limitations;
(g) flight envelope(s);
(h) wind limits, including operations on contaminated runways;
(i) performance limitations for applicable configurations;
(j) (runway) slope;
(k) for aeroplanes, limitations on wet or contaminated runways;
(l) airframe contamination;
(m) system limitations.

2 NORMAL PROCEDURES

The normal procedures and duties assigned to the crew, the appropriate checklists, the system for their use and a statement covering the necessary coordination procedures between flight and cabin/other crew members. The normal procedures and duties should include the following:
(a) pre-flight,
(b) pre-departure,
(c) altimeter setting and checking,
(d) taxi, take-off and climb,
(e) noise abatement,
(f) cruise and descent,
(g) approach, landing preparation and briefing,
(h) VFR approach,
(i) IFR approach,
(j) visual approach and circling,
(k) missed approach,
(l) normal landing,
(m) post-landing,
(n) (reserved by CAA).

3 ABNORMAL AND/OR EMERGENCY PROCEDURES

The abnormal and/or emergency procedures and duties assigned to the crew, the appropriate checklists, the system for their use and a statement covering the necessary coordination procedures between flight and cabin/other crew members. The abnormal and/or emergency procedures and duties should include the following:
(a) crew incapacitation,
(b) fire and smoke drills,
(c) (Reserved by CAA)
(d) for helicopters, exceeding structural limits such as hard landing,
(e) lightning strikes,
(f) distress communications and alerting ATC to emergencies,
(g) engine/burner failure,
(h) system failures,
(i) guidance for diversion in case of serious technical failure,
(j) ground proximity warning, including for helicopters audio voice alerting device (AVAD) warning,
(k) ACAS/TCAS warning for helicopters/audio voice alerting device (AVAD),
(l) windshear,
(m) emergency landing/ditching,
(n) for helicopters, departure contingency procedures.

4 PERFORMANCE

4.1 Performance data must be provided in a form in which it can be used without difficulty.

4.2 Performance data. Performance material which provides the necessary data for compliance with the performance requirements prescribed in Subparts F, G, H and I.

4.3 If performance Data, as required for the appropriate performance class, is not available in the approved HFM, then other data acceptable to the Authority must be included. Alternatively, the Operations Manual may contain cross-reference to the approved data contained in the HFM where such data is not likely to be used often or in an emergency.
Note: The operator should issue operating instructions and provide information on helicopter climb performance with all engines operating to enable the pilot-in-command to determine the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique.

5 FLIGHT PLANNING

5.1 Data and instructions necessary for pre-flight and in-flight planning. Where applicable, procedures for engine(s) out operations and flights to isolated heliports must be included.

5.2 The method for calculating fuel needed for the various stages of flight, in accordance with OPS 3.255.

6 MASS AND BALANCE

Instructions and data for the calculation of the mass and balance, including the following:
(a) calculation system (e.g. index system);
(b) information and instructions for completion of mass and balance documentation, including manual and computer generated types;
(c) limiting masses and centre of gravity for the types, variants or individual aircraft used by the operator;
(d) dry operating mass and corresponding centre of gravity or index.

7 LOADING

Procedures and provisions for loading and unloading and securing the load in the aircraft.

8 CONFIGURATION DEVIATION LIST

The CDL(s), if provided by the manufacturer, taking account of the aircraft types and variants operated, including procedures to be followed when an aircraft is being dispatched under the terms of its CDL.

9 MINIMUM EQUIPMENT LIST

The Minimum Equipment List (MEL) taking account of the helicopter types and variants operated and the type(s)/area(s) of operation. The MEL must include the navigational equipment and take into account the required navigation performance for the route and area of operation.

10 SURVIVAL AND EMERGENCY EQUIPMENT INCLUDING OXYGEN

10.1 A list of the survival equipment to be carried for the routes to be flown and the procedures for checking the serviceability of this equipment prior to take-off. Instructions regarding the location, accessibility and use of survival and emergency equipment and its associated check list(s) must also be included.

10.2 The procedure for determining the amount of oxygen required and the quantity that is available. The flight profile and number of occupants.

11 EMERGENCY EVACUATION PROCEDURES

11.1 Instructions for preparation for emergency evacuation including crew co-ordination and emergency station assignment.

11.2 Emergency evacuation procedures. A description of the duties of all members of the crew for the rapid evacuation of a helicopter and the handling of the passengers in the event of a forced landing, ditching or other emergency.

12 AIRCRAFT SYSTEMS

A description of the aircraft systems, related controls and indications and operating instructions. Consideration should be given to use the ATA number system when allocating chapters and numbers. (See AMC Appendix 1 to OPS-3.1045.)

C ROUTE/ROLE/AREA AND AERODROME/OPERATING SITE INSTRUCTIONS AND INFORMATION

1 Instructions and information relating to communications, navigation and aerodromes/operating sites, including minimum flight levels and altitudes for each route to be flown and operating minima for each aerodrome/operating site planned to be used, including the following:
(a) minimum flight level/altitude;
(b) operating minima for departure, destination and alternate aerodromes;
(c) communication facilities and navigation aids;
(d) runway/final approach and take-off area (FATO) data and aerodrome/operating site facilities;
(e) approach, missed approach and departure procedures including noise abatement procedures;

(f) communication-failure procedures;
(g) search and rescue facilities in the area over which the aircraft is to be flown;
(h) a description of the aeronautical charts that should be carried on board in relation to the type of flight and the route to be flown, including the method to check their validity;
(i) availability of aeronautical information and MET services;
(j) en-route communication/navigation procedures;
(k) aerodrome/operating site categorisation for flight crew competence qualification;
(l) special aerodrome/operating site limitations (performance limitations and operating procedures, etc.).

2 Information related to landing sites available for operations approved in accordance with SET-IMC under specific approval by CAA:
(a) a description of the landing site (position, surface, slope, elevation, etc.);
(b) the preferred landing direction; and
(c) obstacles in the area.

D TRAINING

1 Training syllabi and checking programmes for all operations personnel assigned to operational duties in connection with the preparation and/or conduct of a flight as well as ground handling training requirements.
2 Training syllabi and checking programmes must include:
2.1 For flight crew. All relevant items prescribed in OPS 3, Subparts E and N including training for the avoidance of CFIT and the use of ACAS and GPWS and for any special approval (EFB, PBN, AWO etc.);
2.2 For cabin crew. All relevant items prescribed in Subpart O;
2.3 For technical crew;
2.4 For operations personnel concerned, including crew members:
(a) All relevant items prescribed in OPS 3 Subpart R (Transport of Dangerous Goods by Air); and
(b) All relevant items prescribed in OPS 3, Subpart S (Security).
2.5 For operations personnel other than crew members (e.g. dispatcher, handling personnel etc.). All other relevant items prescribed in CAR OPS 3 pertaining to their duties.
3 Procedures
3.1 Procedures for training and checking.
3.2 Procedures to be applied in the event that personnel do not achieve or maintain the required standards.
3.3 Procedures to ensure that abnormal or emergency situations requiring the application of part or all of abnormal or emergency procedures and simulation of IMC by artificial means are not simulated during commercial air transportation flights.
4 Description of documentation to be stored and storage periods. (See Appendix 1 to OPS 3.1065.)

Note: If there are sections that, because of the nature of the operation, do not apply, it is recommended that operators maintain the numbering system above and insert 'Not applicable' or 'Intentionally blank' where appropriate.

Appendix 1 to OPS 3.1065 Document Storage Periods

The operator shall ensure that the following information/documentation is stored in an acceptable form, accessible to the Authority, for the periods shown in the Tables below.

Note: Additional information relating to maintenance records is prescribed in OPS 3.915.

Table 1 – Information used for the preparation and execution of a flight

Information used for the preparation and execution of the flight as described in OPS 3.135	
Operational flight plan	3 months
Helicopter Technical log	36 months after the date of last entry and in accordance with AMC OPS-3.035
Route specific NOTAM/AIS briefing documentation if edited by the operator	3 months
Mass and balance documentation	3 months

Notification of special loads including written information to the commander about dangerous goods	3 months
Fuel and oil records	3 months

Table 2 – Reports

Reports	
Journey log	3 months
Flight report(s) for recording details of any occurrence, as prescribed in CAR OPS-3.420, or any event which the commander deems necessary to report/record	3 months
Reports on exceedances of duty and/ or reducing rest periods	3 months

Table 3 – Flight crew records

Flight Crew Records	
Flight, Duty and Rest time	15 months
Licence	As long as the flight crew member is exercising the privileges of the licences of the operator
Conversion training and checking	3 years
Command course (including checking)	3 years
Recurrent training and checking	3 years
Training and checking to operate in either pilot's seat	3 years
Recent experience (OPS 3.970 refers)	15 months
Route and aerodrome competence (OPS 3.975 refers)	3 years
Training and qualification for specific operations when required by OPS (e.g. HEMS CATII/III operations)	3 years
Dangerous Goods training as appropriate	3 years

Table 4 – Cabin crew records

Cabin Crew Records	
Flight, Duty and Rest time	15 months
Initial training, conversion and differences training (including checking)	As long as the cabin crew member is employed by the operator
Recurrent training and refresher (including checking)	Until 12 months after the cabin crew member as left the employ of the operator
Dangerous Goods training as appropriate	3 years

Table 5 – Records for other operations personnel

Records for other operations personnel	
Training /qualification records of other personnel for whom an approved training programme is required by CAR OPS	Last 2 training records

Table 6 – Other records

Other records	
Quality System records	5 years
Dangerous Goods Transport Document	3 months after completion of the flight
Dangerous Goods Acceptance Checklist	3 months after completion of the flight

IEM OPS 3.1041(b) Elements of the Operations Manual subject to approval
(See CAR OPS-3.1041(b))

(1) A number of the provisions of OPS require the prior approval of the Authority. As a consequence, the related sections of the Operations Manual should be subject to special attention. In practice, there are two possible options:
    (a) The Authority approves a specific item (e.g. with a written response to an application) which is then included in the Operations Manual. In such cases, the Authority merely checks that the Operations Manual accurately reflects the content of the approval. In other words, such text has to be acceptable to the Authority; or
    (b) An operator's application for an approval includes the related, proposed, Operations Manual text in which case, the Authority's written approval encompasses approval of the text.
(2) In either case, it is not intended that a single item should be subject to two separate approvals.
(3) The following tables lists those elements of the Operations Manual which require specific approval by the Authority as part of Administration and control of the operations manuals. (A full list of every approval required by OPS in its entirety may be found in Appendix 6 of the Operations Joint Implementation Procedures (JAA Administration & Guidance Material Section 4, Part 2.)

Table 1.

Ops Manual Section (App. 1 to CAR OPS- 3.1045)	Subject	CAR OPS-3 Reference
A 2.4	Operational Control	3.195
A 5.2.6	Procedures for flight crew to operate on more than 1 type or variant	3.980
A 5.3.3	Procedures for cabin crew to operate on four airplane types	3.1030(a)
A 8.1.1	Method of determination of minimum flight attitudes	3.250(b)
A 8.1.8 Mass & balance:	(i) Standard mass values other than those specified in Subpart J	3.620(i)
	(ii) Alternative documentation and related procedures	3.625(c)
	(iii) Omission of data from documentation	App. 1, 3.625, § (a)(1)(ii)
	(iv) Special standard masses for the traffic load	App. 1, 3.605, § (b)
A 8.1.11	Tech Log	CAR-M.A.306
A 8.3.2(C)	RNAV (RNP)	3.243
A 8.4All	Weather Operations	3.440(a)(3), (b) & App. 1 to CAR OPS-3.455 Note 2
A 8.3.2(b)	MNPS	3.243
A 8.3.2(c)	RNAV (RNP)	3.243
A 8.3.2(f)	RVSM	3.241
A 8.6	Use of MEL	3.030(a)

Ops Manual Section (App. 1 to CAR OPS 3.1045)	Subject	CAR OPS-3 Reference
A 9	Dangerous Goods	CAR-92
B 1.1(b)	Max. approved passenger seating configuration	3.480(a)(6)
B 6(b)	Use of on-board mass and balance systems	App. 1 to CAR OPS-3.625, § (c)
B 9	MEL	3.030(a)
D 2.1	Cat II Training syllabus flight crew	3.450(a)(2)
	Recurrent training programme flight crew	3.965(a)(2)
	Advanced qualification, programme	3.978(a)
D 2.2	Initial training cabin crew	3.1005
	Recurrent training programme cabin crew	3.1015(b)
D 2.3(a)	Dangerous Goods	CAR-92

IEM OPS-3.1041(c) Operations Manual – Language
(See CAR OPS-3.1041(c))

(1) CAR OPS-3.1041(c) requires the Operations Manual to be prepared in the English language. However, it is recognised that there may be circumstances where approval for the use of another language, for part or all of the Operations Manual, is justifiable. The criteria on which such an approval may be based should include at least the following:
  (a) The language(s) commonly used by the operator;
  (b) The language of related documentation used, such as the AFM;
  (c) Size of the operation;
  (d) Scope of the operation i.e. domestic or international route structure;
  (e) Type of operation e.g. VFR/IFR; and
  (f) The period of time requested for the use of another language.

AMC OPS-3.1045 Operations Manual Contents
(See CAR OPS-3.1045 & Appendix 1 to CAR OPS-3.1045)

(1) Appendix 1 to CAR OPS 3.1045 prescribes in detail the operational policies, instructions, procedures and other information to be contained in the Operations Manual in order that operations personnel can satisfactorily perform their duties. When compiling an Operations Manual, an operator may take advantage of the contents of other relevant documents. Material produced by the operator for Part B of the Operations Manual may be supplemented with or substituted by applicable parts of the Helicopter Flight Manual required by CAR OPS 3.1050 or, where such a document exists, by a Helicopter Operating Manual produced by the manufacturer of the Helicopter. For Part C of the Operations Manual, material produced by the operator may be supplemented with or substituted by applicable Route Guide material produced by a specialised professional company.
(2) If an operator chooses to use material from another source in his Operations Manual, he should either copy the applicable material and include it directly in the relevant part of the Operations Manual, or the Operations Manual should contain a statement to the effect that a specific manual(s) (or parts thereof) may be used instead of the specified part(s) of the Operations Manual.
(3) If an operator chooses to make use of material from an alternative source (e.g. a Route Manual producer, a Helicopter manufacturer or a training organisation) as explained above, this does not

absolve the operator from the responsibility of verifying the applicability and suitability of this material. (See CAR OPS-3.1041(k)). Any material received from an external source should be given its status by a statement in the Operations Manual.

IEM OPS 3.1045(a) Standard Operating Procedures (SOP) and Checklists
(See CAR OPS-3.1045(a))

(1) Operators shall establish standard operating procedures (SOPs) and the use of checklists that shall be used by flight crew prior to, during and after all phases of operations, and in emergency, to ensure compliance with the operating procedures contained in the aircraft operating manual and the Helicopter flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual, are followed. The design and utilisation of checklists should observe Human Factors principles. These documents shall form a part of Operations Manual Part B, that provide guidance to flight operations personnel to ensure safe, efficient logical and predictable means of carrying out flight procedures. To achieve these objectives, SOPs shall unambiguously express;
   (a) what the task is:
   (b) when the task is going to be conducted (time and sequence);
   (c) by whom the task is going to be conducted;
   (d) how the task is going to be done(actions);
   (e) what the sequence of actions consists of; and
   (f) what type of feedback is to be provided as a result of the actions (verbal call-outs, instrument indications, switch positions and etc.)

(2) To ensure compatibility with specific operational environments and compliance by flight operations personnel, SOPs design should take into account:
   (a) the nature of the operator's environment and type of operation;
   (b) the operational philosophy, including crew coordination;
   (c) the training philosophy, including human performance training;
   (d) the operator's corporate culture, including the degree of flexibility to be built into SOPs design;
   (e) the level of experience of different user groups, such as flight crew, aircraft maintenance engineers and cabin attendants;
   (f) resource conservation policies, such as fuel conservation or wear on power plants and systems
   (g) flight deck automation, including flight deck and systems layout and supporting documents
   (h) the compatibility between SOPs and operational documentation; and (i) procedural deviation during abnormal/unforeseen situation.

(3) Flight operations personnel should be involved in the development of SOPS. Operators shall establish a formal process of feedback from flight operations personnel to ensure standardization, compliance and evaluation of reasons for non-compliance during SOPs implementation and use.

(4) Operators shall establish checklists as an integral part of SOPs. Checklist shall describe the actions relevant to specific phases of operations (engine start, taxi, take off, etc.) that flight crew must perform or verify and which relate to flight safety. Checklist should also provide a framework for verifying aircraft and systems configuration that guard against vulnerabilities in human performance.

(5) Operators shall establish crew briefing as an integral part of SOPs. Crew briefing communicate duties, standardise activities, ensure that a plan of action is shared by crew members and enhance crew situational awareness.

(6) Flight crew briefing shall be conducted for, but not limited to, the following phases of operations
(a) pre-flight;
(b) departure; and (c) arrival

(7) Pre-flight briefing shall include both flight crew and cabin crew. The briefings should focus on crew coordination as well as aircraft operational issues. They shall include, but not be limited to:
   (a) any information necessary for the flight, including unserviceable equipment or abnormalities that may affect operational or passenger safety requirements;
   (b) essential communications, and emergency and safety procedures; and (c) weather conditions

(8) Flight crew departure briefings should prioritise all relevant conditions that exist for the take -off and climb. They shall include, but not limited to:
   (a) runway in use, aircraft configuration and take-off speeds;

(b) departure procedures;
(c) departure routes;
(d) navigation and communication equipment set-up;
(e) heliport, terrain and performance restriction, including noise abatement procedures (if applicable);
(f) take-off alternates (if applicable);
(g) any item(s) included in minimum equipment list (if applicable);
(h) review of applicable emergency procedure; and
(i) applicable standard call-outs

(9) Flight crew arrival briefings should prioritise all relevant conditions that exist for the descent, approach and landing. They shall include, but not limited to:
(a) terrain restriction and minimum safe altitudes during descent;
(b) arrival routes;
(c) instrument or visual approach procedures and runway in use;
(d) operational minima, aircraft configuration, and landing speeds;
(e) navigation and communication equipment set-up;
(f) missed approach procedures;
(g) alternate heliport and fuel considerations;
(h) review of applicable emergency procedures;
(i) applicable standard call-outs; and
(j) cold temperature correction

IEM OPS-3.1045(b) Operations Manual Structure
(See CAR OPS-3.1045(b) & Appendix 1 to CAR OPS-3.1045)

(1) CAR OPS 3.1045(a) prescribes the main structure of the Operations Manual as follows:
(a) Part A – General/Basic;
(b) Part B – Helicopter Operating Matters – Type related;
(c) Part C – Route and Heliport Instructions and Information;
(d) Part D – Training.

(2) CAR OPS-3.1045(b) requires the operator to ensure that the detailed structure of the Operations Manual is acceptable to the Authority.

(3) Appendix 1 to CAR OPS-3.1045 contains a comprehensively detailed and structured list of all items to be covered in the Operations Manual. Since it is believed that a high degree of standardisation of Operations Manuals will lead to improved overall flight safety, it is strongly recommended that the structure described in Appendix 1 to CAR OPS-3.1045 should be used by operators as far as possible.

(4) Manuals which do not comply with the recommended structure may require a longer time to be accepted/approved by the Authority.

(5) To facilitate comparability and usability of Operations Manuals by new personnel, formerly employed by another operator, operators are recommended not to deviate from the numbering system used in Appendix 1 to CAR OPS-3.1045. If there are sections which, because of the nature of the operation, do not apply, it is recommended that operators maintain the numbering system described below and insert ‘Not applicable’ or ‘Intentionally blank’ where appropriate.

IEM to Appendix 1 to CAR OPS 3.1045 Operations Manual Contents

With reference to Operations Manual Section B, paragraphs 9 (Minimum Equipment List) & 12 (Helicopter Systems), operators should give consideration to using the ATA number system when allocating chapters and numbers for Helicopter systems.

IEM OPS 3.1055(a)(12) Signature or equivalent
(See CAR OPS-3.1055(a)(12))

(1) CAR OPS-3.1055 requires a signature or its equivalent. This IEM gives an example of how this can be arranged where normal signature by hand is impracticable and it is desirable to arrange the equivalent

verification by electronic means.

(2) The following conditions should be applied in order to make an electronic signature the equivalent of a conventional hand-written signature:
   (a) Electronic 'signing' should be achieved by entering a Personal Identification Number (PIN) code with appropriate security etc;
   (b) Entering the PIN code should generate a print-out of the individual's name and professional capacity on the relevant document(s) in such a way that it is evident, to anyone having a need for that information, who has signed the document;
   (c) The computer system should log information to indicate when and where each PIN code has been entered;
   (d) The use of the PIN code is, from a legal and responsibility point of view, considered to be fully equivalent to signature by hand;
   (e) The requirements for record keeping remain unchanged; and.
   (f) All personnel concerned should be made aware of the conditions associated with electronic signature and should confirm this in writing.

IEM OPS-3.1055(b) Journey log

(See CAR OPS-3.1055(b))

The 'other documentation' referred to in this paragraph might include such items as the operational flight plan, the Helicopter technical log, flight report, crew lists etc.

SECTION 1 - SUBPART Q – FLIGHT & DUTY TIME LIMITATIONS & REST REQUIREMENTS

CAR OPS-3.1090 Objective and Scope

(a) The operator shall establish a flight and duty time limitations and rest scheme (FDTL) for crew members.

(b) The operator shall ensure that for all its flights:

(1) The flight and duty time limitations and rest scheme is in accordance with both;

(i) the provisions of this Subpart; and

(ii) any additional provisions that are applied by the Authority in accordance with the provisions of this Subpart for the purpose of maintaining safety.

(2) Flights are planned to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the flight and turn-around times.

(3) Duty rosters will be prepared and published sufficiently in advance to provide the opportunity for crew members to plan adequate rest.

(c) Operators' responsibilities

(1) The operator shall nominate a home base for each crew member.

(2) Operators shall be expected to appreciate the relationship between the frequencies and pattern of flight duty periods and rest periods and give due consideration to the cumulative effects of undertaking long duty hours interspersed with minimum rest.

(3) Operators shall allocate duty patterns which avoid such undesirable practices as alternating day/night duties or the positioning of crew members so that a serious disruption of established sleep/work pattern occurs.

(4) Operators shall plan local days free of duty and notify crew members in advance.

(5) Operators shall ensure that rest periods provide sufficient time to enable crew to overcome the effects of the previous duties and to be well rested by the start of the following flight duty period.

(6) Operators shall ensure flight duty periods are planned to enable crew members to remain sufficiently free from fatigue so they can operate to a satisfactory level of safety under all circumstances.

(d) Crew members' responsibilities

(1) A crew member shall not operate a helicopter if he/she knows that he/she is suffering from or is likely to suffer from fatigue or feels unfit, to the extent that the flight may be endangered.

(2) Crew members should make optimum use of the opportunities and facilities for rest provided and plan and use their rest periods properly.

(e) Responsibilities of Authority

The Authority has established the following regulations for the purpose of managing fatigue. These regulations are based upon scientific principles and knowledge, with the aim of ensuring that flight and cabin crew members are performing at an adequate level of alertness.

(f) Variations

(1) The Authority may grant variations to the requirements in this Subpart in accordance with applicable laws and procedures and in consultation with interested parties.

(2) Each operator will have to demonstrate to the Authority, using operational experience and taking into account other relevant factors such as current scientific knowledge, that its request for a variation produces an equivalent level of safety. Such variations will be accompanied with suitable mitigation measures where appropriate.

CAR OPS-3.1095 Definitions

For the purposes of this Regulation, the following definitions shall apply:

(a) Acclimatised:

When a crew member has spent 3 consecutive local nights on the ground within a local time zone band, which is two hours wide, and is able to take uninterrupted nights sleep. The crew member will remain acclimatised thereafter until a duty period finishes at a place where local time differs by more than 2 hours from that at the point of departure.

(b) Augmented flight crew:
A flight crew which comprises more than the minimum number required for the operation of the helicopter and in which each flight crew member can leave his/her post and be replaced by another appropriately qualified flight crew member.

(c) Block time:
The total time from the moment a helicopter's rotor blades start turning until the moment the helicopter finally comes to rest at the end of the flight and the rotor blades are stopped.

(d) Break:
A period free of all duties, which counts as duty, being less than a rest period.

(e) Duty:
Any task that a crew member is required to carry out associated with the business of an AOC holder. Unless where specific rules are provided for by this Regulation, the Authority shall define whether and to what extent standby is to be accounted for as duty.

(f) Duty period:
A period which starts when a crew member is required by the operator to commence a duty and ends when the crew member is free from all duties.

(g) Flight duty period:
A flight duty period (FDP) is any time during which a person operates in an aircraft as a member of its crew. The FDP starts when the crew member is required by the operator to report for a flight or a series of flights; it finishes at the end of the last flight on which he/she is an operating crew member.

(h) Home base:
The location nominated by the operator to the crew member from where the crew member normally starts and ends a duty period or a series of duty periods and where, under normal conditions, the operator is not responsible for the accommodation of the crew member concerned.

(i) Local day:
A 24 hour period commencing at 00.00 local time.

(j) Local night:
A period of eight hours falling between 22.00 and 08.00 local time.

(k) A single day free of duty:
A single day free of duty shall include two local nights. A rest period may be included as part of the day off.

(l) Operating crew member:
A crew member who carries out his/her duties in an aircraft during a flight or during any part of a flight.

(m) Positioning:
The transferring of a non-operating crew member from place to place, at the behest of the operator, excluding travelling time. Travelling time is defined as:
time from home to a designated reporting place and vice versa,
time for local transfer from a place of rest to the commencement of duty and vice versa.

(n) Rest period:
An uninterrupted and defined period of time during which a crew member is free from all duties and airport standby.

(o) Standby:
A defined period of time during which a crew member is required by the operator to be available to receive an assignment for a flight, positioning or other duty without an intervening rest period.

(p) Window of Circadian Low (WOCL):
The Window of Circadian Low (WOCL) is the period between 02.00 and 05.59. Within a band of three time zones the WOCL refers to home base time. Beyond these three time zones the WOCL refers to home base time for the first 48 hours after departure from home base time zone, and to local time thereafter.

CAR OPS-3.1100 Applicability

The Authority has established the following regulations specifying the limitations applicable to the flight time and flight duty periods for crew members. These regulations also make provision for adequate rest periods to ensure that fatigue occurring either in a flight or successive flights, or accumulated over a period of time due to these and other tasks, does not endanger the safety of a flight.

This subpart is applicable to all Oman registered Helicopters, as well as foreign registered Helicopters operated under an Oman Air Operators Certificate. In particular;

(a) Commercial Air Transport operations, or operations operated by an air transport undertaking.

(b) Private use operations of helicopters above 5700 kg maximum take-off mass.

Note: This Subpart is not applicable to flying schools and recreational aircraft operations

CAR OPS 3.1100 Flight and Duty Limitations

(a) Cumulative duty hours

The operator shall ensure that the total duty periods to which a crew member is assigned do not exceed:

(1) 190 duty hours in any 28 consecutive days, spread as evenly as practicable throughout this period; and

(2) 60 duty hours in any seven consecutive days.

(b) Limit on total block times

The operator shall ensure that the total block times of the flights on which an individual crew member is assigned as an operating crew member does not exceed:

(1) 900 block hours in a calendar year;

(2) 100 block hours in any 28 consecutive days.

CAR- OPS 3.1101 General Principles

The prime objective of a flight and duty time limitation scheme is to ensure that crew members are adequately rested at the beginning of each flying duty period (FDP), and whilst flying be sufficiently free from fatigue so that they can operate to a satisfactory level of efficiency and safety in all normal and abnormal situations. Aircraft operators are expected to appreciate the relationship between the frequency and pattern of scheduled FDPs and rest periods and time off, and give due consideration to the cumulative effects of long working hours interspersed with minimum rest. Factors to be considered when planning duty periods include;

(a) The allocation of work patterns, which avoid such undesirable practices as;

(1) alternating day/night duties,

(2) the positioning of crews so that a serious disruption of established sleep/work patterns occur,

(3) the scheduling of rest periods between 18 and 30 hours especially after long flights crossing multiple time zones.

(b) planning days off and notifying crews well in advance,

(c) consultation between operators and crews to agree basic roster concepts, which ensure adequate rest prior to flight but, within that constraint, takes account of the commercial requirements of the operator.

CAR- OPS 3.1102 Responsibilities of operator and crew members

A crew member shall not fly, and an operator shall not require that crew member to fly, if either has reason to believe that he/she is suffering, or is likely to suffer while flying, from such fatigue as may endanger the safety of the aircraft or of its occupants. In addition:

Operator

It is the responsibility of the operator to prepare duty rosters sufficiently in advance to provide the opportunity for crews to plan adequate pre-duty rest. Operators shall establish minimum periods of notification of duty for operating crews, or where this not practicable due to the nature of the operation, shall establish in advance minimum periods of notification of days off, during which a crew member will not be required for any duties. Training of rostering staff shall include guidance on the effects of disturbing circadian rhythms and sleep deprivation. Away from base the operator shall provide for crew members both the opportunity and facilities for adequate pre-flight rest, in suitable accommodation. When an operator employs a crew member on an irregular basis, then that employer shall ensure that the crew member satisfies the provision of the approved scheme. Furthermore, operators shall satisfy themselves that crew members who undertake other employment, if allowed by the operator, still have the opportunity to enjoy adequate pre-flight rest.

(b) Crew Member

Responsibility for preventing the onset of fatigue cannot rest on the operator alone. Crew members shall ensure that they are not in breach of the operator's scheme. They shall make optimum use of the opportunities and facilities for rest provided, and plan and use their rest periods properly. Crew members are reminded that they are not entitled to act as a member of the crew of an aircraft if they know or suspect that their physical or mental condition renders them temporarily unfit so to act.

CAR OPS-3.1103 Standard provisions applicable to a scheme

(a) Subject to the maxima and minima specified in this subpart, it is incumbent on the operator to establish maximum FDPs and minimum rest periods appropriate to the nature of flight operations undertaken.

(b) An operator of a helicopter shall have a scheme for the regulation of flight and duty times of crews. The scheme shall be approved by the AUTHORITY and be included in the Operations Manual. Comprehensive guidance and instructions shall be included in the Operations Manual for the benefit of all crew members and the staff concerned with the preparation and day to day management of rostering and scheduling.

(c) Although operators must plan their schemes in accordance with the requirements, it is recognised that the standard provisions will not necessarily satisfy every type of operation. In these circumstances operators may apply for a change to the standard provisions. Consideration will only be given where an operator can show that any proposal will ensure a better or equivalent level of protection against fatigue than the basic requirements.

Note: Unless otherwise specified, Subpart FTL of annex III EASA Easy Access Rules for Air Operations with associated amending notices, shall be the basis of assessment of operator schemes.

CAR OPS 3.1105 Maximum Daily Flight Duty Period (FDP)

(a) Except for single-pilot operations and to emergency medical service operations;
  - (1) The operator shall specify reporting times that realistically reflect the time for safety related ground duties as approved by the Authority.
  - (2) The maximum basic daily FDP is 12 hours.
  - (3) These 12 hours will be reduced by 30 minutes for each sector from the third sector onwards with a maximum total reduction of two hours.
  - (4) When the FDP starts in the WOCL, the maximum stated in point (a)(2) and point (a)(3) will be reduced by 100 % of its encroachment up to a maximum of two hours. When the FDP ends in or fully encompasses the WOCL, the maximum FDP stated in point (a)(2) and point (a)(3) will be reduced by 50 % of its encroachment.

(b) Cabin Crew

For cabin crew being assigned to a flight or series of flights, the FDP of the cabin crew may be extended by the difference in reporting time between cabin crew and flight crew, as long as the difference does not exceed one hour.

(c) Operational Robustness

Planned schedules must allow for flights to be completed within the maximum permitted flight duty period. To assist in achieving the operators will take action to change a schedule or crewing arrangements at the latest where the actual operation exceeds the maximum FDP on more than 33 % of the flights in that schedule during a scheduled seasonal period.

(d) Positioning
  - (1) All the time spent on positioning is counted as duty.
  - (2) Positioning after reporting but prior to operating shall be included as part of the FDP but shall not count as a sector.

(3) A positioning sector immediately following operating sector will be taken into account for the calculation of minimum rest as defined in OPS 3.1110 points 1.1 and 1.2 below.

(e) Extended FDP (split duty)

(1) The Authority may grant approval to an operation based on an extended FDP which includes a break.

(2) Each operator will have to demonstrate to the Authority, using operational experience and taking into account other relevant factors, such as current scientific knowledge, that its request for an extended FDP produces an equivalent level of safety.

CAR OPS 3.1110 Rest

(a) Minimum rest

(1) The minimum rest which must be provided before undertaking a flight duty period starting at home base shall be at least as long as the preceding duty period or 12 hours whichever is the greater;

(2) The minimum rest which must be provided before undertaking a flight duty period starting away from home base shall be at least as long as the preceding duty period or 10 hours whichever is the greater; when on minimum rest away from home base, the operator must allow for an eight hour sleep opportunity taking due account of travelling and other physiological needs;

(3) The operator will ensure that effects on crew members of time zone differences will be compensated by additional rest, as regulated by the Authority.

(4) Notwithstanding (1) and (2), the Authority may grant reduced rest arrangements. Each operator will have to demonstrate to the Authority, using operational experience and taking into account other relevant factors, such as current scientific knowledge, that its request for reduced rest arrangements produces an equivalent level of safety.

(b) Rest periods

The operator shall ensure that the minimum rest provided as outlined above is increased periodically to a weekly rest period, being a 36-hour period including two local nights, such that there shall never be more than 168 hours between the end of one weekly rest period and the start of the next. As an exception to OPS 3.1095 point 1.9, the Authority may decide that the second of those local nights may start from 20:00 hours if the weekly rest period has a duration of at least 40 hours.

CAR OPS 3.1120 Unforeseen Circumstances in Actual Flight Operations — Commander's Discretion

(a) Taking into account the need for careful control of these instances implied underneath, during the actual flight operation, which starts at the reporting time, the limits on flight duty, duty and rest periods prescribed in this Subpart may be modified in the event of unforeseen circumstances. Any such modifications must be acceptable to the commander after consultation with all other crew members and must, in all circumstances, comply with the following:

(1) The maximum FDP referred to in OPS 3.1105 point 1.3 above may not be increased by more than two hours unless the flight crew has been augmented, in which case the maximum flight duty period may be increased by not more than three hours;

(2) If on the final sector within a FDP unforeseen circumstances occur after take-off that will result in the permitted increase being exceeded, the flight may continue to the planned destination or alternate;

(3) In the event of such circumstances, the rest period following the FDP may be reduced but never below the minimum rest defined in OPS 3.1110 (a)(2) of this Subpart;

(b) The commander shall, in case of special circumstances, which could lead to severe fatigue, and after consultation with the crew members affected, reduce the actual flight duty time and/or increase the rest time in order to eliminate any detrimental effect on flight safety;

(c) The operator shall ensure that:

(1) The commander submits a report to the operator whenever a FDP is increased by his/her discretion or when a rest period is reduced in actual operation and

(2) Where the increase of a FDP or reduction of a rest period exceeds one hour, a copy of the report, to which the operator must add his comments, is sent to the Authority no later than 28 days after the event.

CAR OPS 3.1125 Standby

(a) Heliport (airport) standby
  (1) A crew member is on heliport standby from reporting at the normal report point until the end of the notified standby period.
  (2) Airport standby will count in full for the purposes of cumulative duty hours.
  (3) Where heliport standby is utilised the assigned flight duty shall be defined by the Authority. In such a case, heliport standby shall be added to the duty period referred to in OPS 3.1110 under points (a)(1) and (2) for the purposes of calculating minimum rest.
  (4) Where the heliport standby does not lead to assignment on a flight duty, it shall be followed at least by a rest period as regulated by the Authority.
  (5) While on heliport standby the operator will provide to the crew member a quiet and comfortable place not open to the public.
(b) Other forms of standby (including standby at hotel) shall be regulated by the Authority, taking into account the following:
  (1) All activity shall be rostered and/or notified in advance.
  (2) The start and end time of the standby shall be defined and notified in advance.
  (3) The maximum length of any standby at a place other than a specified reporting point shall be determined.
  (4) Taking into account facilities available for the crew member to rest and other relevant factors, the relationship between the standby and any assigned flight duty resulting from the standby shall be defined.
  (5) The counting of standby times for the purposes of cumulative duty hours shall be defined.

CAR OPS 3.1130 Nutrition

A meal and drink opportunity must occur in order to avoid any detriment to a crew member's performance, especially when the FDP exceeds six hours.

CAR OPS 3.1135 Flight Duty, Duty and Rest Period Records

(a) The operator shall ensure that crew member's records include:
  (1) block times;
  (2) start, duration and end of each duty or flight duty periods;
  (3) rest periods and days free of all duties;

  and are maintained to ensure compliance with the requirements of this Subpart; copies of these records will be made available to the crew member upon request.
(b) If the records held by the operator under paragraph (a) do not cover all of his/her flight duty, duty and rest periods, the crew member concerned shall maintain an individual record of his/her:
  (1) block times;
  (2) start, duration and end of each duty or flight duty periods; and
  (3) rest periods and days free of all duties.
(c) A crew member shall present his/her records on request to any operator who employs his/her services before he/she commences a flight duty period.
(d) Records shall be preserved for at least 15 calendar months from the date of the last relevant entry.
(e) [Additionally, operators shall separately retain all Commander's discretion reports of extended flight duty periods, extended flight hours and reduced rest periods for at least three months after the event.]

CAR OPS 3.1140 Fatigue Management

(See Appendix 1 to OPS 3.1140)

(a) The Authority has established FRMS regulations to authorise the operator to use a Fatigue Risk Management System (FRMS) to manage fatigue with the aim of ensuring that flight and cabin crew members are performing at an adequate level of alertness.

(b) The Authority shall require that the operator, for the purposes of managing its fatigue-related safety risks, establish either:

(1) flight time, flight duty period, duty period and rest period limitations that are within the prescriptive fatigue management regulations stated in this Subpart; or

(2) a Fatigue Risk Management System (FRMS) for all operations; or

(3) a FRMS for a defined part of its operations with the remainder of its operations in compliance with the prescriptive fatigue management regulations stated in this Subpart.

(c) The operator shall maintain records of flight time, flight duty periods, duty periods, and rest periods for all its flight and cabin crew members for a period of time specified in Appendix 1 to OPS 3.1065.

(d) Where the operator complies with prescriptive fatigue management regulations in the provision of part or all of its services, the Authority;

(1) shall require that the operator familiarize those personnel involved in managing fatigue with their responsibilities and the principles of fatigue management;

(2) may approve, in exceptional circumstances, variations to these regulations on the basis of a risk assessment provided by the operator. Approved variations shall provide a level of safety equivalent to, or better than that achieved through the prescriptive fatigue management regulations.

(e) Where the operator implements an FRMS to manage fatigue-related safety risks in the provision of part or all of its services, the Authority shall:

(1) require the operator to have processes to integrate FRMS functions with its other safety management functions;

(2) require that the operator establish maximum values for flight times, flight duty periods and duty periods, and minimum values for rest periods; and

(3) approve the operator's FRMS before it may take the place of any or all of the prescriptive fatigue management regulations. An approved FRMS shall provide a level of safety equivalent to, or better than, the prescriptive fatigue management regulations of this Subpart.

Appendix 1 to OPS 3.1140 Fatigue Risk Management System Requirements

A Fatigue Risk Management System (FRMS) shall contain, as a minimum:

1. FRMS Policy and Documentation

1.1 FRMS policy

1.1.1 The operator shall define its FRMS policy, with all elements of the FRMS clearly identified.

1.1.2 The policy shall require that the scope of the FRMS be clearly defined in the operations manual.

1.1.3 The policy shall:

(a) reflect the shared responsibility of management, flight and cabin crews, and other involved personnel;

(b) clearly state the safety objectives of the FRMS;

(c) be signed by the accountable executive of the organisation;

(d) be communicated, with visible endorsement, to all the relevant areas and levels of the organisation;

(e) declare management commitment to effective safety reporting;

(f) declare management commitment to the provision of adequate resources for the FRMS;

(g) declare management commitment to continuous improvement of the FRMS;

(h) require that clear lines of accountability for management, flight and cabin crews, and all other involved personnel be identified; and

(i) require periodic reviews to ensure it remains relevant and appropriate.

1.2 FRMS documentation

The operator shall develop and keep current FRMS documentation that describes and records:

(a) FRMS policy and objectives;
(b) FRMS processes and procedures;
(c) accountabilities, responsibilities and authorities for these processes and procedures;
(d) mechanisms for ongoing involvement of management, flight and cabin crew members, and all other involved personnel;
(e) FRMS training programmes, training requirements and attendance records;
(f) scheduled and actual flight times, flight duty periods, duty periods and rest periods with significant deviations and reasons for deviations noted; and
(g) FRMS outputs including findings from collected data, recommendations, and actions taken.

2. Fatigue Risk Management Processes

2.1 Identification of hazards

The operator shall develop and maintain three fundamental and documented processes for fatigue hazard identification:

2.1.1 Predictive

The predictive process shall identify fatigue hazards taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include but are not limited to:

(a) operator or industry operational experience and data collected on similar types of operations;
(b) evidence-based scheduling practices; and
(c) bio-mathematical models. 45

2.1.2 Proactive

The proactive process shall identify fatigue hazards within current flight operations. Methods of examination may include but are not limited to:

(a) self-reporting of fatigue risks;
(b) crew fatigue surveys;
(c) relevant flight and cabin crew performance data;
(d) available safety databases and scientific studies; and
(e) analysis of planned versus actual time worked.

2.1.3 Reactive

The reactive process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimised. As a minimum, the process should be triggered by any of the following:

(a) fatigue reports;
(b) confidential reports;
(c) audit reports;
(d) incidents; and
(e) flight data analysis events.

2.2 Risk assessment

2.2.1 The operator shall develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation.

2.2.2 The risk assessment procedures shall review identified hazards and link them to:

(a) operational processes;
(b) their probability;

(c) possible consequences; and
(d) the effectiveness of existing safety barriers and controls.

2.3 Risk mitigation

The operator shall develop and implement risk mitigation procedures that:
(a) select the appropriate mitigation strategies;
(b) implement the mitigation strategies; and
(c) monitor the strategies' implementation and effectiveness.

3. FRMS Safety Assurance Processes

The operator shall develop and maintain FRMS safety assurance processes to:

(a) provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to:
   (1) hazard reporting and investigations;
   (2) audits and surveys; and
   (3) reviews and fatigue studies;
(b) provide a formal process for the management of change which shall include but is not limited to:
   (1) identification of changes in the operational environment that may affect FRMS;
   (2) identification of changes within the organisation that may affect FRMS; and
   (3) consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and
(c) provide for the continuous improvement of the FRMS. This shall include but is not limited to:
   (1) the elimination and/or modification of risk controls that have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;
   (2) routine evaluations of facilities, equipment, documentation and procedures; and
   (3) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

4. FRMS Promotion Processes

FRMS promotion processes support the ongoing development of the FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the operator as part of its FRMS:

(a) training programmes to ensure competency commensurate with the roles and responsibilities of management, flight and cabin crew, and all other involved personnel under the planned FRMS; and
(b) an effective FRMS communication plan that:
   (1) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and
   (2) describes communication channels used to gather and disseminate FRMS-related information.

CAR OPS-3.1085 General

(a) Each operator shall establish a flight and duty time limitations (FDTL) and rest scheme for crewmembers.
(b) Each operator shall ensure that:
   (1) The flight and duty time limitations and rest scheme is in accordance with the provisions of this Subpart;
   (2) Flights are planned to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the flight and the turnaround times, and the nature of operation; and
   (3) Duty rosters are prepared and published in advance and in accordance with the Authority Approved Operator's Operations Manual.

(c) A crew member shall not operate on an aircraft if he knows or suspects that he is suffering from or is likely to suffer from fatigue, or feels unfit to the extent that the flight may be endangered.
(d) Each operator shall nominate a home base for each crew member.
(e) Each operator shall nominate months or roster periods as the method for determining all flight and duty time limitations in this subpart, but in no case, mix the two methods.

CAR OPS-3.1090 Commercial Air Transport Operations

(a) Commercial Air Transport (CAT) operations shall be subject to the requirements of Subpart- Q
(b) By way of derogation from paragraph (a), air taxi, emergency medical service and single pilot CAT operations by Helicopters shall be subject to the requirements specified in the Sultanate of Oman Civil Aviation Regulations and in CAR OPS-3, Subpart Q.
(c) By way of derogation from paragraph (a), CAT operations with helicopters and CAT operations with sailplanes shall comply with the requirements specified in the Sultanate of Oman Civil Aviation Law in which the operator has its principal place of business.
(d) Non-commercial operations, including non-commercial specialised operations, with complex motor-powered Helicopters and helicopters, as well as commercial specialised operations with Helicopters, helicopters and sailplanes shall comply as regards flight time limitations, with the requirements specified in the Sultanate of Oman Civil Aviation Regulations in which the operator has its principal place of business, or, where the operator has no principal place of business, the place where the operator is established or resides.
(e) With regard to flight time limitation:
   (1) the CAA shall issue the applicable certification specifications to ensure compliance with essential requirements and, as appropriate, the related implementing rules. Initially, the implementing rules shall include all substantive provisions of CAR OPS-3, Subpart Q, taking into account the latest scientific and technical evidence;
   (2) CAA may approve individual flight time specification schemes which deviate from the certification specifications referred to in subparagraph (1), above;
   (3) the CAA shall, within one month, assess the individual scheme on the basis of a scientific and medical evaluation. Thereafter the CAA may grant the approval, unless the CAA has discussed the scheme with that operator and proposed changes thereto. Should the operator agree with these changes, it may grant the approval accordingly;
   (4) in the event of unforeseen urgent operational circumstances or operational needs of limited duration and non-repetitive nature, derogations to certification specifications may apply provisionally until the CAA expresses its opinion.
   (5) **Determination of disruptive schedules.**
      i. For the purpose of flight time limitations, the CAA shall determine, in accordance with the definitions of "early type" and "late type" of disruptive schedules in sub-regulation CAR OPS-3.1100 of Subpart Q which of those two types of disruptive schedules shall apply to all CAT operators under its oversight.
   (6) **Approval of individual flight time specification schemes.**
      i. The CAA shall approve flight time specification schemes proposed by CAT operators if the operator demonstrates compliance with Sultanate of Oman Civil Aviation Law and Subpart Q to this Regulation.
      ii. Whenever a flight time specification scheme proposed by an operator deviates from the applicable certification specifications issued by the CAA.
      iii. Whenever a flight time specification scheme proposed by an operator derogates from applicable regulation, the CAA shall apply the procedure that will provide an equivalent level of protection to that attained by the regulations, without discrimination on grounds of operators, grant an approval derogating from those regulations.
      iv. Approved deviations or derogations shall be subject, after being applied, to an assessment to determine whether such deviations or derogations should be confirmed or amended. The CAA shall conduct an independent assessment based on information provided by the operator. The assessment shall be proportionate, transparent and based on scientific principles and knowledge.

(7) **Approval of individual flight time specification schemes.**

i. Further guidance on fatigue risk management processes, appropriate fatigue management, the underlying scientific principles and operational knowledge may be found in ICAO Doc 9966 (Manual for the Oversight of Fatigue Management Approaches).

CAR OPS-3.1092 General Principles

The prime objective of a flight and duty time limitation scheme shall ensure that crew members are adequately rested at the beginning of each flying duty period (FDP), and whilst flying are sufficiently free from fatigue so that they can operate to a satisfactory level of efficiency and safety in all normal and abnormal situations.

Aircraft operators are expected to appreciate the relationship between the frequency and pattern of scheduled FDPs and rest periods and time off, and give due consideration to the cumulative effects of long working hours interspersed with minimum rest. Factors to be considered when planning duty periods shall include;

(a) The allocation of work patterns, which avoid such undesirable practices as;

(1) alternating day/night duties,

(2) the positioning of crews so that a serious disruption of established sleep/work patterns occur,

(3) the scheduling of rest periods between eighteen (18) and thirty (30) hours especially after long flights crossing multiple time zones.

(b) planning days off and notifying crews well in advance,

(c) Internal consultation to agree basic roster concepts, which ensure adequate rest prior to flight but, within that constraint.

CAR OPS-3.1100 Definitions

(See GM-1 to GM-7 CAR OPS-3.1100)

For the purpose of this Subpart. the following definitions shall apply:

Terminology	*Description*
Acclimatised:	When a crew member has spent 3 consecutive local nights on the ground within a local time zone band, which is two hours wide, and is able to take uninterrupted night's sleep The crew member will remain acclimatized thereafter until a duty period finishes at a place where local time differs by more than 2 hours from that at the point of departure.
Accommodation: (Also see - Suitable Accommodation)	For the purpose of standby and split duty, a quiet and comfortable place not open to the public with the ability to control light and temperature, equipped with adequate furniture that provides a crew member with the possibility to sleep, with enough capacity to accommodate all crew members present at the same time and with access to food and drink.
Actual flight operation:	Actual flight operation starts at the reporting time and ends when the crew goes off duty.
Adequate facilities:	A quiet and comfortable place not open to the public.
Augmented flight crew:	A flight crew that comprises more than the minimum number required to operate the Helicopter and in which each flight crew member can leave his or her assigned post and be replaced by another appropriately qualified flight crew member for the purpose of in-flight rest.
Block time:	The time between the time an aircraft first moves from its parking place for the purpose of taking off until it comes to rest on the designated parking position or until all engines are stopped.
Break:	A period of time within a flight duty period, shorter than a rest period, counting as duty and during which a crew member is free of all tasks.
Cabin Crewmember:	An appropriately qualified crew member, other than a flight crew member, who is assigned by an operator to perform duty related to safety of flight and passengers during operations of aircraft.
Commander:	The pilot in command: The pilot designated by the operator being in command and charged with the safe conduct of a flight.
Contactable:	A short period of time during the day, other than a day off, during which the operator requires a crew member to be at an agreed location for the purpose of giving notification of a duty period, which will commence not less than 10 hours ahead. The contactable period shall be nominated by the operator and acceptable to the Authority
Crew member:	A person assigned by an operator to perform duty on an aircraft.
Days Off:	Periods of relaxation free from all duties. A single day off shall include two local nights (minimum of 34 hours period). Consecutive days off shall include a further local night for each additional consecutive day off. A rest period may be included as part of a day off.
Delayed reporting	Means the postponement of a scheduled FDP by the operator before a crew member has left the place of rest;
Dispatch crew:	A fully qualified and current flight/cabin crew member authorized to carry out pre-flight duties as defined by an operator.

Duty:	Any task that crew member is required by the Operator to perform, including, for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue. Administrative work has to be understood as any task that a crew member is required to carry out associated with the business of an AOC holder, which is accepted or approved by AUTHORITY under the regulatory framework.
Duty Period:	A period which starts when flight crew or cabin crew members are required by an Operator to report for or to commence a duty and ends when that person is free from all duties, including post-flight duty. For simulators, the duty period starts at the beginning of the Pre-briefing and ends at the end of the De-briefing.
Early start:	Any duty that is commenced in the period 0500-0659 hours local time.
Fatigue:	A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety-related duties.
Flight Crew member:	A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period such as Pilots and Flight Engineers.
Flight Duty Period (FDP):	A period which commences when a crew member is required to report for duty that includes a flight or a series of flights and which finishes when the Helicopter finally comes to rest at the end of the last flight on which he/she is a crew member.
Flight time/ Block Hours — Helicopters:	The total time from the moment a Helicopter first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight. *"Flight time" as here defined is synonymous with the term "block to block" time or "chock to chock" time in general usage which is measured from the time a Helicopter first moves for the purpose of taking off until it finally stops at the end of the flight.*
FTL variation:	Any operation conducted outside the limits of the prescriptive FTL regulation, and under a specific approval by the Authority on the basis of a risk assessment provided by the operator and assessed by Authority to provide a level of safety equivalent to, or better than, that achieved through the prescriptive fatigue management regulations.
Home base:	Means the location, assigned by the operator to the crew member, from where the crew member normally starts and ends a duty period or a series of duty periods and where, under normal circumstances, the operator is not responsible for the accommodation of the crew member concerned.
In-Flight Rest facility:	Means a comfortable, fully reclining seat, separated and screened from the passengers and flight deck, equipped with a call device, sleep restraint, portable oxygen, and not subject to distraction from noise generated in the cabin.
Late finish:	A duty is a Late Finish when the duty finishes in the period 0100 to 0159 hours local time
Local Night:	A period of 8 hours falling between 2200 hours and 0800 hours' local time.
Operating crew member:	A crew member carrying out his/her duties in an aircraft during a flight that is required for the safety of the Helicopter and its occupants, according to their licenses or authorisation.

Operational delay:	Delays that are beyond the control of the operator such as those that would be caused by weather, aircraft equipment malfunction, and air traffic control delays. It would not include late arriving passengers, late food service, late fuel trucks, delays in loading baggage-freight-mail, or similar events.
Positioning:	The practice of transferring crews from place to place as passengers in surface or air transport at the behest of the Operator.
Reporting Time:	The time at which a crew member is required by an operator to report for any duty.
Reserve:	Means a period of time during which a crew member is required by the operator to be available to receive an assignment for an FDP, positioning or other duty notified at least 10 hours in advance.
Rest Period:	A continuous and defined subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties.
Rostered/Planned duty:	A duty period, or series of duty periods, with stipulated start and finish times, notified by the operator to crews in advance.
Rostering Period:	A number of consecutive weeks, usually 4, but defined by the operator.
Scheduled Duty:	The allocation of a specific flight or flights or other duties to a crew member within the pre-notified rostered/planned series of duty periods.
Sector:	Segment of a Flight Duty Period (FDP) between an aircraft first moving for the purpose of taking off until it comes to rest after landing on the designated parking position
Split Duty:	A flying duty period, which consists of two or more sectors, separated by less than a minimum rest period.
Standby Duty:	A period during which an Operator places constraints on a crew member who would otherwise be off duty. However, it shall not include any time during which an Operator requires a crew member to be contactable for the purpose of giving notification of a duty, which is due to start 10 hours or more ahead.
Suitable Accommodation:	A well-furnished bedroom, with single occupancy if required by the crew member, which is subject to minimum noise, is well ventilated and should have the facility to control the levels of light and temperature.
Time difference:	The number of hours separating local standard time at two locations (disregarding 'daylight saving time').
Travelling:	All time spent by a crew member transiting between the place of rest, and the place of reporting for duty.
Unforeseen operational circumstance:	An unplanned event, such as un-forecast weather, equipment malfunction, or air traffic delay that is beyond the control of the operator.
Week:	A period of seven consecutive days starting at any set time and on set day as specified and stated by the Operator.
Window of Circadian Low ('WOCL'):	Means the period between 02:00 and 05:59 hours in the time zone to which a crew member is acclimatised

CAR- OPS 3.1101 General Principles

The prime objective of a flight and duty time limitation scheme is to ensure that crew members are adequately rested at the beginning of each flying duty period (FDP), and whilst flying be sufficiently free from fatigue so that they can operate to a satisfactory level of efficiency and safety in all normal and abnormal situations. Aircraft operators are expected to appreciate the relationship between the frequency and pattern of scheduled FDPs and rest periods and time off, and give due consideration to the cumulative effects of long working hours interspersed with minimum rest. Factors to be considered when planning duty periods include;

(a) The allocation of work patterns, which avoid such undesirable practices as;
  (1) alternating day/night duties,
  (2) the positioning of crews so that a serious disruption of established sleep/work patterns occur,
  (3) the scheduling of rest periods between 18 and 30 hours especially after long flights crossing multiple time zones.

(b) planning days off and notifying crews well in advance,

(c) consultation between operators and crews to agree basic roster concepts, which ensure adequate rest prior to flight but, within that constraint, takes account of the commercial requirements of the operator.

CAR OPS-3.1105 Operator responsibilities

(See AMC-1 & 2 CAR OPS-3.1105 paras (a) & (j), GM-1 CAR OPS-3.1105(j))

An operator shall:

(a) Ensure training of rostering staff shall include guidance on the effects of disturbing circadian rhythms and sleep deprivation.

(b) Publish duty rosters sufficiently in advance to provide the opportunity for crew members to plan adequate rest;

(c) Ensure that flight duty periods are planned in a way that enables crew members to remain sufficiently free from fatigue so that they can operate to a satisfactory level of safety under all circumstances;

(d) Specify reporting times that allow sufficient time for ground duties;

(e) Take into account the relationship between the frequency and pattern of flight duty periods and rest periods and give consideration to the cumulative effects of undertaking long duty hours combined with minimum rest periods;

(f) Allocate duty patterns which avoid practices that cause a serious disruption of an established sleep/work pattern, such as alternating day/night duties;

(g) Comply with the provisions concerning disruptive schedules**;**

(h) Provide rest periods of sufficient time to enable crew members to overcome the effects of the previous duties and to be rested by the start of the following flight duty period;

(i) Away from base the operator shall provide for crew members both the opportunity and facilities for adequate pre-flight rest, in suitable accommodation.

(j) Plan recurrent extended recovery rest periods and notify crew members sufficiently in advance;

(k) Plan flight duties in order to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the sector and turnaround times;

(l) Change a schedule and/ or crew arrangements if the actual operation exceeds the maximum flight duty period on more than 33 % of the flight duties in that schedule during a scheduled seasonal period.

CAR OPS-3.1110 Crew member responsibilities

(See CAR OPS-3.085)

A crew member shall not fly, and an operator shall not require that crew member to fly, if either has reason to believe that he/she is suffering, or is likely to suffer while flying, from such fatigue as may endanger the safety of the aircraft or of its occupants. In addition:

(a) Comply with point CAR OPS-3.085 paragraphs (a), (b), (c), (d) and

(b) They have the equal responsibility for preventing the onset of fatigue, which cannot rest on the operator alone. Crew members shall ensure that they are not in breach of the operator’s scheme.

(c) Shall make optimum use of the opportunities and facilities for rest provided and plan and use their rest periods properly.

(d) Crew members are reminded that they are not entitled to act as an operating crewmember of an aircraft if they know or suspect that their physical or mental condition renders them temporarily unfit so to act.

CAR OPS-3.1115 Fatigue risk management system (FRMS)

(See AMC's 1, 2, 3, 4, 5, 6, 7,8, 9 & 10 and GM's 1 & 2 for CAR OPS-3.1115)

(a) The Authority shall approve the operators FRMS before it may take place of any or all of the prescriptive fatigue management regulations. An approved FRMS shall provide a level of safety equivalent to, or better than, the prescriptive fatigue management regulations.

(b) When FRMS is required by this Subpart or for an applicable certification specification, the operator shall establish, implement and maintain a FRMS as an integral part of its management system. The FRMS shall be described in the operations manual.

  (1) that no crew member allows their task achievement/decision making to deteriorate to the extent that safety is endangered because of the effects of fatigue, taking into account, inter alia, fatigue accumulation, sleep deprivation, number of sectors flown, night duties or time zone changes;

  (2) that a crew member does not perform allocated duties on board an aircraft when unfit due to fatigue and

  (3) that prevention of fatigue is managed through a rostering system that addresses flight times, flight duty periods, duty and adapted rest periods. Limitations established within the rostering system must take account of all relevant factors contributing to fatigue such as, in particular, number of sectors flown, time-zone crossing, sleep deprivation, disruption of circadian cycles, night hours, positioning, cumulative duty time, for given periods of time, sharing of allocated tasks between crew members, and also the provision of augmented crews.

(c) The FRMS established, implemented and maintained shall provide for continuous improvement to the overall performance of the FRMS and shall include:

  (1) a description of the philosophy and principles of the operator with regard to FRMS, referred to as the FRMS policy;

  (2) documentation of the FRMS processes, including a process for making personnel aware of their responsibilities and the procedure for amending this documentation;

  (3) scientific principles and knowledge;

  (4) a hazard identification and risk assessment process that allows managing the operational risk(s) of the operator arising from crew member fatigue on a continuous basis;

  (5) a risk mitigation process that provides for remedial actions to be implemented promptly, which are necessary to effectively mitigate the operator's risk(s) arising from crew member fatigue and for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions;

  (6) FRMS safety assurance processes;

  (7) FRMS promotion processes.

(d) The FRMS shall correspond to the flight time specification scheme, the size of the operator and the nature and complexity of its activities, taking into account the hazards and associated risks inherent in those activities and the applicable flight time specification scheme.

(e) The operator shall take mitigating actions when the FRMS safety assurance process shows that the required safety performance is not maintained.

(f) Although operators must plan their schemes in accordance with the requirements, it is recognised that the standard provisions will not necessarily satisfy every type of operation. In these circumstances operators may apply for FTL Variation to the standard provisions at least thirty (30) days, or as otherwise agreed, before the date of the intended operation. Consideration will only be given where an operator can show that any proposal will ensure a better or equivalent level of protection against fatigue than the basic requirements.

(g) *Approval of FTL Variation by the CAA:* The Authority may grant variations to the FTL requirements contained in this Subpart provided the operator demonstrates to the Authority, on the basis of a risk assessment, that an equivalent level of safety is ensured. The Authority may impose additional requirements prior to the approval of the variations to the prescriptive scheme. A validation flight may be conducted by the Authority before or after the issuance of each route FTL variation scheme.

Note: Any existing approved Flight Time Variation to the prescriptive scheme shall remain in force until the time a re-assessment is required. Such re-assessment shall be conducted considering the AMC-8 & 9 OPS-3.115(f).

CAR OPS-3.1120 Prescriptive Fatigue Management Requirements

The operator's FRMS shall establish a process to ensure that an FRMS provides a level of safety equivalent to, or better than, the prescriptive fatigue management regulations. As part of this process, the Authority shall:

(a) require that the operator establish maximum values for flight times and/or flight duty periods(s) and duty period(s), and minimum values for rest periods. These values shall be based upon scientific principles and knowledge, subject to safety assurance processes, and acceptable to the Authority;

(b) mandate a decrease in maximum values and an increase in minimum values in the event that the operator's data indicates these values are too high or too low, respectively; and

(c) approve any increase in maximum values or decrease in minimum values only after evaluating the operator's justification for such changes, based on accumulated FRMS experience and fatigue-related data.

Note: Safety assurance processes are described in Annex 6, Appendix 7.

CAR OPS-3.1125 Implementation of an FRMS

Where the operator implements an FRMS to manage fatigue-related safety risks, the operator shall, as a minimum:

(a) incorporate scientific principles and knowledge within the FRMS;

(b) identify fatigue-related safety hazards and the resulting risks on an ongoing basis;

(c) ensure that remedial actions, necessary to effectively mitigate the risks associated with the hazards, are implemented promptly;

(d) provide for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions; and

(e) provide for continuous improvement to the overall performance of the FRMS.

Note 1: As of 7 November 2019, detailed requirements for an FRMS are in Annex 6, Appendix 7.

Note 2: As of 7 November 2019, provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19.

SECTION 1 – COMMERCIAL AIR TRANSPORT OPERATORS

CAR OPS-3.1150 Home Base

(See GM-1 CAR OPS-3.1150)

An operator shall assign a home base to each crew member as per the following:

(a) The home base is a single airport location assigned with a high degree of permanence.

(b) In the case of a change of home base, the first recurrent extended recovery rest period prior to starting duty at the new home base is increased to seventy (72) hours, including three (3) local nights. Travelling time between the former home base and the new home base is positioning.

CAR OPS-3.1155 Limits for Flying Time and Duty Period

(a) No person shall act as an operating crew member of the flight crew of an aircraft if at the beginning of the flight the aggregate of all his previous flight times;

(1) during the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred (100) block hours: or

(2) during the period of twelve (12) months expiring at the end of the previous month exceeds nine hundred (900) block hours:

(b) The maximum cumulative duty hours for Flight crew of a Helicopter shall not exceed;

(1) Fifty-five (55) hours in any seven (7) consecutive days, but may be increased to sixty (60) hours, when rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays.

(2) Ninety-five (95) hours in any fourteen (14) consecutive days; and

(3) One hundred and ninety (190) hours in any twenty-eight (28) consecutive days.

CAR OPS-3.1160 Duty cycle and days off

A Crew member:

(a) Shall not be on duty more than seven (7) consecutive days between days off, but may be positioned, and may operate only, under unforeseen circumstances, to the usual operating base on the eighth day, provided they are then allocated a minimum of two (2) consecutive days off, and

(b) Shall have two (2) consecutive days off in any consecutive fourteen (14) days following the previous two (2) consecutive days off, and

(c) Shall have a minimum of seven (7) days off in any consecutive twenty-eight (28) days, and

(d) Shall have an average of at least eight (8) days off in each consecutive twenty-eight (28) day period, averaged over three (3) such periods.

CAR OPS-3.1162 Standard Provisions Applicable to a FDP/FTL Scheme

(See AMC 1 &2 & GM TO CAR OPS-3.1162(d))

(a) Subject to the maxima and minima specified in this subpart, it is incumbent on the operator to establish maximum FDPs and minimum rest periods appropriate to the nature of flight operations undertaken.

(b) An operator of an aircraft shall have a scheme for the regulation of flight and duty times of crews. The scheme shall be approved by the Authority and be included in the Operations Manual for the benefit of all crew members and the staff concerned with the preparation and day to day management of rostering and scheduling.

(c) Although operators must plan their schemes in accordance with the requirements, it is recognised that the standard provisions will not necessarily satisfy every type of operation.

In these circumstances operators may apply for FTL Variation to the standard provisions at least thirty (30) days, or as otherwise agreed, before the date of the intended operation.
Consideration will only be given where an operator can show that any proposal will ensure a better or equivalent level of protection that achieved through the prescriptive fatigue management regulations.

(d) Approval of FTL Variation by CAA:

(1) The CAA may grant variations to the FTL requirements contained in this Subpart provided the operator demonstrates to the CAA, on the basis of a risk assessment, that an equivalent level of safety is ensured.

(2) The CAA may impose additional requirements prior to the approval of the variations to the prescriptive scheme.

(3) A validation flight may be conducted by the CAA before or after the issuance of each route FTL variation scheme.

CAR OPS-3.1165 Flight Time Limitations (FTL) and Flight Duty Period (FDP) – All Operations

Maximum FDP - Helicopters

Local time of Start	SINGLE PILOT		TWO PILOTS	
	Max. Length of Flying Duty Period (Hours)	Maximum Flying Time (Hours)	Max. Length of Flying Duty Period (Hours)	Maximum Flying Time (Hours)
0600-0659	9	6	10	7
0700-0759	10	7	11	8
0800-1359	10	7	12	8
1400-2159	9	6	10	7
2200-0559	8	5	9	6

The maximum number of flying hours which a pilot may be permitted to undertake are:

(a) Duty periods and flying duty periods, plus subsequent post-flight duties Single Day Table above.

(b) Any 3 consecutive days -18 hours

(c) Any 7 consecutive days -30 hours

(d) Any 3 consecutive 28 day periods -240 hours (Also refers CAR OPS 3.1155)

(See AMC-1 to 6 and GM-1 to 9 for CAR OPS-3.1165)

(a) ***Late finishes/Early starts/Night Duties:*** The conditions set in this paragraph only apply when a crew member is acclimatised. Sleep deprivation, leading to the onset of fatigue, can arise if an Operating Crew Member is required to report early for duty on a number of consecutive days. Therefore:

(1) Not more than three (3) consecutive duties that occur in any part of the period 0100 to 0659 hours' local time can be undertaken, nor will there be more than four (4) such duties in any seven (7) consecutive days.

(2) Any run of consecutive duties (Late Finishes or Nights or Early Starts) can only be broken by a period of not less than thirty-four (34) consecutive hours free from such duties. These thirty-four (34) consecutive hours may include a duty that is not an Early, Late or Night duty.

(3) Operating Crew Members who are employed on a regular early morning duty for a maximum of five (5) consecutive duties will work to the following:

(i) The minimum rest period before the start of such a series of duties will be twenty-four (24) hours.

(ii) The duty will not exceed nine (9) hours, irrespective of the sectors flown.

(iii) At the finish of such a series of duties, Operating Crew Members will have a minimum of sixty-three (63) hours free of all duties.

(4) Any duties scheduled to be conducted within any part of the period 0200 to 0459 hours local time, for a minimum of two (2) and a maximum of three (3) consecutive nights, then Operating Crew Members shall finish the duty preceding this series of duties by 2100 hours local time before covering the block of consecutive night duties. (This allows Operating Crew Members a rest period during a local night).

(5) ***Alternative:*** Operators may replace the above paragraph (a) with one of the following choices:

A. Either Options A and B **OR** Options B and C.

i. The operator may roster Operating Crew Members for either two (2) or three (3) consecutive nights, but must ensure that the duty preceding this series of duties finishes by 2359 hours local time (2 nights) or 2100 hours local time (3 nights) as appropriate. ii. If it is preferred to retain the present contents, then attention must be paid to the notes attached to the Options listed (below).

ii. These notes list the actions to be followed in the event that duty is inadvertently extended beyond the cut-off times (i.e. 2100 or 2359 hours).

<u>Option A – 3 consecutive night duties</u>

Should any duties be scheduled to be carried out within any part of the period 0200 and 0459-hours local time, for three (3) consecutive nights, then crew members will finish the duty preceding this series of duties by 2100 hours local time before commencing the block of consecutive night duties, such that the Operating Crew Members can take a rest period during a local night. If the duty immediately prior to the three (3) consecutive night duties extends beyond 2100 hours local time and the individual Operating Crew Member is willing to continue with the planned roster, [i.e. three (3) consecutive night duties] then provided that duty preceding this series of duties finishes no later than 2359 hours local time, the schedule may continue.

Note 1: *Under this Option, if the operating Crew member chooses not to continue the planned roster (after finishing duty between 2100 and 2359 hours local time) then only the planned first and second night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.*

Note 2: *Under this Option, if the duty finishes after 2359 hours local time, then only the first of the three (3) consecutive night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.*

<u>Option B – 2 consecutive night duties</u>

Should any duties be scheduled to be carried out within any part of the period 0200 and 0459 hours local time, for two (2) consecutive nights, then Operating Crew Members will finish the duty preceding this series of duties by 2359 hours local time before commencing the block of two (2) consecutive night duties, such that the crew members can avail a rest period during a local night.

Note: Under this Option in the event of 2359 hours being exceeded, then only the first of the two (2) planned consecutive night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.

<u>Option C - 3 consecutive night duties</u>

Should any duties be scheduled to be carried out within any part of the period 0200 and 0459 hours local time, for three (3) consecutive nights, then crew members will finish the duty preceding this series of duties by 2100 hours local time before commencing the block of consecutive night duties, such that the crew members can avail a rest period during a local night.

Note 1: *Under this Option in the event of 2100 hours being exceeded, then only the first of the three (3) planned consecutive night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.*

Note 2: *In all cases the limits in paragraphs 2.1(i) and 2.1(ii) must not be exceeded [i.e. maximum of three (3) consecutive nights and four (4) in seven (7) consecutive days].*

2.1. However, Operating Crew Members who are employed on a regular night duty for a maximum of five (5) consecutive nights will work to the following:

i. The minimum rest period before the start of such a series of duties will be twenty- four (24) hours.
ii. The duty will not exceed eight (8) hours, irrespective of the sectors flown.
iii. At the finish of such a series of duties crew members will have a minimum of fifty- four (54) hours free of all duties.

2.1.1. Options for night operations

If an operator elects to roster four (4) or five (5) consecutive night duties, then the criteria laid down in paragraph 2.1 must be complied with and must form part of the approved FTL scheme. Operators are reminded that the normal days off requirements must be met (i.e. the fifty-four (54) hours off between two blocks of five (5) nights is only one (1) proper day off).

However, if operators find that this part of the Scheme is too restrictive then one of the following options may be employed but, if used, must be fully complied with:

i. When crew are employed on duty for a total of twenty (20) hours or less during five (5) consecutive night duties, (i.e. maximum duty each night is four (4) hours) the fifty-four (54) hours free from all duties will meet the "Days Off" requirements for each twenty-eight (28) consecutive day period. Any positioning flights must be completed within the twenty (20) hours' duty.

ii. When crew are employed on duty for a total of more than twenty (20) hours but not more than forty (40) hours during five (5) consecutive night duties, the first fifty-four(54) hours (between week 1 and week 2) may be counted as two (2) "Days Off". For the twenty-eight (28) consecutive day period that starts on the first night of the first duty, crew must be given a minimum of a further five (5) "Days Off" (average of a further six (6) days). Any positioning flights must be completed within the forty (40) hours' duty.

iii. When crew are employed on duty which requires full use of forty (40) hours' duty during five (5) consecutive night duties plus a maximum of three (3) hours positioning (pre- and post-total) then:

A. Allowable flying hours (month and year) will be reduced to the following:

1) a maximum of seventy-five (75) hours in any twenty-eight (28) consecutive days with a maximum of sixty (60) hours in twenty-eight (28) consecutive days averaged over three (3) twenty-eight (28) day periods, and;
2) 600 hours in any twelve (12) consecutive months.
3) a minimum of nine (9) "Days Off" in any twenty-eight (28) consecutive days will be granted;
4) any increase in duty over forty (40) hours during the block of five (5) consecutive night duties is to be added to the subsequent fifty-four (54) hours rest period which may not be reduced.

2.1.2. General rules

(a) To be applied when an operator utilises (i), (ii) or (iii) of paragraph 2.1.1 above

i. The exercise of "Commander's Discretion" is limited to one (1) hour per night with a total of two (2) hours allowed during any five (5) consecutive night cycle. Any duty worked in excess of forty (40) hours by use of "Commander's Discretion" must also be added to the subsequent fifty-four (54) hours rest which may not be reduced.

ii. The absolute maximum duty permitted during a block of five (5) consecutive night duties is forty-five (45) hours (40 hours, plus 3 hours positioning, plus 2 hours "Commander's Discretion", as per paragraphs 2.1.1 (iii) and 2.1.2 (i) above).

iii. Crew cannot be rostered for more than eight (8) hours per night, except when working to paragraph 2.1.1 (iii) above.

iv. Combination of split duties and extension of FDP by in-flight rest are not permitted.

v. "Commander's Discretion" to reduce rest is not permitted.

Note: *For five (5) consecutive earlies, the same rule as in 2.1.2 (i) above applies (i.e. maximum 1 hour discretion per day and a total of 2 hours in the 5 day cycle).*

(b) **Air Taxi/Sole Use Charter - Interrupted Rest**

(1) If, prior to the start of an FDP, a crew member's rest period is interrupted for operational reasons between 2300 and 0700 hours local time, the following shall apply:

(i) If the disturbance happens earlier than one (1) hour before the planned departure from the crew member's place of rest, the time elapsed between that disturbance and the departure time from the place of rest minus one (1) hour, shall count as part of the subsequent FDP.

Note: *The phrase "operational reasons" applies to such actions as contacting the customer, checking weather, liaison with ATC or any action pertaining to the planned flight. It is anticipated that operators with a twenty-four (24) hour support organisation will provide these services for crew, leaving their crew members undisturbed.*

(c) ***Split duty*** (Also see AMC-6 & 7 for CAR OPS-3.1165)

(1) When an FDP consists of two or more sectors/duties, of which one can be a positioning journey counted as a sector, but separated by less than a minimum rest period, then the FDP may be extended beyond that permitted by the amounts indicated below:

Consecutive Hours Rest	Maximum Extension of FDP
Less than 3 hours	NIL
3 to 10 hours	A period equal to half of the consecutive hours taken.

(2) The rest period shall not include the time allowed for immediate post-flight duties and pre-flight duties, a minimum total of thirty (30) minutes. The actual time allowed for immediate post-flight duties and pre-flight duties shall be specified by the operator in its Operations Manual (OM). When the rest period is six (6) hours or less it will suffice if a quiet and comfortable place, not open to the public, if provided with a comfortable reclining seat (reclining more than forty [40] degrees and provide foot and leg rest), or bunk are available. If the rest period is more than six (6) consecutive hours, then suitable accommodation must be provided.

(3) When rest is taken in the aircraft on the ground,

(i) In-flight rest facilities acceptable standards are applicable, and

(ii) Minimum standards of noise, temperature, light and ventilation are to be specified in the Operations Manual. Such arrangements will only be permitted when the Operating Crew have adequate control of the temperature and ventilation within the aircraft, and passengers are not on board.

(d) ***Rest period*** (Also see GM-6, 7, 8, & 9 to CAR OPS-3.1165(d))

(1) The aircraft operator must notify all crew members in good time of a flying duty period so that sufficient and uninterrupted pre-flight rest can be obtained. When away from base the operator must provide the crew with the opportunity and the facilities for adequate pre-flight rest. The operator must provide suitable accommodation. When flights are carried out at such short notice that it is impracticable for an operator to arrange suitable accommodation, then this responsibility devolves to the aircraft commander.

(2) The minimum rest period which must be provided before undertaking a flying duty period shall be:

(i) at least as long as the preceding duty period; or

(ii) twelve (12) hours;

(iii) whichever is the greater.

(3) When away from base, in the case when the rest period earned by a crew member is twelve (12) hours, and suitable accommodation is provided by the operator, then that rest period may be reduced by one (1) hour. In such circumstances, if the travelling time between the heliport and the accommodation is more than thirty (30) minutes each way then the rest period must be increased by the amount the total time spent travelling exceeding one hour. The room allocated to the crew member must be available for occupation for a minimum of ten (10) hours. This sub-paragraph does not apply to rest periods that exceed twelve (12) hours.

(4) Exceptionally at home base, individual crew members may be asked to exercise their discretion to reduce rest by up to a maximum of one (1) hour but only to a minimum of twelve (12) hours for flight crew and eleven (11) hours for cabin crew. If discretion is used, it is the responsibility of the operator and the crew member to inform the commander of the flight immediately following the rest period, that a reduced rest period has been taken.

(5) If the preceding duty period, which includes any time spent on positioning, exceeded eighteen (18) hours, then the ensuing rest period must include a local night.

(6) The rest period following a sequence of reduced rest and then an extended FDP, cannot be reduced.

(7) After being called out from a standby duty the length of minimum rest shall be determined by the length of standby duty, plus any time spent on positioning, and any FDP completed.

(8) Crew members who inform an operator that they are having difficulty in achieving adequate pre-flight rest must be given the opportunity to consult an aviation medical specialist.

(e) ***Aircraft commander's discretion to extend a flying duty period.***

(See Appendices A and B of this Subpart)

(1) An aircraft commander may, at his discretion, and after taking note of the circumstances of other members of the crew, extend an FDP beyond that permitted in paragraph (j), provided he is satisfied that the flight can be made safely. The extension shall be calculated according to what actually happens, not on what was planned to happen. An extension of three (3) hours is the maximum permitted, except in cases of emergency;

Note: In respect of an extension of a flying duty period, an emergency is a situation which in the judgement of the commander presents a serious risk to the health or safety of crew and passengers, or endangers the lives of others (includes security reasons). Discretion reports may be used by the Authority to assess the realism of particular schedules.

(2) The operator's scheme shall include guidance to aircraft commanders on the limits within which discretion may be exercised, and shall include specific limits to which a commander may extend the flying duty period. In a Flying Duty Period involving two
(2) or more sectors up to a maximum of two (2) hours discretion may be exercised prior to the first and subsequent sectors. On a single sector flight and immediately prior to the last sector on a multi-sector flight, a commander may utilise the full amount of discretion authorised by the operator.

(3) A commander may exercise discretion to extend an FDP following a reduced rest period, only exceptionally, and then only to the extent necessary to allow for unforeseen circumstances that become apparent during the last sector.

(4) Whenever a commander extends an FDP, it shall be reported to the Operator on a Discretion Report Form, in a format acceptable to the Authority. If the extension is greater than two (2) hours, or when exercised after any reduced rest period, then the operator shall submit the commander's written report, together with the operator's comments to the Authority, within fourteen (14) days of the aircraft's return to base.

(f) ***Mixed duties***

(1) When a crew member is required to report for duty in advance of the stipulated report time for a scheduled flight, to carry out a task at the behalf of the company, then the time spent on that task shall be part of the subsequent FDP.

(2) *Mixed Simulator and Aircraft Flying*
When a Flight Crew Member flies in the simulator, either on a check or training flight, or as a Training Captain or Instructor, and then within the same Duty Period flies as a Flight Crew Member on a scheduled commercial transport flight, all the time spent in the simulator is counted in full towards the subsequent FDP. Simulator flying does not count as a sector, but the FDP allowable is calculated from the report time of the simulator detail.

(g) ***Travelling Time***

(1) Travelling time, other than that time spent on positioning, does not count as duty.

(2) When crew members are required to travel from their home to an heliport other than the one from which they normally operate, any travelling time over and above the journey time from home to the usual operating heliport shall be classed as positioning. Notional times for any additional travelling shall be agreed between the operator and the Authority.

(h) ***Positioning***

(1) All Operating crew member's time spent positioning time for company operations shall count as Duty Time, but positioning does not count as a sector when calculating the FDP. In these circumstances the FDP commences not later than the time at which the Operating Crew Member

reports for the positioning journey, or positions in accordance with paragraph (g)(2) above.

(2) If, after a Positioning journey, the Operating Crew Member spends less than a minimum rest period at suitable accommodation provided by the company, and then carries out an FDP, the positioning will be counted as a sector if a split duty is claimed when calculating the allowable FDP. If it is not, a split duty FDP will not be used.

(i) ***Delayed Reporting Time in a Single FDP***

(1) When an Operating Crew Member is informed of a delay to the reporting time due to a changed schedule, before leaving the place of rest, the FDP shall be calculated as follow:

(i) When the delay is less than four (4) hours, the maximum FDP allowed shall be based on the original report time and the FDP shall start at the actual report time;

(ii) Where the delay is four (4) hours or more, the maximum FDP shall be based on the more limiting time band of the planned and the actual report time and the FDP starts four (4) hours after the original report time.

(2) When an operator informs a crew member before leaving the place of rest of a delay in reporting time of ten (10) hours or more ahead, and that crew member is not further disturbed by the operator until a mutually agreed hour, then that elapsed time is classed as a rest period. If, upon the resumption of duty, further delays occur, then the appropriate criteria in this paragraph and paragraph (1) above shall be applied to the rearranged reporting time.

(j) ***Maximum FDP***

(1) An operator shall specify standard reporting times that realistically reflect the time for safety related ground duties as approved by the Authority. Pre-flight duties are part of the FDP; a minimum of thirty (30) minutes duty will be allowed for post-flight activities. The time spent between reporting for a flight and the completion of post-flight tasks determines the length of the subsequent rest period.
If this "period" for post FDP duties is routinely exceeded, then the post FDP duty period stated in the scheme must be revised to better represent the actual time taken.

(2) A non-standard reporting time designed to take advantage of an increased FDP from a more favourable time band, must not be used.

CAR OPS-3.1170 Standby and duties at the airport

(See AMC-1, 2, 3, 4 & 5 for CAR OPS-3.1170)

If an operator assigns crew members to standby or to any duty at the airport, the following shall apply in accordance with the certification specifications applicable to the type of operation:

(a) Standby and any duty at the airport shall be in the roster and the start and end time of standby shall be defined and notified in advance to the crew members concerned to provide them with the opportunity to plan adequate rest;

(b) A crew member is considered on airport standby from reporting at the reporting point until the end of the notified airport standby period; (See AMC-3 & 4 OPS-3.1170(b))

(c) Airport standby shall count in full as duty period for the purpose of CAR OPS-3.1165;

(d) Any duty at the airport shall count in full as duty period and the FDP shall count in full from the airport duty reporting time;

(e) The operator shall provide accommodation to the crew member on airport standby which shall include the following:

(1) The resting area at the airport shall be separated from the operational area of crew activities by a sound-proof door;

(2) Suitable secure baggage storage facilities shall be provided within this rest area;

(3) Suitable seating that allows to recline more than 45° back angle to the vertical; and provides leg and foot support;

(4) It is separated from other seating by at least a curtain to provide darkness and some sound mitigation, and is reasonably free from disturbance by other crew members.

(f) Flight time specification schemes shall specify the following elements:

(1) the maximum duration of any standby; and

(2) the impact of the time spent on standby on the maximum FDP that may be assigned, taking into account facilities provided to the crew member to rest, and other relevant factors such as:
  i. the need for immediate readiness of the crew member,
  ii. the interference of standby with sleep, and
  iii. sufficient notification to protect a sleep opportunity between the call for duty and the assigned FDP;

(3) the minimum rest period following standby which does not lead to assignment of an FDP;

(4) how time spent on standby other than airport standby shall be counted for the purpose of cumulative duty periods.

CAR OPS-3.1175 Reserve duty

(See AMC-1 to 5 & GM-1 for CAR OPS-3.1175)

If an operator assigns crew members to reserve duty, the following requirements shall apply in accordance with the certification specifications applicable to the type of operation:

(a) Reserve duty shall be in the roster;

(b) Flight time specification schemes shall specify the following elements:
  (1) the maximum duration of any single reserve duty period;
  (2) the number of consecutive reserve duty days that may be assigned to a crew member.

(c) Reserve duty accommodation shall be approved by the Authority.

CAR OPS-3.1180 Nutrition

(See AMC-1 to CAR OPS-3.1180)

(a) During the FDP there shall be the opportunity for a meal and drink in order to avoid any detriment to a crew member’s performance, especially when the FDP exceeds six (6) hours.

(b) An operator shall specify in its operations manual how the crew member’s nutrition during FDP is ensured.

CAR OPS-3.1185 Cabin crew requirements

The limitations, which shall be applied to cabin crew, are those applicable to flight crew members, but with the following differences:

(a) An FDP can be one (1) hour longer than that permitted for flight crew. The FDP and limits set on early starts for cabin crew shall be based on the time at which the flight crew report for their FDP. Cabin crew FDP shall start at the report time of the Cabin Crew

(b) The minimum rest period which will be provided before undertaking a flying duty period shall be:
  (1) at least as long as the preceding duty period less one (1) hour; or
  (2) eleven (11) hours; whichever is the greater.

(c) The combined sum of standby time and subsequent FDP can be one (1) hour longer than that permitted for flight crew.

(d) The maximum duty hours for cabin crew shall not exceed
  (1) Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays;
  (2) One hundred and five (105) hours in any fourteen (14) consecutive days; and
  (3) Two hundred and ten (210) hours in any twenty-eight (28) consecutive days.

(e) No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;
  (1) during the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred (100) Block Hours; or
  (2) during the period of twelve (12) consecutive months expiring at the end of the previous month exceeds one thousand (1000) Block hours.

(f) Notwithstanding (d) and (e), the following shall be considered:
  (1) For crews that exclusively operate short and medium haul routes;

No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;

i. during the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred and twenty (120) Block Hours or during the period of twelve months (12) expiring at the end of the previous month exceeds one thousand and two hundred (1200) Block hours.
   The Cabin crew members who fly above one hundred (100) block hours in twenty- eight (28) consecutive days and/or one thousand (1000) block hours in twelve (12) consecutive months shall fulfill the following conditions:
   A. Minimum of eight (8) days-off in any twenty-eight (28) consecutive days
   B. A total of twenty-six (26) days-off in any eighty-four (84) consecutive day period
   C. A total of one hundred & four (104) days off in any consecutive twelve (12) month period excluding annual leave entitlement.

ii. The maximum Duty Hours for Cabin Crew members shall not exceed;
   A. Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays,
   B. 105 hours in any fourteen (14) consecutive days,
   C. 200 hours in any twenty-eight (28) consecutive days; and
   D. 600 hours in any eighty-four (84) consecutive days.

(2) For crews that operate long hauls or mixed long, medium and short haul routes:

i. Subset 1:

No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;

A. During the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred and fifteen (115) Block Hours or during the period of twelve (12) months expiring at the end of the previous month exceeds one thousand and two hundred (1200) Block hours
B. The Cabin crew members who fly above one hundred (100) block hours in twenty-eight (28) consecutive days and/or one thousand (1000) block hours in twelve (12) consecutive months shall fulfill the following conditions:
   - Minimum of eight (8) days-off in any twenty-eight (28) consecutive days;
   - A total of twenty-six (26) days-off in any consecutive eighty-four (84) day period (if two or more fourteen (14) consecutive day periods exceeds one hundred (100) block hours each one;
   - A total of ninety-four (94) days off in any consecutive twelve (12) month period excluding annual leave entitlement.
C. The maximum Duty Hours for Cabin Crew members shall not exceed;
   - Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays,
   - 115 hours in any fourteen (14) consecutive days;
   - 200 hours in any twenty-eight (28) consecutive days; and
   - 555 hours in any eighty-four (84) consecutive days.

ii. Subset 2

No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;

A. During the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred and twenty (120) Block Hours or during the period of twelve months (12) expiring at the end of the previous month exceeds one thousand and two hundred (1200) Block hours.
B. The Cabin crew members who fly above one hundred (100) block hours in twenty-eight (28) consecutive days and/or one thousand (1000) block hours in twelve (12) consecutive months shall fulfil the following conditions:

- Minimum of eight (8) days-off in any twenty-eight (28) consecutive days
- A total of twenty-six (26) days-off in any eighty-four (84) consecutive day period (if two or more twenty-eight (28) consecutive day periods exceeds one hundred (100) block hours each one;
- A total of one hundred (100) days off in any consecutive twelve (12) month period excluding annual leave entitlement.

C. The maximum Duty Hours for Cabin Crew members shall not exceed;
- Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays,
- 115 hours in any fourteen (14) consecutive days;
- 200 hours in any twenty-eight (28) consecutive days; and
- 600 hours in any eighty-four (84) consecutive days.

CAR OPS-3.1190 Reporting time

Each operator shall specify reporting times that realistically reflect the time required for pre-flight duties of not less than sixty (60) minutes prior to the beginning of the planned block time unless otherwise approved by the Authority.

CAR OPS-3.1195 Records to be maintained

(See Appendix 1 to CAR OPS-3.1065)

(a) An operator shall maintain records for all its flight and cabin crew members of flight time, flight duty periods, duty periods, and rest periods for at least fifteen (15) months from the date of the last relevant entry. These records shall include;
  (1) For each crew member: The beginning, end and duration of each duty or FDP, and function performed during the period. In addition;
    (i) Duration of each rest period prior to a FDP or standby duty period, and
    (ii) Dates of days off, and
    (iii) Seven (7) Consecutive day totals of duty
    (iv) Fourteen (14) consecutive day totals of duty
    (v) Twenty-eight (28) consecutive day totals of duty
    (vi) The twelve (12) consecutive month totals of duty
    (vii) Twenty-eight (28) day and twelve (12) consecutive months Block Hour durations
  (2) For each flight crew member:
    (i) Daily and seven (7) consecutive day period flying hours, in addition to (a)(1) above.
  (3) In case of augmented crew and in-flight rest is performed:
    (i) For the aircraft Commander, the beginning, end and duration of each Block Time.
    (ii) For all other Flight Crew Members, the beginning, end and the duration of each Block Time expressed, as the time at the controls as an Operating Crew Member.
    (iii) For cabin crew, beginning, end and the duration of each Block Time expressed as the time on service as Operating Crew member.

(b) Additionally, operators shall retain all aircraft commander's discretion reports of extended FDPs, extended flying hours, and reduced rest periods for a period of at least 6 months after the event. Records referred to in point CAR OPS 3.085(a), (b), (c), and (d) in relation to crew members who undertake duties for more than one operator, shall be kept for a period of twenty-four (24) months in accordance with sub-paragraphs (a)(1) and (2).

GM-1 OPS-3.1100 Definitions

ACCLIMATISED

(a) A crew member remains acclimatised to the local time of his or her reference time during 47 hours 59 minutes after reporting no matter how many time zones he has crossed.

(b) The maximum daily FDP for acclimatised crew members is determined by using table A of CAR OPS-3.1165(j)(1) with the reference time of the point of departure. As soon as forty- eight (48) hours have elapsed, the state of acclimatisation is derived from the time elapsed since reporting at reference time and the number of time zones crossed.

(c) A crew member is considered to be in an unknown state of acclimatisation after the first 48 hours of the rotation have elapsed unless he remains in the first arrival destination time zone (either for rest or any duties) in accordance with Table A in CAR OPS-3.1165.

(d) Should a crew member's rotation include additional duties that end in a different time zone than his or her first arrival destination's time zone while he is considered to be in an unknown state of acclimatisation, then the crew member remains in an unknown state of acclimatisation until he or she:

 (1) has taken the rest period required at home base;
 (2) has taken the rest period required at the new location; or
 (3) has been undertaking duties starting at and returning to the time zone of the new location until he or she becomes acclimatised in accordance with the values in Table A of CAR OPS-3.1165.

(e) To determine the state of acclimatisation, the two following criteria should be applied:

 (1) the greater of the time differences between the time zone where he or her was last acclimatised or the local time of his or her last departure point and the new location; and
 (2) the time elapsed since reporting at home base for the first time during the rotation.

GM-2 OPS-3.1100 Definitions

ACCLIMATISED 'POINT OF DEPARTURE'

The point of departure refers to the reporting point for a flight duty period or positioning duty after a rest period.

GM-3 OPS-3.1100 Definitions

Table 1: ACCLIMATISED 'TIME ELAPSED SINCE REPORTING AT REFERENCE TIME'

The time elapsed since reporting at reference time for operations at home base refers to the time elapsed since reporting for the first time at home base for a rotation.

GM-4 OPS-3.1100 Definitions

ADEQUATE FURNITURE FOR 'ACCOMMODATION'

Adequate furniture for crew member accommodation should include a seat that reclines at least 45° back angle to the vertical, has a seat width of at least 20 inches (50cm) and provides leg and foot support.

GM-5 OPS-3.1100 Definitions

DETERMINATION OF DISRUPTIVE SCHEDULES

If a crew member is acclimatised to the local time at his/her home base, the local time at the home base should be used to consider an FDP as 'disruptive schedule'. This applies to operations within the 2-hour wide time zone surrounding the local time at the home base, if a crew member is acclimatised to the local time at his/her home base.

GM-6 OPS-3.1100 Definitions

ELEMENTS OF STANDBY FOR DUTY

CAR OPS 3.1170(c) and (d) determine which elements of standby count as duty.

GM-7 OPS-3.1100 Definitions

OPERATING CREW MEMBER

A person on board an aircraft is either a crew member or a passenger. If a crew member is not a passenger on board an aircraft he should be considered as 'carrying out duties'. The crew member remains an operating crew member during in-flight rest. In-flight rest counts in full as FDP, and for the purpose of CAR OPS-3.1160.

AMC-1 CAR OPS-3.1105 Operator responsibilities

SCHEDULING

(a) Scheduling has an important impact on a crew member's ability to sleep and to maintain a proper level of alertness. When developing a workable roster, the operator shall strike a fair balance between the commercial needs and the capacity of individual crew members to work effectively. Rosters shall be developed in such a way that they distribute the amount of work evenly among those that are involved.

(b) Schedules shall allow for flights to be completed within the maximum permitted flight duty period and flight rosters shall take into account the time needed for pre-flight duties, taxiing, the flight- and turnaround times. Other factors to be considered when planning duty periods shall include:
   (1) the allocation of work patterns which avoid undesirable practices such as alternating day/night duties, alternating eastward-westward or westward-eastward time zone transitions, positioning of crew members so that a serious disruption of established sleep/work patterns occur;
   (2) scheduling sufficient rest periods especially after long flights crossing many time zones; and
   (3) preparation of duty rosters sufficiently in advance with planning of recurrent extended recovery rest periods and notification of the crew members well in advance to plan adequate pre-duty rest.

AMC-2 OPS-3.1105(a) Operator responsibilities

PUBLICATION OF ROSTERS

Rosters shall be published fourteen (14) days in advance.

AMC-3 OPS-3.1105(j) Operator responsibilities

OPERATIONAL ROBUSTNESS OF ROSTERS

The operator should establish and monitor performance indicators for operational robustness of rosters.

GM-1 OPS-3.1105(j) Operator responsibilities

OPERATIONAL ROBUSTNESS OF ROSTERS

Performance indicators for operational robustness of rosters should support the operator in the assessment of the stability of its rostering system. Performance indicators for operational robustness of rosters should at least measure how often a rostered crew pairing for a duty period is achieved within the planned duration of that duty period. Crew pairing means rostered positioning and flights for crew members in one duty period.

GM-1 OPS-3.1115 Fatigue risk management systems (FRMS)

Further guidance on FRMS processes, appropriate fatigue management, the underlying scientific principles and operational knowledge may be found in ICAO Doc 9966 (Manual for the Oversight of Fatigue Management Approaches).

AMC-1 OPS-3.1115(b)(1) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS POLICY

(a) The operator's FRMS policy should identify all the elements of FRMS.
(b) The FRMS policy should define to which operations FRMS applies.
(c) The FRMS policy should:
  (1) reflect the shared responsibility of management, flight and cabin crew, and other involved personnel;
  (2) state the safety objectives of FRMS;
  (3) be signed by the accountable manager;
  (4) be communicated, with visible endorsement, to all the relevant areas and levels of the organisation;
  (5) declare management commitment to effective safety reporting;
  (6) declare management commitment to the provision of adequate resources for FRMS;
  (7) declare management commitment to continuous improvement of FRMS;
  (8) require that clear lines of accountability for management, flight and cabin crew, and all other involved personnel are identified; and
  (9) require periodic reviews to ensure it remains relevant and appropriate,

AMC-2 OPS-3.1115(b)(2) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS DOCUMENTATION

The operator should develop and keep current FRMS documentation that describes and records:
(1) FRMS policy and objectives;
(2) FRMS processes and procedures;
(3) accountabilities, responsibilities and authorities for these processes and procedures;
(4) mechanisms for on-going involvement of management, flight and cabin crew members, and all other involved personnel;
(5) FRMS training programmes, training requirements and attendance records;
(6) scheduled and actual flight times, duty periods and rest periods with deviations and reasons for deviations; and
(7) FRMS outputs including findings from collected data, recommendations, and actions taken.

GM-2 OPS-3.1115(b)(3) Fatigue risk management systems (FRMS)

SCIENTIFIC METHOD

'Scientific method' is defined as 'a method or procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses'.
A scientific study may be required as an element of proactive fatigue hazard identification. Such a study should be based on scientific principles, i.e. use the scientific method. That means that the study should consist of the following elements as applicable to each individual case:
(a) an introduction with a summary and the description of the study design, methods and results;
(b) a statement of the hypothesis being tested, how it is being tested and a conclusion as to whether the hypothesis was found to be true or not;
(c) a description of the data collection method and tools, e.g. the sensitivity of the activity monitors, further information on any model and its limitations and how it is being used as part of the study;
(d) a description of how the study subjects were selected and how representative of the crew member population the study group is;
(e) a description of the rosters the study participants have worked containing data such as e.g. flight and duty hours, number of sectors, duty start/finish times;
(f) reports on mean sleep duration and efficiency and data for other standard measures (e.g. sleep timing, self-rated sleepiness/fatigue, sources of sleep disruption, performance, safety);
(g) a description of how sleep and the other measures varied across the roster (i.e. day-to-day) and where

and why minimum sleep occurred;

(h) statistical data analysis to test the hypothesis; and

(i) the explanation of how the study results have been used to influence the design of the roster or other fatigue mitigations.

AMC-3 OPS-3.1115(b)(4) Fatigue risk management systems (FRMS)

CAT OPERATORS' IDENTIFICATION OF HAZARDS

The operator shall develop and maintain three documented processes for fatigue hazard identification:

(a) Predictive

The predictive process shall identify fatigue hazards by examining crew scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance.

Methods of examination may include, but are not limited to:

(1) operator or industry operational experience and data collected on similar types of operations;

(2) evidence-based scheduling practices; and

(3) bio-mathematical models.

(b) Proactive

The proactive process shall identify fatigue hazards within current flight operations. Methods of examination may include, but are not limited to:

(1) self-reporting of fatigue risks;

(2) crew fatigue surveys;

(3) relevant flight and cabin crew performance data;

(4) available safety databases and scientific studies; and

(5) analysis of planned versus actual time worked.

(c) Reactive

The reactive process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimised. At a minimum, the process may be triggered by any of the following:

(1) fatigue reports;

(2) confidential reports;

(3) audit reports;

(4) incidents; or

(5) flight data monitoring (FDM) events.

AMC-4 OPS-3.1115(b)(4) Fatigue risk management systems (FRMS)

CAT OPERATORS RISK ASSESSMENT

An operator shall develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation. The risk assessment procedures should review identified hazards and link them to:

(a) operational processes;

(b) their probability;

(c) possible consequences; and

(d) the effectiveness of existing safety barriers and controls.

AMC-5 OPS-3.1115(b)(5) Fatigue risk management systems (FRMS)

CAT OPERATORS RISK MITIGATION

An operator shall develop and implement risk mitigation procedures that:

(a) select the appropriate mitigation strategies;

(b) implement the mitigation strategies; and

(c) monitor the strategies' implementation and effectiveness.

AMC-6 OPS-3.1115(b)(6) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS SAFETY ASSURANCE PROCESSES

The operator shall develop and maintain FRMS safety assurance processes to:

(a) provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to:
 (1) hazard reporting and investigations;
 (2) audits and surveys; and
 (3) reviews and fatigue studies;

(b) provide a formal process for the management of change which shall include, but is not limited to:
 (1) identification of changes in the operational environment that may affect FRMS;
 (2) identification of changes within the organisation that may affect FRMS; and
 (3) consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and

(c) provide for the continuous improvement of FRMS. This shall include, but is not limited to:
 (1) the elimination and/or modification of risk controls have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;
 (2) routine evaluations of facilities, equipment, documentation and procedures; and
 (3) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

AMC-7 OPS-3.1115(b)(7) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS PROMOTION PROCESS

FRMS promotion processes shall support the on-going development of FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the operator as part of its FRMS:

(a) Training programmes shall ensure competency commensurate with the roles and responsibilities of management, flight and cabin crew, and all other involved personnel under the planned FRMS; and

(b) An effective FRMS communication plan that:
 (1) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and
 (2) describes communication channels used to gather and disseminate FRMS-related information.

AMC-8 OPS 3.1115 Training Syllabus - Fatigue management training

TRAINING SYLLABUS FATIGUE MANAGEMENT TRAINING

(1) All personnel engaged in the provision FRMS training shall be approved by the Authority prior to conducting such training courses, seminars or briefings.

(2) The training syllabus shall contain the following:
 (a) Applicable regulatory requirements for flight, duty and rest;
 (b) The basics of fatigue including sleep fundamentals and the effects of disturbing the circadian rhythms;
 (c) The causes of fatigue, including medical conditions that may lead to fatigue;
 (d) The effect of fatigue on performance;
 (e) Fatigue countermeasures;
 (f) The influence of lifestyle, including nutrition, exercise, and family life, on fatigue;
 (g) Familiarity with sleep disorders and their possible treatments;
 (h) Where applicable, the effects of long-range operations and heavy short-range schedules on individuals;
 (i) The effect of operating through and within multiple time zones; and
 (j) The crew members’ responsibility for ensuring adequate rest and fitness for flight duty.

AMC-9 to CAR OPS-3.1115(f) Commercial Air Transport Operations

(a) ***APPLICATION AND APPROVAL PROCESS –*** The application and approval process shall start with the submission of an operational plan by the operator including the following documentation:
   (1) FTL Variation scheme (sample to be discussed with Authority).
   (2) On-board crew rest scheme, including extended FDPs and delayed scenarios.
   (3) Risk assessment focuses on the crew members' ability to operate the aircraft or perform safety-related duties during the whole FDP.
   (4) A contingency plan for flights to Oman from outstations with Depleted Crew Complement.

(b) ***FTL VARITION SCHEME –*** The FTL VARITION SCHEME should consider the following:
   (1) Pre-flight Rostering Requirements – All crew members should be acclimatised prior to operating a flight or a standby when departing from home base.
   (2) A scheme should be established by the Operator to:
      i. provide guidance to the crew on the expected pre-flight preparations and in- flight rest period.
      ii. provide guidance to the crew on the minimum rest when away from base.
      iii. provide guidance to the crew on the minimum rest between consecutive flights.
      iv. determine the maximum number of pairings per calendar month.
      v. determine the requirement for replacement of crew due to flight disruptions at home base or away from base.
      vi. determine the crew compliment and composition.

AMC-10 to CAR OPS-3.1115(f) General Aviation and private operators

The General Aviation or the private operator sectors shall ensure that the following documents to be submitted:

(a) Two years historical data for Pilots & Cabin Crew in terms of their duty and flying hours.
(b) Two years historical data for Pilots & Cabin Crew days off.
(c) Two years historical data for Pilots & Cabin Crew un-flown days.
(d) Two years historical data for the aircraft hours as per the fleet.
(e) A Comparison table of the regulation and the proposed changes, reason for the change, reference from an international regulation if any.
(f) A Safety Case that includes a risk assessment to ensure a better or equivalent level of protection against fatigue than the basic requirements.
(g) An official request for the variation quoting full responsibility for the request.
(h) An appropriate monitoring, reliability and oversight mechanism is included.
(i) After the issuance of the FTL variation approval, will conduct an inflight FTL variation assessment or survey the crew members.
(j) The approval letter is valid for six months subject to variation assessment results and the crew feedback.

Note: Unless otherwise specified in this Subpart Q, the UK Civil Aviation Authority document, Civil Aviation Publication, ***CAP 371 or any other superseding publication may be used as additional guidance in the process*** *of assessment of operator schemes.*

GM to CAR OPS-3.1115(f) Applications and variations to FTL schemes

(a) The application and approval process sequentially are as follows:
   (1) Submission of an operational plan by the operator including the Fatigue Risk Assessment. These will involve the following:
      i. Authorization to commence trial by the Authority.
      ii. Assessment by the Authority.
   (2) Validation results and final approval by the Authority.

   Note: The Authority will conduct an ongoing safety oversight which may include Validation

Flights. The aim of this validation is to assess the implementation and effectiveness of the preventive and mitigating risk controls, as well to gather operational data and information relevant to the FTL variation standards adequacy.

(b) Such variations to the FTL should be designed in accordance with the operational experience of each operator, and procedures accepted by the Authority and taking into account other relevant factors such as current scientific knowledge, as well as including appropriate risk controls mechanisms. The following elements may be considered to develop a risk assessment:

(1) ***Scientific and Technical considerations:*** AOC holders should consider general scheduling principles based on fatigue science, at the time of planning, issuance, amendment and analysis of crew rosters. Below are included some of those principles:

i. The perfect schedule for the human body is daytime duties with unrestricted sleep at night. Anything else is a compromise.
ii. The circadian body clock does not adapt fully to altered schedules such as night work. It does adapt progressively to a new time zone, but full adaptation usually takes longer than the 24-48 hours of most layovers.
iii. Whenever a duty period overlaps a crewmember's usual sleep time, it can be expected to restrict sleep. Examples include early duty start times, late duty end times, and night work.
iv. The more that a duty period overlaps a crewmember's usual sleep time, the less sleep the crewmember is likely to obtain. Working right through the usual night time sleep period is the worst-case scenario.
v. Night duty also requires working through the time in the circadian body clock cycle when self-rated fatigue and mood are worst and additional effort is required to maintain alertness and performance.
vi. Across consecutive duties with restricted sleep, crewmembers will accumulate a sleep debt and fatigue-related impairment will increase.
vii. Sufficient rest periods to recover from sleep debt considering length and frequency of the rest periods.

(2) ***Safety Case:*** For each AOC holder intending to apply for a FTL variation, a "safety case" for risk assessment is set on the basis of the assessment that demonstrate an acceptable level of alertness of the crew during the whole FDP, as well unforeseen circumstances for extended FDP scenarios considered in the variation limits (unforeseen circumstances may be based on their in-service experiences and likely scenarios). Therefore, the related provided facilities should have been assessed and monitoring:

i. Inflight rest facilities, as CRC or alternatives one in case of unforeseen circumstances.
ii. Suitable accommodation during layover.

(3) ***Select and implement preventive and mitigating controls:*** The following controls and mitigations are to be considered:

i. The aircraft chosen for the route has the best available on-board crew rest facilities.
ii. All crewmembers flying the new operation receive specific education on personal and organizational strategies for managing fatigue on the operation. This includes discussion on how to make best use of in-flight and layover sleep opportunities.
iii. Sufficient flight crew to ensure that a single captain does not have sole command responsibility for entire flight. iv. There is a clear policy on the distribution of inflight rest opportunities, so that crewmembers can plan how best to use them.
v. Each crewmember has sufficient rest opportunities in flight.
vi. Meals may be taken by the flight crew on the flight deck, in order to maximize the amount of time for sleep during in-flight rest periods.
vii. The layover hotel has been carefully vetted to ensure that it provides adequate facilities for sleep, eating, and exercise.
viii. A procedure is implemented between the Operator and the layover hotel to provide notification of delays without having to wake crewmembers. ix. There are clear

procedures on the management of flight delays.

x. There are clear procedures on the management of flight diversions.

(4) The following common parameters are to be considered in the application for variation for singular or cluster of routes:

i. Time zone
ii. Departure time windows
iii. FDP extensions
iv. Operational complexity
v. Crew composition
vi. Rest type facility

GM-1 OPS-3.1150 Home base

TRAVELLING TIME

Crew members should consider making arrangements for temporary accommodation closer to their home base if the travelling time from their residence to their home base usually exceeds ninety (90) minutes.

AMC-1 to OPS-3.1162(d) FTL Variation for Air Carriers

APPLICATION AND APPROVAL PROCESS

(1) The application and approval process shall start with the submission of an operational plan by the operator including the following documentation:
   (a) FTL Variation scheme (sample to be discussed with CAA)
   (b) On-board crew rest scheme, including extended FDPs and delayed scenarios
   (c) Risk assessment focuses on the crew members' ability to operate the aircraft or perform safety-related duties during the whole FDP.
   (d) A contingency plan for flights to Oman from an outstation with a "Depleted Crew Complement FTL Variation Scheme".
(2) The FTL Variation Scheme shall consider the following:
   (a) Pre-flight Rostering Requirements:
      (i) All crew members shall be acclimatised prior to operating a flight or a standby when departing from home base.
   (b) A scheme shall be established by the Operator that:
      (i) provides guidance to the crew on the expected pre-flight preparations and in flight rest period.
      (ii) provides guidance to the crew on the minimum rest when away from base.
      (iii) provides guidance to the crew on the minimum rest between consecutive flights.
      (iv) determines the maximum number of pairings per calendar month.
      (v) determines the requirement for replacement of crew due to flight disruptions at home base or away from base.
      (vi) determines the crew complement and composition.

AMC-2 to OPS-3.1162(d) FTL Variation for Non-Scheduled and Private Operators

(1) The non-scheduled or the private operator shall ensure that the following documents are submitted:
   (a) Two (2) years historical data for Pilots & Cabin Crew in terms of their duty and flying hours.
   (b) Two (2) years historical data for Pilots & Cabin Crew days off.
   (c) Two (2) years historical data for Pilots & Cabin Crew un-flown days.
   (d) Two (2) years historical data for the aircraft hours as per the fleet.
   (e) A Comparison table of the regulation and the proposed changes, reason for the change, reference from an international regulation if any.
   (f) A Safety Case that includes a risk assessment to ensure a better or equivalent level of protection against fatigue than the basic requirements.

(g) An official request for the variation quoting full responsibility for the request.

(2) The initial approval shall be valid for six months and is subject to variation assessment results and crew feedback indicating that the safety objective contained in paragraph (f) is not jeopardized.

(3) An appropriate monitoring, reliability and oversight mechanism shall be included.

(4) After the issuance of the FTL variation approval, the operator shall conduct an inflight FTL variation assessment including a survey of the crew members.

Note: Unless otherwise specified in this Subpart Q, the UK Civil Aviation Authority, CAP 371 or any other superseding publication may be used as additional guidance in the process of assessment of the operator schemes.

GM to OPS-3.1162(d) Approval of FTL Variation by CAA:

The application and approval process sequentially are as follows:

(a) Submission of an operational plan by the operator including the Fatigue Risk Assessment. These will involve the following:
   (1) Authorization to commence trial by the CAA.
   (2) Assessment by the CAA.

(b) Validation results and final approval by the CAA.

Note: The CAA will conduct an ongoing safety oversight which may include Validation Flights. The aim of this validation is to assess the implementation and effectiveness of the preventive and mitigating risk controls, as well to gather operational data and information relevant to the FTL variation standards adequacy.

Such variations to the FTL should be designed in accordance with the operational experience of each operator, and procedures accepted by the CAA and taking into account other relevant factors such as current scientific knowledge, as well as including appropriate risk control mechanisms. The following elements may be considered to develop a risk assessment:

(1) **Scientific and Technical considerations.**

AOC holders should consider general scheduling principles based on fatigue science, at the time of planning, issuance, amendment and analysis of crew rosters. Below are included some of those principles:

(i) The perfect schedule for the human body is daytime duties with unrestricted sleep at night. Anything else is a compromise.

(ii) The circadian body clock does not adapt fully to altered schedules such as night work. It does adapt progressively to a new time zone, but full adaptation usually takes longer than the 24-48 hours of most layovers.

(iii) Whenever a duty period overlaps a crewmember's usual sleep time, it can be expected to restrict sleep. Examples include early duty start times, late duty end times, and night work.

(iv) The more that a duty period overlaps a crewmember's usual sleep time, the less sleep the crewmember is likely to obtain. Working right through the usual night time sleep period is the worst-case scenario.

(v) Night duty also requires working through the time in the circadian body clock cycle when self-rated fatigue and mood are worst and additional effort is required to maintain alertness and performance.

(vi) Across consecutive duties with restricted sleep, crewmembers will accumulate a sleep debt and fatigue-related impairment will increase.

(vii) Sufficient rest periods to recover from sleep debt considering length and frequency of the rest periods.

(2) **Safety Case.**

For each AOC holder intending to apply for a FTL variation, a "safety case" for risk assessment is set on the basis of the assessment that demonstrate an acceptable level of alertness of the crew during the whole FDP, as well as unforeseen circumstances for extended FDP scenarios

considered in the variation limits (unforeseen circumstances may be based on their in-service experiences and likely scenarios). Therefore, the related provided facilities should be assessed and monitored:
(i) Inflight rest facilities such as Crew Rest Container or alternatives in case of unforeseen circumstances.
(ii) Suitable accommodation during layover.

(3) **Select and implement preventive and mitigating controls.**
Following controls and mitigations are considered:
(i) The aircraft chosen for the route has the best available on-board crew rest facilities.
(ii) All crewmembers flying the new operation receive specific education on personal and organizational strategies for managing fatigue on the operation. This includes discussion on how to make best use of in-flight and layover sleep opportunities.
(iii) Sufficient flight crew to ensure that a single captain does not have sole command responsibility for the entire flight.
(iv) There is a clear policy on the distribution of inflight rest opportunities, so that crewmembers can plan how best to use them.
(v) Each crewmember has sufficient rest opportunities in flight.
(vi) Meals may be taken by the flight crew on the flight deck, in order to maximize the amount of time for sleep during in-flight rest periods.
(vii) The layover hotel has been carefully vetted to ensure that it provides adequate facilities for sleep, eating, and exercise.
(viii) A procedure is implemented between the Operator and the layover hotel to provide notification of delays without having to wake crewmembers.
(ix) There are clear procedures on the management of flight delays.
(x) There are clear procedures on the management of flight diversions.

(4) The following common parameters are to be considered in the application for variation for singular or cluster of routes:
(i) Time zone;
(ii) Departure time windows;
(iii) FDP extensions;
(iv) Operational complexity;
(v) Crew composition; and
(vi) Rest type facility.

AMC-1 OPS-3.1165 Flight duty period (FDP)

(a) Night duties under the provisions of CAR OPS-3.1165 shall comply with the following:
(1) When establishing the maximum FDP for consecutive night duties, the number of sectors is limited to four (4) sectors per duty.
(2) The operator applies appropriate fatigue risk management to actively manage the fatiguing effect of night duties of more than ten (10) hours in relation to the surrounding duties and rest periods.

(b) Extension of FDP without in-flight rest:
(1) The extension of FDP without in-flight rest under the provisions of CAR OPS-3.1165 is limited to the values specified in CAR OPS-3.1165 (j) - *Maximum FDP*.

AMC-2 OPS-3.1165 Flight Duty Period (FDP)

IN-FLIGHT REST

(a) In-flight rest shall be taken during the cruise phase of the flight.
(b) In-flight rest periods shall be allocated in order to optimise the alertness of those flight crew members at control during landing.

AMC-3 OPS-3.1165 Flight Duty Period (FDP)

UNFORESEEN CIRCUMSTANCES IN ACTUAL FLIGHT OPERATIONS — COMMANDER'S DISCRETION

(a) As general guidance when developing a commander's discretion policy, the operator shall take into consideration the shared responsibility of management, flight and cabin crew in the case of unforeseen circumstances. The exercise of commander's discretion shall be considered exceptional and shall be avoided at home base and/or company hubs where standby or reserve crew members will be available. Operators will access on a regular basis the series of pairings where commander's discretion has been exercised in order to be aware of possible inconsistencies in their rostering.

(b) The operator's policy on commander's discretion shall state the safety objectives, especially in the case of an extended FDP or reduced rest and shall take due consideration of additional factors that may decrease a crew member's alertness levels, such as:
   (1) WOCL encroachment;
   (2) weather conditions;
   (3) complexity of the operation and/or airport environment;
   (4) Helicopter malfunctions or specifications;
   (5) flight with training or supervisory duties;
   (6) increased number of sectors;
   (7) circadian disruption; and
   (8) individual conditions of affected crew members (time since awake, sleep-related factor, workload, etc.).

AMC-4 CAR OPS-3.1165(c) Flight times and duty periods

POST-FLIGHT DUTIES

The operator shall specify post-flight duty times, taking into account the type of operation, the size and type of aircraft and the airport conditions.

AMC-5 OPS-3.1165(c) Split duty

The increase of limits on flight duty, under the provisions of CAR OPS-3.1165(c), complies with the following:

(a) The break on the ground within the FDP has a minimum duration of three (3) consecutive hours.

(b) The break excludes the time allowed for post and pre-flight duties and travelling. The minimum total time for post and pre-flight duties and travelling is thirty (30) minutes. The operator specifies the actual times in its operations manual.

(c) The maximum FDP specified in CAR OPS-3.1165 paragraph (c) shall not exceed 50 % of the break.

(d) Suitable accommodation is provided either for a break of six (6) hours or more or for a break that encroaches the window of circadian low (WOCL).

(e) In all other cases:
   (1) accommodation is provided; and
   (2) any time of the actual break exceeding six (6) hours or any time of the break that encroaches the WOCL does not count for the extension of the FDP.

(f) Split duty cannot be combined with in-flight rest.

AMC-6 OPS-3.1165(c)(2) Split duty

POST, PRE-FLIGHT DUTY AND TRAVELLING TIMES

The operator shall specify post and pre-flight duty and travelling times, taking into account aircraft type, type of operation and airport conditions.

GM-1 OPS-3.1165 Flight Duty Period (FDP)

REPORTING TIMES

The operator should specify reporting times taking into account the type of operation, the size and type of aircraft and the reporting airport conditions.

GM-2 OPS-3.1165 Flight duty period (FDP)

NIGHT DUTIES – APPROPRIATE FATIGUE RISK MANAGEMENT

(a) When rostering night duties of more than ten (10) hours (referred to below as 'long night duties'), it is critical for the crew member to obtain sufficient sleep before such duties when he is adapted to being awake during day time hours at the local time where he is acclimatised. To optimise alertness on long night duties, the likelihood of obtaining sleep as close as possible to the start of the FDP should be considered, when rostering rest periods before long night duties, by providing sufficient time to the crew member to adapt to being awake during the night. Rostering practices leading to extended wakefulness before reporting for such duties should be avoided. Fatigue risk management principles that could be applied to the rostering of long night duties may include:
   (1) avoiding long night duties after extended recovery rest periods
   (2) progressively delaying the rostered ending time of the FDPs preceding long night duties;
   (3) starting a block of night duties with a shorter FDP; and
   (4) avoiding the sequence of early starts and long night duties.
(b) Fatigue risk management principles may be applied to the rostering of long night duties by means of:
   (1) considering operator or industry operational experience and data collected on similar operations;
   (2) evidence-based scheduling practices; and
   (3) bio-mathematical models.

GM-3 OPS-3.1165 Flight duty period (FDP)

REFERENCE TIME

The start time of the FDP in the table refers to the 'reference time'. That means, to the local time of the point of departure, if this point of departure is within a two (2) hour wide time zone band around the local time where a crew member is acclimatised.

GM-4 OPS-3.1165(e)(1) Extension of Flight Duty Period (FDP)

COMMANDER'S DISCRETION

The maximum allowable FDP should be determined by the planned block times and factored number of sectors as applicable. The factored number of sectors should be increased by the additional number of sectors in case of a diversion.

GM-5 OPS-3.1165 Flight Duty Period (FDP)

DELAYED REPORTING

Operator procedures for delayed reporting should:
(a) specify a contacting mode;
(b) establish minimum and maximum notification times; and
(c) avoid interference with sleeping patterns when possible.

GM-6 OPS 3.1165(d) Rest periods

MINIMUM REST PERIOD AT HOME BASE IF SUITABLE ACCOMMODATION IS PROVIDED

An operator may apply the minimum rest period away from home base during a rotation which includes a rest period at a crew member's home base. This applies only if the crew member does not rest at his/her residence, or temporary accommodation, because the operator provides suitable accommodation. This type of roster is known as "back-to-back operation".

GM-7 OPS-3.1165(d) Rest periods

MINIMUM REST PERIOD AWAY FROM HOME BASE

The time allowed for physiological needs should be 1 hour. Consequently, if the travelling time to the suitable accommodation is more than 30 minutes, the operator should increase the rest period by twice the amount of difference of travelling time above 30 minutes.

GM-8 OPS-3.1165(d) Rest periods

TIME ELAPSED SINCE REPORTING

The time elapsed since reporting for a rotation involving at least a four (4) hour time difference to the reference time stops counting when the crew member returns to his/her home base for a rest period during which the operator is no longer responsible for the accommodation of the crew member.

GM-9 OPS-3.1165(d) Additional rest to compensate for time zone differences

REST AFTER ROTATIONS WITH THREE OR MORE FLIGHT DUTY PERIODS

For a rotation with three or more FDPs, the greatest time zone difference from the original reference time shall be used to determine the minimum number of local nights of rest to compensate for time zone differences. If such a rotation includes time zones crossings in both directions, the calculation is based on the highest number of time zones crossed in any one FDP during the rotation.

AMC-1 OPS-3.1170 Standby

The modification of limits on flight duty, duty and rest periods under the provisions of CAR OPS- 3.1165 complies with the following:

(a) Airport standby

(1) If not leading to the assignment of an FDP, airport standby is followed by a rest period as specified in AMC OPS-3.1165(d).

(2) If an assigned FDP starts during airport standby, the following applies:

i. the FDP counts from the start of the FDP. The maximum FDP is reduced by any time spent on standby in excess of four (4) hours;

ii. the maximum combined duration of airport standby and assigned FDP as specified in CAR OPS-3.1155 paragraphs (b) and (d) is sixteen (16) hours.

(b) Standby other than airport standby:

(1) the maximum duration of standby other than airport standby is sixteen (16) hours;

(2) The operator's standby procedures are designed to ensure that the combination of standby and FDP do not lead to more than eighteen (18) hours awake time;

(3) 25 % of time spent on standby other than airport standby counts as duty time for the purpose of CAR OPS-3.1160;

(4) standby is followed by a rest period in accordance with CAR OPS-3.1185;

(5) standby ceases when the crew member reports at the designated reporting point;

(6) if standby ceases within the first six (6) hours, the maximum FDP counts from reporting;

(7) if standby ceases after the first six (6) hours, the maximum FDP is reduced by the amount of standby time exceeding six (6) hours;

(8) if the FDP is extended due to in-flight rest according to CAR OPS-3.1155 paragraph (c), or to split duty according to CS FTL-3.1170, the six (6) hours of paragraphs (6) and (7) are extended to eight (8) hours;

(9) if standby starts between 23:00 and 07:00, the time between 23:00 and 07:00 does not count towards the reduction of the FDP under paragraphs (6), (7) and (8) until the crew member is contacted by the operator; and

(10) the response time between call and reporting time established by the operator allows the crew member to arrive from his/her place of rest to the designated reporting point within a reasonable time.

AMC-2 OPS-3.1170 Standby

MINIMUM REST AND STANDBY

(a) If airport or other standby initially assigned is reduced by the operator during standby that does not lead to an assignment to a flight duty period, the minimum rest requirements specified in CAR OPS-3.1185 shall apply.
(b) If a minimum rest period as specified in CAR OPS-3.1185 is provided before reporting for the duty assigned during the standby, this time period shall not count as standby duty.
(c) Standby other than airport standby counts (partly) as duty for the purpose of CAR OPS- 3.1160 only. If a crew member receives an assignment during standby other than airport standby, the actual reporting time at the designated reporting point shall be used for the purpose of CAR OPS-3.1185.

AMC-3 OPS-3.1170(b) Standby

STANDBY OTHER THAN AIRPORT STANDBY NOTIFICATION

Operator procedures for the notification of assigned duties during standby other than airport standby shall avoid interference with sleeping patterns.

AMC-4 OPS.1170(b) Standby

AWAKE TIME

Scientific research shows that continuous awake in excess of 18 hours can reduce the alertness and shall be avoided.

AMC-5 OPS-3.1170(c) & (d) Standby and duties at the airport
(See CAR OPS-3.1170)
If an operator assigns crew members to standby or to any duty at the airport, the following shall apply in accordance with the certification specifications applicable to the type of operation:
(a) Standby and any duty at the airport shall be in the roster and the start and end time of standby shall be defined and notified in advance to the crew members concerned to provide them with the opportunity to plan adequate rest;
(b) A crew member is considered on airport standby from reporting at the reporting point until the end of the notified airport standby period;
(c) Airport standby shall count in full as duty period for the purpose of points CAR OPS-3.1165 and CAR OPS-3.1185;
(d) Any duty at the airport shall count in full as duty period and the FDP shall count in full from the airport duty reporting time;
(e) The operator shall provide accommodation to the crew member on airport standby which shall include the following:
    (1) The resting area at the airport shall be separated from the operational area of crew activities by a sound-proof door;
    (2) Suitable secure baggage storage facilities shall be provided within this rest area;
    (3) Suitable seating that allows to recline more than 45° back angle to the vertical; and provides leg and foot support;
    (4) It is separated from other seating by at least a curtain to provide darkness and some sound mitigation, and is reasonably free from disturbance by other crew members.
(f) Flight time specification schemes shall specify the following elements:
    (1) the maximum duration of any standby; and
    (2) the impact of the time spent on standby on the maximum FDP that may be assigned, taking into account facilities provided to the crew member to rest, and other relevant factors such as:
        i. the need for immediate readiness of the crew member,
        ii. the interference of standby with sleep, and
        iii. sufficient notification to protect a sleep opportunity between the call for duty and the assigned FDP;

(3) the minimum rest period following standby which does not lead to assignment of an FDP;
(4) how time spent on standby other than airport standby shall be counted for the purpose of cumulative duty periods.

AMC-1 OPS-3.1175 Reserve

The operator assigns duties to a crew member on reserve under the provisions of CAR OPS-3.1165 complying with the following:

(a) An assigned FDP counts from the reporting time.
(b) Reserve times do not count as duty period for the purpose of CAR OPS-3.1165.
(c) The operator defines the maximum number of consecutive reserve days within the limits of CAR OPS-3.1165.
(d) To protect an eight (8) hour sleep opportunity, the operator rosters a period of eight (8) hours, taking into account fatigue management principles, for each reserve day during which a crew member on reserve is not contacted by the operator.

AMC-2 OPS-3.1175 Reserve

RESERVE NOTIFICATION

Operator procedures for the notification of assigned duties during reserve shall avoid interference with sleeping patterns.

AMC-3 OPS-3.1175 Reserve

NOTIFICATION IN ADVANCE

The minimum 'at least ten (10) hours' between the notification of an assignment for any duty and reporting for that duty during reserve may include the period of eight (8) hours during which a crew member on reserve is not contacted by the operator.

AMC-4 OPS.1175 Standby

AWAKE TIME

Scientific research shows that continuous awake in excess of 18 hours can reduce the alertness and shall be avoided.

AMC-5 OPS-3.1175(c) Reserve

RECURRENT EXTENDED RECOVERY REST

CAR OPS 3.1165 paragraph (d) applies to a crew member rest on reserve.

GM-1 to AMC OPS-3.1175(c) Reserve

ROSTERING OF RESERVE

Including reserve in a roster, also referred to as 'rostering', implies that a reserve period that does not result in a duty period may not retrospectively be considered as part of a recurrent extended recovery rest period.

AMC-1 OPS-3.1180 Nutrition

MEAL OPPORTUNITY

(a) The operations manual shall specify the minimum duration of the meal opportunity, when a meal opportunity is provided, in particular when the FDP encompasses the regular meal windows (e.g. if the FDP starts at 11:00 hours and ends at 22:00 hours meal opportunities for two meals shall be given).
(b) It shall define the time frames in which a regular meal should be consumed in order not to alter the human needs for nutrition without affecting the crew member's body rhythms.

Appendix A – Commander's Discretion Report – Extension of Flying Duty Period/ Flying Hours

Part A

Operator Aircraft Type: ....Flight Number:………………………

Commander: ....   Date: ....

Note:

- *If discretion exercised for part crew or individuals state name(s) and operating capacity below.*
- *An aircraft commander may, at his discretion, and after taking note of the circumstances of other members of the crew, extend an FDP beyond the Allowable FDP.*

Part B

Voyage Details:

1. Crew acclimatised ☐ **YES** ☐**NO**
2. Length of preceding rest:
   (a) 18 to 30 hrs
   (b) under 18 hrs or over 30 Hrs.
3. Allowable FDP from Table A or B: …….Hrs............ Mins
4. Split duty: actual time off............. time on.................. Credit.................
5. In-flight relief (more than 3 hours); rest taken............ bunk/seat ....Credit…………….
6. Revised allowable FDP: …………………

Voyage Details									
Schedule (Planned)				**Actual**			**Crew**		
	Place	**UTC**	**Local**		**UTC**	**Local**	**No.**	**Rank**	**Name**
Duty to start				Duty started			1		
Depart				Departed			2		
Arrive				Arrived			3		
Depart				Departed			4		
Arrive				Arrived			5		
Depart				Departed			6		
Arrive				Arrived			7		
Depart				Departed			8		
Arrive				Arrived			9		
Depart				Departed			10		
Arrive				Arrived			11		
FDP to end				FDP ended			12		
				Actual FDP			13		

Appendix B – Commander's Discretion Report - Reduction of Rest

Note:	*All times to be recorded as date/time six-figure groups, expressed in both UTC and Local time.*			
Part A	Operator		Aircraft Type	
	Flight Number		Commander	
	Date			
Note:	*If discretion exercised for part crew or individuals state name(s) and operating capacity below.*			
			UTC	Local
Part B	Last duty started			
	Last duty ended			
	Calculated earliest next available			
	Actual start of next FDP			
	Rest earned		Hours:	
	Rest period reduced by:			
	Crew affected:			

Amount of Commander's Discretion Exercised............................. Hrs/Mins

Planned FDP........................ Actual FDP........................

Allowed FDP........................ Extension........................

Length of preceding rest................ Time over six (6) hours on stby:................

Was the FDP preceded by Stand-by-duty? ☐**YES** ☐ **NO**

Note:

If rest is taken in a bunk (Up to 18 Hrs.).

A period equal to one half of the total of rest taken, provided that the FDP shall not exceed (*) hours; (*) hours in the case of cabin crew.

If rest is taken in a seat (Up to 15 Hrs.).

A period equal to one third of the total of rest taken, provided that the FDP permissible shall not exceed (*) hours; (*) hours in the case of cabin crew.

Extension of Flying Duty Period by Split Duty (3 – 10)

A period equal to half the consecutive hours' rest taken

SECTION 1 - SUBPART R – TRANSPORT OF DANGEROUS GOODS BY AIR

(See CAR-92 – Dangerous Goods)

CAR OPS-3.1150 Terminology

(See CAR-92.010 and AC OPS-3.1250(a)(3) & (4))

Note: Refer to CAR 92 for all terminology related to Dangerous Goods

CAR OPS-3.1155 Approval to Transport Dangerous Goods

(See CAR-92, Subpart G)

(a) An operator shall not transport dangerous goods unless approved to do so by the Authority.
  (1) Approval for the transport of dangerous goods will be reflected on the Air Operator Certificate. In other circumstances an approval may be issued separately.
  (2) Before the issue of an approval for the transport of dangerous goods, the operator should satisfy the Authority that adequate training has been given, that all relevant documents (e.g. for ground handling, helicopter handling, training) contain information and instructions on dangerous goods, and that there are procedures in place to ensure the safe handling of dangerous goods at all stages of air transport.
  (3) The exemption or approval indicated in CAR-OPS 3.1165(b)(1) or (2) is in addition to that indicated by CAR-OPS 3.1155.

Note: Specific approval, certification and approval all have the same meaning when applied in this circumstance.

Note: The carriage of dangerous goods must be included in the scope of the operator's safety management system (SMS).

CAR OPS-3.1160 Scope

(See AC OPS & IEM OPS-3.1160)

(a) An operator shall comply with the provisions contained in the Technical Instructions on all occasions when dangerous goods are carried, irrespective of whether the flight is either within or outside the territory of the Oman FIR.

(b) Articles and substances which would otherwise be classed as dangerous goods are excluded from the provisions of this Subpart, to the extent specified in the Technical Instructions, provided:
  (1) They are required to be onboard the Helicopter in accordance with the relevant CARs or for operating reasons (See IEM OPS-3.1260(b));
  (2) They are carried as catering or cabin service supplies;
  (3) They are carried for use in flight as veterinary aid or as a euthanizing agent for an animal;
  (4) They are carried for use in flight for medical aid for a patient, provided that:
    i. Gas cylinders have been manufactured specifically for the purpose of containing and transporting that particular gas;
    ii. Drugs, medicines and other medical items are under the control of trained personnel during the time when they are in use in the Helicopter;
    iii. Equipment containing wet cell batteries is kept and, when necessary secured, in an upright position to prevent spillage of the electrolyte; and
    iv. Proper provision is made to stow and secure all the equipment during take-off and landing and at all other times when deemed necessary by the commander in the interests of safety; (Also see AC OPS-3.1260(b)(4)) or
  (5) They are carried by passengers or crew members.

(c) Articles and substances intended as replacements for those in (b)(1) and (b)(2) above shall be transported on a Helicopter as specified in the Technical Instructions.

CAR OPS-3.1165 Limitations on the Transport of Dangerous Goods
(See IEM OPS-3.1165(b))

(a) An operator shall take all reasonable measures to ensure that articles and substances that are specifically identified by name or generic description in the Technical Instructions as being forbidden for transport under any circumstances are not carried on any Helicopter.
(b) An operator shall take all reasonable measures to ensure that articles and substances or other goods that are identified in the Technical Instructions as being forbidden for transport in normal circumstances are only transported when:
    (1) They are exempted by the States concerned under the provisions of the Technical Instructions (see IEM OPS-3.1265(b)(1)); or
    (2) The Technical Instructions indicate they may be transported under an approval issued by the State of Origin.

CAR OPS-3.1170 Classification

An operator shall take all reasonable measures to ensure that articles and substances are classified as dangerous goods as specified in the Technical Instructions.

CAR OPS-3.1175 Packing

An operator shall take all reasonable measures to ensure that articles and substances are classified as dangerous goods dangerous goods are packed as specified in the Technical Instructions.

CAR OPS-3.1180 Labelling and Marking

(a) An operator shall take all reasonable measures to ensure that packages, overpacks and freight containers are labelled and marked as specified in the Technical Instructions.
(b) An operator shall take all reasonable measures to ensure packages, overpacks and freight containers are marked as specified in the Technical Instructions or as specified by the Authority. (See AMC OPS 3.1180(b).)
(c) Where dangerous goods are carried on a flight which takes place wholly or partly outside the territory of a State, labelling and marking must be in the English language in addition to any other language requirements.

CAR OPS-3.1185 Dangerous Goods Transport Document

(a) An operator shall ensure that, except when otherwise specified in the Technical Instructions, dangerous goods are accompanied by a dangerous goods transport document.
(b) Where dangerous goods are carried on a flight which takes place wholly or partly outside the territory of a State, the English language must be used for the dangerous goods transport document in addition to any other language requirements.

CAR OPS-3.1195 Acceptance of Dangerous Goods
(See CAR-92.110)

(a) An operator shall not accept dangerous goods for transport until the package, overpack or freight container has been inspected in accordance with the acceptance procedures in the Technical Instructions.
(b) An operator or his ground handling agent shall use an acceptance check list. The acceptance checklist shall allow for all relevant details to be checked and shall be in such form that will allow for the recording of the results of the acceptance check by manual, mechanical or computerised means.

CAR OPS-3.1200 Inspection for Damage, Leakage or Contamination
(See CAR-92.120)

(a) An operator shall ensure that:

(1) Packages, overpacks and freight containers are inspected for evidence of leakage or damage immediately prior to loading on a Helicopter or into a unit load device, as specified in the Technical Instructions;

(2) Leaking or damaged packages, overpacks or freight containers are not loaded on a Helicopter;

(3) Any package of dangerous goods found on a Helicopter and which appears to be damaged or leaking is removed or arrangements made for its removal by an appropriate Authority or organisation. In this case the remainder of the consignment shall be inspected to ensure it is in a proper condition for transport and that no damage or contamination has occurred to the Helicopter or its load; and

(4) Packages, overpacks and freight containers are inspected for signs of damage or leakage upon unloading from a Helicopter or from a unit load device and, if there is evidence of damage or leakage, the area where the dangerous goods were stowed is inspected for damage or contamination.

CAR OPS-3.1205 Removal of Contamination
(See CAR-92.125)

(a) An operator shall ensure that:

(1) Any contamination found as a result of the leakage or damage of dangerous goods is removed without delay; and

(2) A Helicopter which has been contaminated by radioactive materials is immediately taken out of service and not returned until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.

CAR OPS-3.1210 Loading Restrictions
(See CAR-92.135)

(a) ***Passenger Cabin, Flight Deck and Cargo Compartment***. The operator shall ensure that dangerous goods are loaded, segregated, stowed, secured and carried in a helicopter as specified in the Technical Instructions or as approved by the Authority.

(b) ***Dangerous Goods Designated for Carriage Only on Cargo Aircraft***. An operator shall ensure that packages of dangerous goods bearing the 'Cargo Aircraft Only' label are carried on a cargo aircraft and loaded as specified in the Technical Instructions.

CAR OPS-3.1215 Provision of Information
(See AMC-1 OPS-3.1215(e) and AC OPS-3.1215(c)(1))

(a) Information to Ground Staff. An operator shall ensure that:

(1) Information is provided to enable ground staff to carry out their duties with regard to the transport of dangerous goods, including the actions to be taken in the event of incidents and accidents involving dangerous goods; and

(2) Where applicable, the information referred to in sub-paragraph (a)(1) above is also provided to his handling agent.

(b) Information to Passengers and Other Persons

(1) An operator shall ensure that information is promulgated as required by the Technical Instructions so that passengers are warned as to the types of goods which they are forbidden from transporting aboard a Helicopter; and

(2) An operator and, where applicable, his handling agent shall ensure that notices are provided at acceptance points for cargo giving information about the transport of dangerous goods.

(c) *Information to Crew Members.* An operator shall ensure that information is provided in the Operations Manual to enable crew members to carry out their responsibilities in regard to the transport of dangerous goods, including the actions to be taken in the event of emergencies arising involving dangerous goods. (See AC OPS-3.1315(c)(1))

(d) *Information to the Commander.* An operator shall ensure that the commander is provided with written information, as specified in the Technical Instructions (See Table 1 of Appendix 1 to CAR OPS-3.1065 for the document storage period).

(e) *Information in the Event of a Helicopter Incident or Accident (*See AMC-1 OPS-3.1315(e).)
  (1) The operator of a Helicopter which is involved in a Helicopter incident shall, on request, provide any information required to minimise the hazards created by any dangerous goods carried.
  (2) The operator of a Helicopter which is involved in a Helicopter accident shall, as soon as possible, inform the appropriate Authority of the State in which the Helicopter accident occurred of any dangerous goods carried.

CAR OPS-3.1320 Training programmes

(See CAR-92.590, CAR-92.595 and CAR-92 Appendix A)

(a) An operator shall establish and maintain staff training programmes, as required by the Technical Instructions, which shall be approved by the Authority.
(b) An operator shall ensure that staff receive training in the requirements commensurate with their responsibilities.
(c) Operators not holding a permanent approval to carry dangerous goods:
  (1) An operator shall ensure that staff who are engaged in general cargo and baggage handling have received training to carry out their duties in respect of dangerous goods;
  (2) As a minimum this training must cover the areas identified in CAR-92 Appendix A and be to a depth sufficient to ensure that an awareness is gained of the hazards associated with dangerous goods, how to identify them and what requirements apply to the carriage of such goods by passengers.

CAR OPS-3.1325 Dangerous Goods Incident and Accident Reports

(See AC OPS-3.1325 & Appendix 1 to CAR OPS-3.1325)

(a) An operator shall report dangerous goods incidents and accidents to the Authority. An initial report shall be dispatched within seventy-two (72) hours of the event unless exceptional circumstances prevent this.
(b) An operator shall also report to the Authority undeclared or mis-declared dangerous goods discovered in cargo or passengers' baggage. An initial report shall be dispatched within seventy-two (72) hours of the discovery unless exceptional circumstances prevent this.
(c) If the above stated incidents or accidents (paras (a) & (b)) occur in another state the occurrence shall also be reported to the local Authority. (See to CAR-92.160)

Appendix 1 to CAR OPS-3.1325 Dangerous goods incident and accident reports

(See CAR OPS-3.1325)

(1) An operator shall ensure that any type of dangerous goods incident or accident is reported, irrespective of whether the dangerous goods are contained in cargo, mail, passengers' baggage or crew baggage. The finding of undeclared or mis-declared dangerous goods in cargo, mail or baggage shall also be reported.
(2) The first report shall be dispatched within seventy-two (72) hours of the event unless exceptional circumstances prevent this. It may be sent by any means, including e-mail, telephone or fax. This report shall include the details that are known at that time, under the headings identified in paragraph 3. If necessary, a subsequent report shall be made as soon as possible giving all the details that were not known at the time the first report was sent. If a report has been made verbally, written confirmation shall be sent as soon as possible.
(3) The first and any subsequent report shall be as precise as possible and contain such of the following data that are relevant:
  (a) Date of the incident or accident or the finding of undeclared or mis-declared dangerous goods;

(b) Location, the flight number and flight date;
(c) Description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc;
(d) Proper shipping name (including the technical name, if appropriate) and UN/ID number, when known;
(e) Class or division and any subsidiary risk;
(f) Type of packaging, and the packaging specification marking on it;
(g) Quantity;
(h) Name and address of the shipper, passenger, etc;
(i) Any other relevant details;
(j) Suspected cause of the incident or accident;
(k) Action taken;
(l) Any other reporting action taken; and
(m) Name, title, address and telephone number of the person making the report.

(4) Copies of relevant documents and any photographs taken should be attached to a report.

SECTION 2 – SUBPART R – AC/AMC/IEM — TRANSPORT OF DANGEROUS GOODS

AMC OPS-3.1150(a)(13) & (a)(14) Terminology - Dangerous Goods Accident and Dangerous Goods Incident

(See CAR OPS-3.1150(a)(13) & (a)(14))

As a dangerous goods accident (See CAR OPS-3.1150(a)(13)) and dangerous goods incident (See CAR OPS-3.1250(a)(14)) may also constitute an aircraft accident, serious incident or incident the criteria for the reporting both types of occurrences should be satisfied (Also see CAR-13.400).

AMC OPS-3.1160(b)(4) Medical Aid for a Patient

(See CAR OPS-3.1160(b)(4))

Gas cylinders, medications, other medical material (such as sterilising wipes) and wet cell or lithium batteries are the dangerous goods which are normally provided for use in flight as medical aid for a patient. However, what is carried may depend on the needs of the patient. These dangerous goods are not those which are a part of the normal equipment of the Helicopter.

IEM-1 OPS-3.1160(b) Dangerous goods on a Helicopter in accordance with the relevant regulations or for operating reasons

(See CAR OPS 3.1160(b))

(1) Dangerous goods required to be on board a Helicopter in accordance with the relevant CARs or for operating reasons are those which are for:
  (a) The airworthiness of the Helicopter;
  (b) The safe operation of the Helicopter; or
  (c) The health of passengers or crew.
(2) Such dangerous goods include but are not limited to:
  (a) Batteries;
  (b) Fire extinguishers;
  (c) First-aid kits;
  (d) Insecticides/Air fresheners;
  (e) Lifesaving appliances; and
  (f) Portable oxygen supplies.

IEM-2 OPS-3.1160(c) Scope – Dangerous goods carried by passengers or crew

(See CAR OPS 3.1160(c))

(1) The Technical Instructions exclude some dangerous goods from the requirements normally applicable to them when they are carried by passengers or crew members, subject to certain conditions.
(2) For the convenience of operators who may not be familiar with the Technical Instructions, these requirements are repeated below.
(3) The dangerous goods which each passenger or crew member can carry are:
  (a) Alcoholic beverages containing more than 24% but not exceeding 70% alcohol by volume, when in retail packaging not exceeding five (5) litres and with a total not exceeding five (5) litres per person;
  (b) Non-radioactive medicinal or toilet articles (including aerosols, hair sprays, perfumes, medicines containing alcohol); and, in checked baggage only, aerosols which are nonflammable, non-toxic and without subsidiary risk, when for sporting or home use. Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release. The net quantity of each single article should not exceed 0·5 litre or 0·5 kg and the total net quantity of all articles should not exceed two (2) litres or two (2) kg;
  (c) Safety matches or a lighter for the person’s own use and when carried on the person. ‘Strike anywhere’ matches, lighters containing unabsorbed liquid fuel (other than liquefied gas), lighter fuel and lighter refills are not permitted;

(d) A hydrocarbon gas-powered hair curler, providing the safety cover is securely fitted over the heating element. Gas refills are not permitted;
(e) Small cylinders of a gas of division 2.2 worn for the operation of mechanical limbs and spare cylinders of a similar size if required to ensure an adequate supply for the duration of the journey;
(f) Radio-isotopic cardiac pacemakers or other devices (including those powered by lithium batteries) implanted in a person, or radio-pharmaceuticals contained within the body of a person as a result of medical treatment;
(g) A small medical or clinical thermometer containing mercury, for the person's own use, when in its protective case;
(h) Dry ice, when used to preserve perishable items, providing the quantity of dry ice does not exceed two (2) kg and the package permits the release of the gas. Carriage may be in carry-on (cabin) or checked baggage, but when in checked baggage the operator's agreement is required;
(i) When carriage is allowed by the operator, small gaseous oxygen or air cylinders for medical use;
(j) When carriage is allowed by the operator, not more than two small cylinders, or other suitable gas of division 2.2, fitted into a self-inflating life-jacket and not more than two spare cylinders;
(k) When carriage is allowed by the operator, wheelchairs or other battery-powered mobility aids with non-spillable batteries, providing the equipment is carried as checked baggage. The battery should be securely attached to the equipment, be disconnected and the terminals insulated to prevent accidental short circuits;
(l) When carriage is allowed by the operator, wheelchairs or other battery-powered mobility aids with spillable batteries, providing the equipment is carried as checked baggage. When the equipment can be loaded, stowed, secured and unloaded always in an upright position, the battery should be securely attached to the equipment, be disconnected and the terminals insulated to prevent accidental short circuits. When the equipment cannot be kept upright, the battery should be removed and carried in a strong, rigid packaging, which should be leak-tight and impervious to battery fluid. The battery in the packaging should be protected against accidental short circuits, be held upright and be surrounded by absorbent material in sufficient quantity to absorb the total liquid contents. The package containing the battery shall have on it 'Battery wet, with wheelchair' or 'Battery wet, with mobility aid', bear a 'Corrosives' label and be marked to indicate its correct orientation. The package shall be protected from upset by securement in the cargo compartment of the Helicopter. The commander shall be informed of the location of a wheelchair or mobility aid with an installed battery or of packed battery;
(m) When carriage is allowed by the operator, cartridges for weapons, (UN0012 and UN0014 only) in Division 1.4S providing they are for that person's own use, they are securely boxed and in quantities not exceeding five (5) kg gross mass and they are in checked baggage. Cartridges with explosive or incendiary projectiles are not permitted. Allowances for more than one person must not be combined into one or more packages.;

Note: Division 1.4S is a classification assigned to an explosive. It refers to cartridges which are packed or designed so that any dangerous effects from the accidental functioning of one or more cartridges in a package are confined within the package unless it has been degraded by fire, when the dangerous effects are limited to the extent that they do not hinder firefighting or other emergency response efforts in the immediate vicinity of the package. Cartridges for sporting use are likely to be within Division 1.4S.

(n) When carriage is allowed by the operator, a mercurial barometer or mercurial thermometer in carry-on (cabin) baggage when in the possession of a representative of a government weather bureau or similar official agency. The barometer or thermometer should be packed in a strong packaging having inside a sealed inner liner or bag of strong leak-proof and puncture resistant material impervious to mercury closed in such a way as to prevent the escape of mercury from the package irrespective of its position. The commander should be informed when such a barometer or thermometer is to be carried;
(o) When carriage is allowed by the operator, heat producing articles (i.e. battery operated equipment, such as under-water torches and soldering equipment, which if accidentally activated will generate extreme heat which can cause a fire), providing the articles are in carry-

on (cabin) baggage. The heat producing component or energy source should be removed to prevent accidental functioning;

(p) With the approval of the operator(s), one avalanche rescue backpack per person equipped with a pyrotechnic trigger mechanism containing not more than 200 mg net of division 1.4S and not more than 250 mg of compressed gas in division 2.2. The backpack must be packed in such a manner that it cannot be accidentally activated. The airbags within the backpack must be fitted with pressure relief valves;

(q) Consumer electronic devices (watches, calculating machines, cameras, cellphones, lap top computers, camcorders, etc.) containing lithium or lithium-ion cells or batteries when carried by passengers or crew for personal use. Spare batteries must be individually protected so as to prevent short circuits and carried in carry-on baggage only. In addition, each spare battery must not exceed the following quantities:

- For lithium metal or lithium alloy batteries, lithium content of not more than 1 grams; or for lithium-ion batteries, an aggregate equivalent lithium content of not more than 8 grams.
- Lithium-ion batteries with an aggregate equivalent lithium content of more than eight (8) grams but not more than twenty-five (25) grams may be carried in carry-on baggage if they are individually protected so as to prevent short circuits and are limited to two spare batteries per person.

(4) The list in the Technical Instructions of items permitted for carriage by passengers or crew may be revised periodically and OPS may not always reflect the current list. Consequently, the latest version of the Technical Instructions should also be consulted.

IEM OPS-3.12165(b) States concerned with exemptions

(See CAR OPS 3.1265(b))

(1) The Technical Instructions provide that in certain circumstances dangerous goods, which are normally forbidden on a Helicopter, may be carried. These circumstances include cases of extreme urgency or when other forms of transport are inappropriate or when full compliance with the prescribed requirements is contrary to the public interest. In these circumstances all the States concerned may grant exemptions from the provisions of the Technical Instructions provided that every effort is made to achieve an overall level of safety which is equivalent to that provided by the Technical Instructions.

(2) Although exemptions are most likely to be granted for the carriage of dangerous goods which are not permitted in normal circumstances, they may also be granted in other circumstances, such as when the packaging to be used is not provided for by the appropriate packing method or the quantity in the packaging is greater than that permitted. The Instructions also make provision for some dangerous goods to be carried when an approval has been granted only by the State of Origin, providing specific conditions, which are laid down in the Technical Instructions, are met.

(3) The States concerned are those of origin, transit, overflight and destination of the consignment and that of the operator. However, the Technical Instructions allow for the State of overflight to consider an application for exemption based solely on whether an equivalent level of safety has been achieved, if none of the other criteria for granting an exemption are relevant.

(4) The Technical Instructions provide those exemptions and approvals are granted by the "appropriate national Authority", which is intended to be the Authority responsible for the particular aspect against which the exemption or approval is being sought. The Instructions do not specify who should seek exemptions and, depending on the legislation of the particular State, this may mean the operator, the shipper or an agent. If an exemption or approval has been granted to other than an operator, the operator should ensure a copy has been obtained before the relevant flight. The operator should ensure all relevant conditions on an exemption or approval are met.

(5) The exemption or approval referred to in CAR OPS-3.1265(b) is in addition to the approval required by CAR OPS-3.1155.

AC OPS-3.1215(c)(1) Information to the Commander

(See-CAR OPS-3.1315(c)(1))

If the volume of information provided to the commander is such that it would be impracticable to transmit it in the event of an in-flight emergency, a summary of the information should be provided to the commander by the operator, containing at least the quantities and class or division of the dangerous goods in each cargo compartment.

AMC-1 OPS-3.1315(e) Information in the Event of an Inflight Emergency

(See CAR OPS-3.1315(e))

(1) To assist the ground services in preparing for the landing of a Helicopter in an emergency situation, it is essential that adequate and accurate information about any dangerous goods carried on board as cargo be given to the appropriate air traffic services unit. Wherever possible this information should include the proper shipping name and/or the UN/ID number, the class/division and for Class 1 the compatibility group, any identified subsidiary risks(s), the quantity and the location on board the Helicopter.

(2) When it is not possible to include all the information, those parts thought most relevant in the circumstances should be given, such as the UN/ID numbers or classes/divisions and quantity or a summary of the quantities and class/division in each cargo compartment. As an alternative, a telephone number can be given from where a copy of the written information to the commander can be obtained during the flight.

(3) It is accepted that due to the nature of the in-flight emergency, the situation may never permit the commander to inform the appropriate air traffic services unit of the dangerous goods carried as cargo on board the Helicopter.

AC OPS-3.1325 Dangerous Goods Incident and Accident Reports

(See CAR OPS-3.1325)

Use of a standard reporting format concerning the reporting of dangerous goods incidents and accidents would assist the Authorities and enable them to establish quickly the essential details of an occurrence. The details stated in CAR 92.420 Appendix 1 to CAR OPS-3.1325 have been listed for such use and its correct and full completion means that all the details required by CAR-13 would have been covered. These details may be sent to the relevant Authorities (state of operator and state of occurrence) by any appropriate means including fax, mail, electronic mail, etc.

SECTION 1 - SUBPART S – SECURITY

CAR OPS-3.1335 Security requirements

An operator shall ensure that all appropriate personnel are familiar, and comply, with the relevant requirements of the national security programmes of the Sultanate of Oman.

CAR OPS-3.1340 Training programmes

(See AC OPS-3.1340)

(a) An operator shall establish, maintain and conduct approved training programmes which enable the operator's crew members to take appropriate action to prevent acts of unlawful interference, such as sabotage or unlawful seizure of Helicopters and to minimise the consequences of such events.
(b) The training programme shall be compatible with the National Aviation Security programme. Individual crew member shall have knowledge and competency of all relevant elements of the training programme.
(c) The operator shall establish and maintain an approved security training programme which ensures crew members act in the most appropriate manner to minimize the consequences of acts of unlawful interference. As a minimum, this programme shall include the following elements:
    (1) determination of the seriousness of any occurrence;
    (2) crew communication and coordination;
    (3) appropriate self-defense responses;
    (4) use of non-lethal protective devices assigned to crew members whose use is authorized by the Authority;
    (5) understanding of behaviour of terrorists so as to facilitate the ability of crew members to cope with hijacker behaviour and passenger responses;
    (6) live situational training exercises regarding various threat conditions;
    (7) flight crew compartment procedures to protect the Helicopter; and
    (8) Helicopter search procedures and guidance on least-risk bomb locations where practicable.
(d) The operator shall establish and maintain a training programme to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage on a Helicopter so that they contribute to the prevention of acts of sabotage or other forms of unlawful interference.

CAR OPS-3.1345 Reporting acts of unlawful interference

Following an act of unlawful interference on board a Helicopter the commander or, in his absence the operator, shall submit, without delay, a report of such an act to the designated local Authority and the Authority in the Sultanate of Oman.

CAR OPS-3.1350 Helicopter search procedure checklist

(a) An operator shall ensure that there is on board a checklist of the procedures to be followed in search for a bomb or Improvised Explosive Device (IED) in case of suspected sabotage and for the inspecting of Helicopters for concealed weapons, explosives or other dangerous devices where a well-founded suspicion exists that the Helicopter may be the object of an act of unlawful interference.
(b) The checklist shall be supported by guidance on the appropriate course of action to be taken should a bomb or suspicious object be found and information on the least-risk bomb location specific to the Helicopter were provided by the Type Certificate holder.

CAR OPS-3.1355 Flight crew compartment security

If installed, the flight crew compartment door on all helicopters operated for the purpose of carrying passengers shall be capable of being locked from within the compartment in order to prevent unauthorised access.

AC OPS-3.1340 Training programmes

(See CAR OPS 3.1340)

An operator shall establish, maintain and conduct approved training programmes which enable the operator's crew members to take appropriate action to prevent acts of unlawful interference, such as sabotage or unlawful seizure of Helicopters and to minimise the consequences of such events, should they occur. The training programme shall be compatible with the National Aviation Security Programme. Individual crew member shall have knowledge and competence of all relevant elements of the training programme.