Civil Aviation Authority

CAR OPS - 4
Civil Aviation Regulation
General Aviation Operations
(Helicopter)

Effective: 1st August 2023

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President of Civil Aviation Authority

CORRIGENDUM OF AMENDMENTS

No.	Ref	Description
01	01	This is a new CAR issued against the Civil Aviation Law of Oman
02	02	This CAR has been reviewed with no changes implemented
03	03	This CAR has been revised as per ICAO requirements to include following major changes as per ICAO Annex 6 Part III Ed 11 and amendments by CAA:- • Terminology • CAR OPS 4.109 83 Bis Agreement • CAR OPS 4.429 • CAR OPS 4.505 • CAR OPS 4.445 Documents to be carried on board. • CAR OPS 4.446 Manuals to be carried • CAR OPS 4.447 Forms to be carried

ACRONYMS

The following terms or acronyms may be used in any manual or document published by the CAA.

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AC Advisory Circular
AD Airworthiness directive
ADREP Accident/incident data reporting (ICAO)
AGA Aerodromes, air routes and ground aids, (ICAO Doc 8400)
AGL Above ground level, (ICAO DOC 8400)
AGL Aerodrome or aeronautical ground lighting; i.e. any light specifically provided asan aid to air navigation, other than a light displayed on an aircraft.
AIM Aeronautical Information Management
AIS Aeronautical Information Services
ALoSP Acceptable level of safety performance
AMC Acceptable means of compliance
AME Aircraft maintenance engineer
ANS Air navigation service
AOC Air operator certificate
ATC Air traffic control
ATM Air traffic management
ATS Air traffic service(s)
CAA Civil Aviation Authority
CMA Continuous monitoring approach
CMC Crisis management centre
CMT Crisis management team
CNS Communications, navigation and surveillance
EMC Emergency management centre
EMS Environmental management system
ERP Emergency response plan
FIR Flight information region
FRMS Fatigue risk management systems
GM Guidance material
HIRA Hazard identification and risk assessment
HIRM Hazard identification and risk mitigation
IATA International Air Transport Association

ICAO International Civil Aviation Organization

OHSMS Occupational health and safety management system

OPS Operations

OPM Office Procedures Manual

ORP Organization risk profile

OSC Organization safety culture

OSHE Occupational safety, health and environmentQAQuality assurance

QC Quality control

QM Quality management

QMS Quality management system

SA Safety assurance

SAG Safety action group

SARPs Standards and Recommended Practices (ICAO)

SeMS Security management system

SM Safety management

SMM Safety management manual

SMP Safety Management Panel

SMS Safety management system(s)

SOPs Standard operating procedures

SPI Safety performance indicator

SPM Safety performance monitoring

SPT Safety performance trend

SRB Safety review board

SRC Safety review committee

SRM Safety risk management

SSO Safety services office

SSP State safety programme

TBD To be determined

TOR Terms of reference

USOAP Universal Safety Oversight Audit Programme (ICAO)

VRS Voluntary Reporting System

WIP Work in progress

Terminology

Terms used in CAR OPS-IV 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.*

***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 thatspecified 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.*

***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 provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft.*

***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 forward external 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 is 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.

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 the 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 is 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 ofthe 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.*

***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.*

State of 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 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.

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FOREWORD

(a) CAR-OPS 4 has been issued by the Civil Aviation Affairs of Oman (hereinafter called the Authority) under the provisions of the Civil Aviation Law of the Sultanate of Oman.

(b) ICAO Annex 6 has been selected to provide the basic structure of CAR–OPS 4, the CAR for General Aviation (Helicopter), but with additional sub-division were considered appropriate. The content of Annex 6 has been used and added to where necessary.

(c) CAR-OPS 4 has been developed to provide requirements for General Aviation Helicopter operators.

(d) Amendments to the text in CAR-OPS 4 are issued as amendment pages containing revised paragraphs.

(e) New, amended and corrected text will be enclosed within brackets until a subsequent 'Change' is issued

(f) 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, the industry or the applicant, as appropriate.

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

(g) Subparts of CAR-OPS 3 that have identical requirements as for CAR-OPS 4 have been incorporated by reference.

(h) Where applicable, CAR-OPS 3 Section 2 AMC's, AC's and IEM's have been incorporated by reference.

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

SUBPART A – Applicability

CAR OPS 4.001 Applicability

CAR OPS 4 applies to all international General Aviation helicopter operations.

CAR OPS 4.002 Exemptions

The Authority may exceptionally grant an exemption from the provisions of CAR OPS 4 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.

CAR OPS 4.003 Leasing and Interchange

(a) An operator may lease a helicopter with flight crew to another person for a private operation for the following;
   (1) Ferry or training flights;
   (2) Specialised operations such as aerial photography or survey, or pipeline patrol only;
   (3) Flights for the demonstration of a helicopter to prospective customers when no charge is made except for those specified in paragraph (c) of this section;
   (4) Flights conducted by the operator of a helicopter for his personal transportation, or the transportation of his guests when no charge, assessment, or fee is made for the transportation;
   (5) Carriage of officials, employees, guests, and property of a company on a helicopter operated by that company, or the parent or a subsidiary of the company or a subsidiary of the parent, when the carriage is within the scope of, and incidental to, the business of the company (other than transportation by air) and no charge, assessment or fee is made for the carriage in excess of the cost of owning, operating, and maintaining the helicopter, except that no charge of any kind may be made for the carriage of a guest of a company, when the carriage is not within the scope of, and incidental to, the business of that company;
   (6) The carriage of company officials, employees, and guests of the company on a helicopter operated under a time sharing, interchange, or joint ownership agreement as defined in paragraph (b);
   (7) The carriage of property (other than mail) on a helicopter operated by a person in the furtherance of a business or employment (other than transportation by air) when the carriage is within the scope of, and incidental to, that business or employment and no charge, assessment, or fee is made for the carriage other than those specified in paragraph (c);
   (8) The carriage on a helicopter of an athletic team, sports group, choral group, or similar group having a common purpose or objective when there is no charge, assessment, or fee of any kind made by

any person for that carriage; and

(9) The carriage of persons on a helicopter operated by a person in the furtherance of a business other than transportation by air for the purpose of selling them land, goods, or property, including franchises or distributorships, when the carriage is within the scope of, and incidental to, that business and no charge, assessment, or fee is made for that carriage.

(10) Any operation identified in paragraphs (a)(1) through (a)(9) of this section when conducted;

(i) by a fractional ownership programme manager under CAR OPS 4.003, or

(ii) by a fractional owner in a fractional ownership programme aircraft, except that a flight under a joint ownership arrangement under paragraph (a)(6) of this section may not be conducted. For a flight under an interchange agreement under paragraph (a)(6) of this section, the exchange of equal time for the operation must be properly accounted for as part of the total hours associated with the fractional owner's share of ownership.

(b) For the purpose of paragraph (a);

(1) A time sharing agreement means an arrangement whereby a person leases his/her helicopter with flight crew to another person, and no charge is made for the flights conducted under that arrangement other than those specified in paragraph (c) of this section;

(2) An interchange agreement means an arrangement whereby a person leases his/her helicopter to another person in exchange for equal time, when needed, on the other person's helicopter, and no charge, assessment, or fee is made, except that a charge may be made not to exceed the difference between the cost of owning, operating, and maintaining the two helicopters;

(3) A joint ownership agreement means an arrangement whereby one of the registered joint owners of a helicopter employs and furnishes the flight crew for that helicopter and each of the registered joint owners pays a share of the charge specified in the agreement.

(c) The following may be charged, as expenses of a specific flight, for transportation as authorised by paragraphs (a)(3) and (7) and (b)(1);

(1) Fuel, oil, lubricants, and other additives.

(2) Travel expenses of the crew, including food, lodging, and ground transportation.

(3) Hangar and tie-down costs away from the helicopter's base of operation.

(4) Insurance obtained for the specific flight.

(5) Landing fees, airport taxes, and similar assessments.

(6) Customs, foreign permit, and similar fees directly related to the flight.

(7) In flight food and beverages.

(8) Passenger ground transportation.

(9) Flight planning and weather contract services.

(10) An additional charge equal to 100% of the expenses listed in sub-paragraph (c)(1).

CAR OPS 4.004 Fractional Ownership Operations

(a) No person shall engage in a fractional ownership operation unless specifically approved by the Authority and in accordance with any directives and management specifications issued by the Authority governing;

(1) the provision of programme management services in a fractional ownership programme;

(2) the operation of a fractional ownership programme aircraft in a fractional ownership programme; and

(3) the operation of a programme aircraft included in a fractional ownership programme managed by an affiliate of the manager of the programme to which the owner belongs.

SUBPART B - GENERAL

CAR OPS 4.101 Compliance with Laws, Regulations and Procedures

(a) The pilot-in-command shall comply with the laws, regulations and procedures of those States in which operations are conducted.

(b) The pilot-in-command shall be responsible for the operation and safety of the helicopter and for the safety of all crew members, passengers and cargo on board, from the moment the engine(s) are started until the helicopter finally comes to rest at the end of the flight, with the engine(s) shut down and the rotor blades stopped.

(c) The pilot-in-command shall have responsibility for operational control.

(d) If an emergency situation which endangers the safety or security of the helicopter or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-in-command 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, as the State of Registry of the helicopter. Such reports shall be submitted as soon as possible and normally within ten days.

(e) 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.

(f) The pilot-in-command shall ensure that flight crew members demonstrate the ability to speak and understand the English language.

(g) Recommendation — The pilot-in-command should have available on board the helicopter essential information concerning the search and rescue services in the areas over which it is intended the helicopter will be flown.

CAR OPS 4.103 Dangerous Goods

(a) Applicability. The provisions of the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc. 9284) and CAR-92 (Dangerous Goods) also apply to the acceptance for carriage, loading and carriage of dangerous goods in any general aviation helicopter.

(b) Exceptions. The General Exceptions contained in Part 1; 1.1.5 of the Technical Instructions and the Exceptions contained in Part 1; 2.2 of the Technical Instructions also apply to any general aviation helicopter.

(c) Dangerous goods shall only be transported by the operator approved by the Authority except when;

(1) they are not subject to the Technical Instructions in accordance with Part 1 of those Instructions; or

(2) they are carried by passengers or the pilot-in-command, or are in baggage, in accordance with Part 8 of the Technical Instructions.

(d) The pilot-in-command shall take all reasonable measures to prevent dangerous goods from being carried on board inadvertently.

(e) The pilot-in-command shall, in accordance with the Technical Instructions, report without delay to the Authority and the appropriate authority of the State of occurrence in the event of any dangerous goods accidents or incidents.

(f) The pilot-in-command shall ensure that passengers are provided with information about dangerous goods in accordance with the Technical Instructions.

CAR OPS 4.105 Use of Psychoactive Substances

Holders of licences provided by the Authority for Annex 1 shall not exercise the privileges of their licences and related ratings while under the influence of any psychoactive substance which might render them unable to safely and properly exercise these privileges.

Holders of licences provided by the Authority for Annex 1 shall not engage in any problematic use of substances.

No person whose function is critical to the safety of aviation (safety-sensitive personnel) shall undertake that function while under the influence of any psychoactive substance, by reason of which human performance is impaired. No such person shall engage in any kind of problematic use of substances.

The Operator should ensure, as far as practicable, that all licence holders who engage in any kind of problematic use of substances are identified and removed from their safety-critical functions. Return to the safety-critical functions may be considered after successful treatment or, in cases where no treatment is necessary, after cessation of the problematic use of substances and upon determination that the person's continued performance of the function is unlikely to jeopardize safety.

Note.— Guidance on suitable methods of identification (which may include biochemical testing on such occasions as pre-employment, upon reasonable suspicion, after accidents/incidents, at intervals, and at random) and on other prevention topics is contained in the Manual on Prevention of Problematic Use of Substances in the Aviation Workplace (Doc 9654).

CAR OPS 4.107 Specific Approvals

(a) An operator shall not operate a helicopter for the purpose of General Aviation operations otherwise than under, and in accordance with, the approvals and limitations of Specific Approvals issued for that helicopter.

(b) The pilot-in-command shall not conduct operations for which a specific approval is required unless such

approval has been issued by the Authority.

(c) Specific approvals shall follow the layout listed in ICAO Annex 6, Part III, Appendix 5 and contain the information on the following required approvals;

(1) Low Visibility Operations;

(2) Operational credit operations for advanced aircraft, when used for low visibility operations;

(3) Performance Based Operations (PBN);

(4) Carriage of Dangerous Goods;

(5) Use of EFB (installed or portable);

(6) Use of CPDLC;

(7) Use of ADS-B Out;

(8) Use of ADS C;

(9) Required Communications Performance (RCP);

(10) Required Surveillance Performance (RSP); and

(11) Fractional Ownership management operations.

CAR OPS 4.109 Aeroplane 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 principal location of a general aviation operator, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format.

(b) When the summary is issued in a language other than English, an English translation shall be included.

(c) 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 principal location of a general aviation operator, when conducting surveillance activities such as ramp checks.

(d) 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 principal location of a general aviation 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 will need to list only the specific aircraft carrying the copy.

(e) 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.

SUBPART C - FLIGHT OPERATIONS

CAR OPS 4.201 Adequacy of Operating Facilities

The pilot-in-command shall not commence a flight unless it has been ascertained by every reasonable means available that the ground and/or water facilities available and directly required for such flight and for the safe operation of the helicopter, are adequate including communication facilities and navigation aids.

CAR OPS 4.203 Heliport or Landing Location Operating Minima

(a) The pilot-in-command shall establish operating minima in accordance with criteria specified by the Authority, as 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) The Authority, as the State of Registry, shall authorize operational credit(s) 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: Operational credit includes:

(1) for the purposes of an approach ban or dispatch considerations, a minimum below the heliport or landing operating minima;

(2) reducing or satisfying the visibility requirements; or

(3) requiring fewer ground facilities as compensated for by airborne capabilities.

(c) When issuing a specific approval for the operational credit, the Authority, as the State of the Operator, shall ensure that;

(1) the helicopter meets the appropriate airworthiness certification requirements;

(2) 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;

(3) the operator has carried out a safety risk assessment of the operations supported by the equipment;

(4) the operator/owner has established and documented normal and abnormal procedures and MEL;

(5) the operator/owner has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;

(6) 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

(7) the operator has instituted appropriate procedures in respect of continuing airworthiness

(maintenance and repair) practices and programmes

(d) For operations with operational credit with minima above those related to low visibility operations, the Authority, as the State of the Operator shall establish criteria for the safe operation of the helicopter.

CAR OPS 4.205 Briefing

(a) The pilot-in-command shall ensure that passengers are made familiar with the location and use of:
   (1) seat belts;
   (2) emergency exits;
   (3) life jackets, if the carriage of life jackets is prescribed;
   (4) oxygen dispensing equipment if the use of oxygen is anticipated; and
   (5) other emergency equipment provided for individual use, including passenger emergency briefing cards.

(b) The pilot-in-command shall ensure that all persons on board are aware of the location and general manner of use of the principal emergency equipment carried for collective use.

CAR OPS 4.207 Duties of the pilot-in-command

(a) The pilot-in-command shall be responsible for the operation and safety of the helicopter and for the safety of all crew members, passengers and cargo on board, from the moment the engine(s) are started until the helicopter finally comes to rest at the end of the flight, with the engine(s) shut down and the rotor blades stopped.

(b) A flight shall not be commenced until the pilot-in-command is satisfied that:
   (1) the helicopter is airworthy, duly registered and that appropriate certificates with respect thereto are aboard the helicopter;
   (2) the instruments and equipment installed in the helicopter are appropriate, taking into account the expected flight conditions;
   (3) any necessary maintenance has been performed in accordance with Subpart G of these regulations;
   (4) the mass of the helicopter and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
   (5) any load carried is properly distributed and safely secured; and
   (6) the helicopter operating limitations, contained in the flight manual, or its equivalent, will not be exceeded.

CAR OPS 4.209 Weather Reports and Forecasts

Before commencing a flight, the pilot-in-command shall be familiar with all available meteorological information appropriate to the intended flight. Preparation for a flight away from the vicinity of the place of departure, and for every flight under the instrument flight rules, shall include:

(a) a study of available current weather reports and forecasts; and

(b) the planning of an alternative course of action to provide for the eventuality that the flight cannot be completed as planned, because of weather conditions.

CAR OPS 4.211 Flight in Accordance with VFR

A flight to be conducted in accordance with VFR shall not be commenced 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 the VFR will, at the appropriate time, be such as to enable compliance with these rules.

CAR OPS 4.213 Flight in Accordance with IFR

(a) When an alternate is required.

A flight to be conducted in accordance with IFR shall not be commenced unless the available information indicates that conditions, at the heliport of intended landing and at least one alternate heliport will, at the estimated time of arrival, be at or above the heliport operating minima.

(b) When no alternate is required.

A flight to be conducted in accordance with IFR to a heliport when no alternate heliport is required shall not be commenced unless available current meteorological information indicates that the following meteorological conditions will exist from two hours before to two hours after the estimated time of arrival, or from the actual time of departure to two hours after the estimated time of arrival, whichever is the shorter period:

(1) a cloud base of at least 120 m (400 ft) above the minimum associated with the instrument approach procedure; and

(2) visibility of at least 1.5 km more than the minimum associated with the procedure.

CAR OPS 4.215 Heliport Operating Minima

(a) A flight shall not be continued towards the heliport of intended landing unless the latest available meteorological information indicates that conditions at that heliport, or at least one alternate heliport, will, at the estimated time of arrival, be at or above the specified heliport operating minima.

(b) An instrument approach shall not be continued below 300 m (1000 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.

(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 beyond a point at which the limits of the heliport operating minima would be infringed.

CAR OPS 4.217 Flight in Icing Conditions

A flight to be operated in known or expected icing conditions shall not be commenced unless the helicopter is certificated and equipped to cope with such conditions.

CAR OPS 4.219 Alternate Heliports

(a) For a flight to be conducted in accordance with IFR, at least one alternate heliport or landing location shall be specified in the operational flight plan and the flight plan, unless:

(1) the weather conditions in CAR OPS 4.213(b) prevail; or

(2) (i) the heliport or landing location of intended landing is isolated and no alternate heliport or landing location is available; and

(ii) an instrument approach procedure is prescribed for the isolated heliport of intended landing; and

(iii) a point of no return (PNR) is determined in case of an offshore destination.

(b) Suitable offshore alternates may be specified subject to the following:

(1) the offshore alternates shall be used only after passing a PNR prior to a PNR onshore alternates shall be used;

(2) mechanical reliability of critical control systems and critical components shall be considered and taken into account;

(3) when determining the suitability of the alternate;

(4) one engine inoperative performance capability shall be attainable prior to arrival at the alternate;

(5) to the extent possible, deck availability shall be guaranteed; and

(6) weather information must be reliable and accurate.

Note: Offshore alternates should not be used when it is possible to carry enough fuel to have an onshore alternate. Offshore alternates should not be used in a hostile environment.

CAR OPS 4.221 Fuel and Oil Requirements

(a) All helicopters.

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

(b) VFR operations.

The fuel and oil carried in order to comply with paragraph (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 a 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 potential contingencies, as determined by the State and specified in the State regulations governing general aviation.

(c) IFR operations.

The fuel and oil carried in order to comply with paragraph (a) shall, in the case of IFR operations, be at least the amount to allow the helicopter:

(1) When no alternate is required, in terms of CAR OPS 4.213(b, to fly to and execute an approach at the heliport or landing location to which the flight is planned, and thereafter to have:

(i) a 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 potential contingencies.

(2) When an alternate is required, in terms of CAR OPS 4.213(a), 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) fly to and execute an approach at the alternate specified in the flight plan; and then

(ii) have a 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) have an additional amount of fuel to provide for the increased consumption on the occurrence of potential contingencies.

(3) When no alternate heliport or landing location is available (i.e. the heliport of intended landing is isolated and no alternate is available), to fly to the heliport to which the flight is planned and thereafter for a period as specified by the State of the Operator.

(d) In computing the fuel and oil required in paragraph (a), at least the following shall be considered:

(1) meteorological conditions forecast;

(2) expected air traffic control routings and traffic delays;

(3) for IFR flight, one instrument approach at the destination heliport, including a missed approach;

(4) the procedures for loss of pressurisation, where applicable, or failure of one engine while en route; and

(5) any other conditions that may delay the landing of the helicopter or increase fuel and/or oil consumption.

Note: Nothing in this regulation precludes amendment of a flight plan in flight in order to replan the flight to another heliport, provided that the requirements can be complied with from the point where the flight has been replanned.

(e) The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

CAR OPS 4.223 In-Flight Fuel Management

(a) The pilot-in-command 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.

Note: The protection of final reserve fuel is intended to ensure safe landing at any heliport or landing location when unforeseen occurrences may not permit a safe completion of an operation as originally planned.

(b) 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.

(c) The pilot-in-command 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 in compliance with 2.8.

Note 1: The planned final reserve fuel refers to the value calculated in CAR OPS 4.221 and 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.

CAR OPS 4.225 Oxygen Supply

(a) A flight to be operated at altitudes at which the cabin pressure in personnel compartments will be higher than 10 000 ft shall not be commenced unless sufficient stored breathing oxygen is carried to supply:
   (1) all crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the cabin pressure in compartments occupied by them will be between 10 000 ft and 13 000 ft; and
   (2) the crew and passengers for any period that the cabin pressure in compartments occupied by them will be greater than 13 000 ft.

(b) A flight to be operated with a pressurised 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 pressurisation, for any period that the cabin pressure in any compartment occupied by them would be more than 10 000 ft.

CAR OPS 4.227 Use of Oxygen

The pilot-in-command shall ensure that he/she and flight crew members engaged in performing duties essential to the safe operation of a helicopter in flight use supplemental oxygen continuously whenever the circumstances prevail for which its supply has been required in CAR OPS 4.225.

CAR OPS 4.229 In-flight Emergency Instruction

In an emergency during flight, the pilot-in-command shall ensure that all persons on board are instructed in such emergency action as may be appropriate to the circumstances.

CAR OPS 4.231 Weather Reporting by Pilots

When weather conditions likely to affect the safety of other aircraft are encountered, they should be reported as soon as possible.

CAR OPS 4.233 Hazardous Flight Conditions

Hazardous flight conditions, other than those associated with meteorological conditions, encountered enroute should be reported as soon as possible. The reports so rendered should give such details as may be pertinent to the safety of other aircraft.

CAR OPS 4.235 Fitness of Flight Crew Members

The pilot-in-command shall be responsible for ensuring that a flight:

(a) will not be commenced if any flight crew member is incapacitated from performing duties by any cause such as injury, sickness, fatigue, the effects of alcohol or drugs; and

(b) will not be 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, lack of oxygen.

CAR OPS 4.237 Flight Crew Members at Duty Stations

(a) Take-off and landing.

All flight crew members required to be on flight deck duty shall be at their stations.

(b) En route.

All flight crew members required to be on flight deck duty shall remain at their stations except when their absence is necessary for the performance of duties in connection with the operation of the helicopter or for physiological needs.

(c) Seat belts.

All flight crew members shall keep their seat belts fastened when at their stations.

(d) Safety harness.

When safety harnesses are provided, 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.

Note: Safety harness includes shoulder strap(s) and a seat belt which may be used independently.

CAR OPS 4.239 Instrument Flight Procedures

(a) One or more instrument approach procedures designed to support instrument approach operations shall be approved and promulgated by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State, to serve each final approach and take-off area or heliport utilised for instrument flight operations.

(b) All helicopters operated in accordance with the instrument flight rules shall comply with the instrument approach procedures approved by the State in which the heliport is located, or by the State which is responsible for the heliport when located outside the territory of any State.

CAR OPS 4.241 Instruction - General

A helicopter rotor shall not be turned under power for the purpose of flight without a qualified pilot at the controls.

CAR OPS 4.243 Refuelling with Passengers on Board

(a) A helicopter shall not be refuelling when passengers are embarking, on board or disembarking, or when the rotor is turning unless it is attended by the pilot-in-command or other qualified personnel ready to initiate an evacuation of the helicopter by the most practical and expeditious means available.

(b) When refuelling with passengers embarking, on board or disembarking, 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 pilot-in-command or other qualified personnel on board the helicopter.

(c) The helicopter shall not be refuelled with aviation gasoline (AVGAS) or wide-cut type fuel or a mixture of these types of fuel, or when an open line is used, when passengers are embarking, on board or disembarking.

CAR OPS 4.245 Over-Water Flights

All helicopters on flights over water in a hostile environment in accordance CAR OPS 4.419(a) shall be certificated for ditching. Sea state shall be an integral part of ditching information.

SUBPART D - PERFORMANCE OPERATING LIMITATIONS

CAR OPS 4.301 General

(See Appendix 1 to CAR OPS 4.301)

(a) A helicopter shall be operated;

(1) in compliance with the terms of its airworthiness certificate or equivalent approved document; and

(2) within the operating limitations prescribed by the certificating authority and the Authority, as the State of Registry; and

(3) within the operating limitations prescribed in Appendix to CAR OPS 4.301 by the Authority, as the State of Registry; and

(4) if applicable, within the mass limitations imposed by compliance with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorised in exceptional circumstances for a certain heliport where there is no noise disturbance problem, by the competent authority of the State in which the heliport is situated.

(b) Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the Authority, as the State of Registry for visual presentation, shall be displayed in the helicopter.

(c) Where helicopters are operating to or from heliports in a congested hostile environment, the competent authority of the State in which the heliport is situated shall take such precautions as are necessary to control the risk associated with an engine failure.

Appendix 1 to CAR OPS 4.301

Helicopter Performance and Operating Limitations

(See CAR OPS 4.301)

1. General

1.1 Purpose and scope

This attachment comprises the code of performance for helicopters operated under these regulations.

1.2 Performance - general

1.2.1 Categories

Category A. With respect to helicopters, means a multi-engine helicopter designed with engine and system isolation features specified in ICAO Annex 8, Part IVB, and capable of operations using take-off and landing data scheduled under a critical engine failure concept which assures adequate designated surface area and

adequate performance capability for continued safe flight or safe rejected take-off.

Category B. With respect to helicopters, means a single engine or multi-engine helicopter which does not meet Category A standards. Category B helicopters have no guaranteed capability to continue safe flight in the event of an engine failure, and a forced landing is assumed.

1.3 General requirements

(a) Helicopters operating in performance Classes 1 and 2 shall be certificated in Category A.

(b) Helicopters operating in performance Class 3 shall be certificated in either Category A or Category B (or equivalent).

(c) Except as permitted by the Authority:

(1) Take-off or landing from/to heliports in a congested hostile environment shall only be conducted in performance Class 1.

(2) Operations in performance Class 2 shall only be conducted with a safe forced landing capability during take-off and landing.

(3) Operations in performance Class 3 shall only be conducted in a non-hostile environment.

(d) In order to permit variations from c), d) and e), the Authority shall, in cooperation with the operator, undertake a risk assessment, considering factors such as:

(1) the type of operation and the circumstances of the flight;

(2) the area/terrain over which the flight is being conducted;

(3) the probability of a critical engine failure and the consequence of such an event;

(4) the procedures to maintain the reliability of the engine(s);

(5) the training and operational procedures to mitigate the consequences of the critical engine failure; and

(6) installation and utilization of a usage monitoring system.

Note: If there are routes with access to suitable forced landing areas, these should be used for flights into and out of the congested area. Where no such routes exist, evaluation of the operation could include consideration of mitigating factors such as the reliability of the propulsion system in the short periods when flight over a suitable forced landing area is not possible.

1.4 Abbreviations Specific to Helicopter Operations

D	Maximum dimension of helicopter
DPBL	Defined point before landing
DPATO	Defined point after take-off
DR	Distance travelled (helicopter)

FATO	Final approach and take-off area
HFM	Helicopter flight manual
LDP	Landing decision point
LDAH	Landing distance available (helicopter)
LDRH	Landing distance required (helicopter)
R	Rotor radius of helicopter
RTODR	Rejected take-off distance required (helicopter)
TDP	Take-off decision point
TLOF	Touchdown and lift-off area
TODAH	Take-off distance available (helicopter)
TODRH	Take-off distance required (helicopter)
VTOSS	Take-off safety speed

1.5 Definitions

1.5.1 Only applicable to operations in performance Class 1

Landing distance required (LDRH). The horizontal distance required to land and come to a full stop from a point 15 m (50 ft) above the landing surface.

Rejected take-off distance required (RTODR). The horizontal distance required from the start of the take-off to the point where the helicopter comes to a full stop following an engine failure and rejection of the take-off at the take-off decision point.

Take-off distance required (TODRH). The horizontal distance required from the start of the takeoff to the point at which VTOSS, a selected height and a positive climb gradient are achieved, following failure of the critical engine being recognized at TDP, the remaining engines operating within approved operating limits.

Note: The selected height stated above is to be determined with reference to either:

(a) the take-off surface; or

(b) a level defined by the highest obstacle in the take-off distance required.

1.5.2 Applicable to operations in all performance classes

D. The maximum dimension of the helicopter.

Distance DR. DR is the horizontal distance that the helicopter has travelled from the end of the take-off distance available.

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.

R. The rotor radius of the helicopter.

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.

Take-off flight path. The vertical and horizontal path, with the critical engine inoperative, from a specified point in the take- off to 300 m (1 000 ft) above the surface.

Touchdown and lift-off area (TLOF). A load bearing area on which a helicopter may touch down or lift off.

VTOSS. Take-off safety speed for helicopters certificated in Category A.

Vy . Best rate of climb speed.

2. Requirements

2.1 Applicability

2.1.1 Helicopters with a passenger seating configuration of more than 19, or helicopters operating to or from a heliport in a congested hostile environment shall be operating in performance Class 1.

2.1.2 Helicopters with a passenger seating configuration of 19 or less but more than 9 shall be operating in performance Class 1 or 2, unless operating to or from a congested hostile environment in which case the helicopters shall be operating in performance Class 1.

2.1.3 Helicopters with a passenger seating configuration of 9 or less shall be operating in performance Class 1, 2 or 3, unless operating to or from a congested hostile environment in which case the helicopters shall be operating in performance Class 1.

2.2 Significant performance factors

To determine the performance of the helicopter, account shall be taken of at least the following factors:

(a) mass of the helicopter;

(b) elevation or pressure-altitude and temperature; and

(c) wind; for take-off and landing, accountability for wind shall be no more than 50 per cent of any reported steady headwind component of 5 knots or more. Where take-off and landing with a tailwind component is permitted in the flight manual, not less than 150 per cent of any reported tailwind component shall be allowed. Where precise wind measuring equipment enables accurate measurement of wind velocity over the point of take-off and landing, these values may be varied.

2.3 Operating conditions

2.3.1 For helicopters operating in performance Class 2 or 3 in any flight phase where an engine failure may cause the helicopter to force-land:

(a) a minimum visibility shall be defined by the operator, taking into account the characteristics of the helicopter, but shall not be less than 800 m for helicopters operating in performance Class 3; and

(b) the operator shall verify that the surface below the intended flight path permits the pilot to execute a safe forced landing.

2.3.2 Performance Class 3 operations are not to be performed:

(a) out of the sight of the surface; or

(b) at night; or

(c) when the cloud ceiling is less than 180 m (600 ft).

2.4 Obstacle accountability area

2.4.1 For the purpose of the obstacle clearance requirements in 4 below, an obstacle shall be considered if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

(a) for VFR operations:

(1) half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) 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 DR for VFR day operations

— 0.15 DR for VFR night operations

(b) for IFR operations:

(1) 1.5 D (or 30 m, whichever is greater), plus:

— 0.10 DR for IFR operations with accurate course guidance

— 0.15 DR for IFR operations with standard course guidance

— 0.30 DR for IFR operations without course guidance

(c) for operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria required in 2.4.1 a) apply up to the transition point then the criteria required in 2.4.1 b) apply after the transition point.

2.4.2 For a take-off using a backup take-off procedure (or with lateral transition), for the purpose of the obstacle clearance requirements in 4 below, an obstacle located below the backup flight path (lateral 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 half of the minimum width of the FATO (or the equivalent term used in the helicopter flight manual) defined in the helicopter flight manual when no width is defined, 0.75 D plus 0.25 times D, or 3 m, whichever is greater) plus:

(a) 0.10 distance travelled from the back edge of the FATO for VFR day operations;

(b) 0.15 distance travelled from the back edge of the FATO for VFR night operations.

2.4.3 Obstacles may be disregarded if they are situated beyond:

(a) 7 R for day operations if it is assured that navigational accuracy can be achieved by reference to suitable

visual cues during the climb;

(b) 10 R for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

(c) 300 m if navigational accuracy can be achieved by appropriate navigation aids; and

(d) 900 m in the other cases.

Note: Standard course guidance includes ADF and VOR guidance. Accurate course guidance includes ILS, MLS, or other course guidance providing an equivalent navigational accuracy.

2.4.4 The transition point shall not 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.

2.4.5 When considering the missed approach flight path, the divergence of the obstacle accountability area shall only apply after the end of the take-off distance available.

2.5 Source of performance data

The operator shall ensure that the approved performance data contained in the helicopter flight manual is used to determine compliance with this Attachment, supplemented as necessary with other data acceptable to the State of the Operator.

3. Operating area considerations

3.1 FATO

For operations in performance Class 1, the dimensions of the FATO shall be at least equal to the dimensions specified in the helicopter flight manual.

Note: A FATO that is smaller than the dimensions specified in the helicopter flight manual may be accepted if the helicopter is capable of a hover out of ground effect with one engine inoperative (HOGE OEI), and the conditions of 4.1 below can be met.

4. Limitations resulting from performance

4.1 Operations in performance Class 1

4.1.1 Take-off

4.1.1.1 The take-off mass of the helicopter shall not exceed the maximum take-off mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and

the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2 (Figure 1).

4.1.1.2 Rejected take-off

The take-off mass shall be such that the rejected take-off distance required does not exceed the rejected take-off distance available.

4.1.1.3 Take-off distance

The take-off mass shall be such that the take-off distance required does not exceed the take-off distance available.

Note 1: As an alternative, the requirement above may be disregarded provided that the helicopter with the critical engine failure recognized at TDP can, when continuing the take-off, clear all obstacles from the end of the take-off distance available to the end of the take-off distance required by a vertical margin of not less than 10.7 m (35 ft) (Figure 2).

Note 2: For elevated heliports, the take-off technique must have appropriate clearance from the elevated heliport edge (Figure 3).

4.1.1.4 Backup procedures (or procedures with lateral transition)

The operator shall ensure that, with the critical engine inoperative, all obstacles below the backup flight path (the lateral flight path) are cleared by an adequate margin. Only the obstacles specified in 2.4.2 should be considered.

4.1.2 Take-off flight path

From the end of the take-off distance required with the critical engine inoperative:

4.1.2.1 The take-off mass shall be such that the climb path provides a vertical clearance of not less than 10.7 m (35 ft) for VFR operations and 10.7 m (35 ft) plus 0.01 DR for IFR operations above all obstacles located in the climb path. Only obstacles as specified in 2.4 should be considered.

4.1.2.2 Where a change of direction of more than 15 degrees is made, obstacle clearance requirements shall be increased by 5 m (15 ft) from the point at which the turn is initiated. This turn should not be initiated before reaching a height of 60 m (200 ft) above the take-off surface, unless permitted as part of an approved procedure in the flight manual.

4.1.3 En route

The take-off mass is such that it is possible, in case of the critical engine failure occurring at any point of the flight path, to continue the flight to an appropriate landing site and achieve the minimum flight altitudes for the route to be flown.

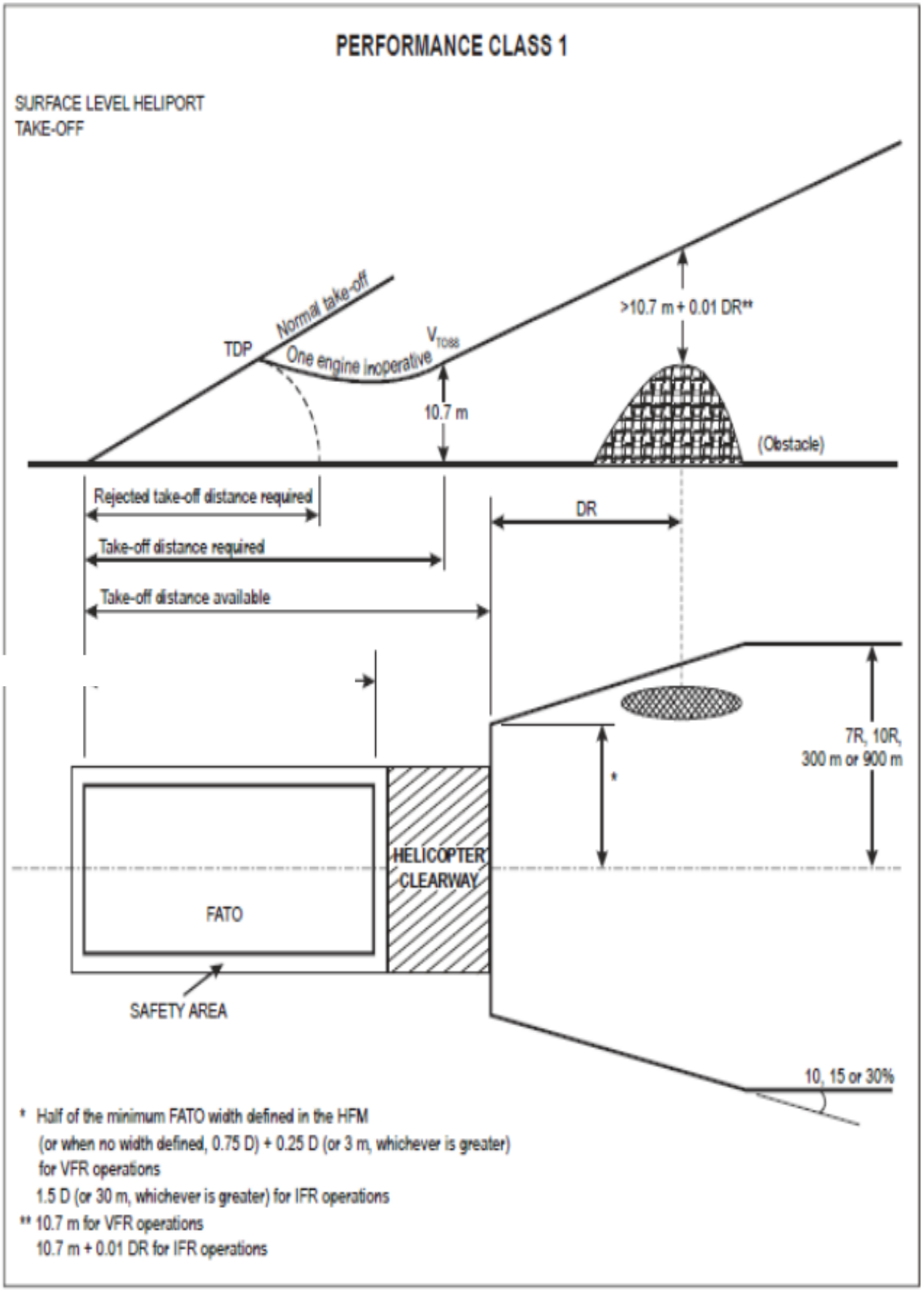

PERFORMANCE CLASS 1
SURFACE LEVEL HELIPORT
TAKE-OFF
Normal take-off
TDP
One engine inoperative
V_{TOSS}
10.7 m
>10.7 m + 0.01 DR**
(Obstacle)
Rejected take-off distance required
Take-off distance required
Take-off distance available
DR
7R, 10R,
300 m or 900 m
*
HELICOPTER CLEARWAY
FATO
SAFETY AREA
10, 15 or 30%
* Half of the minimum FATO width defined in the HFM
(or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater)
for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 1

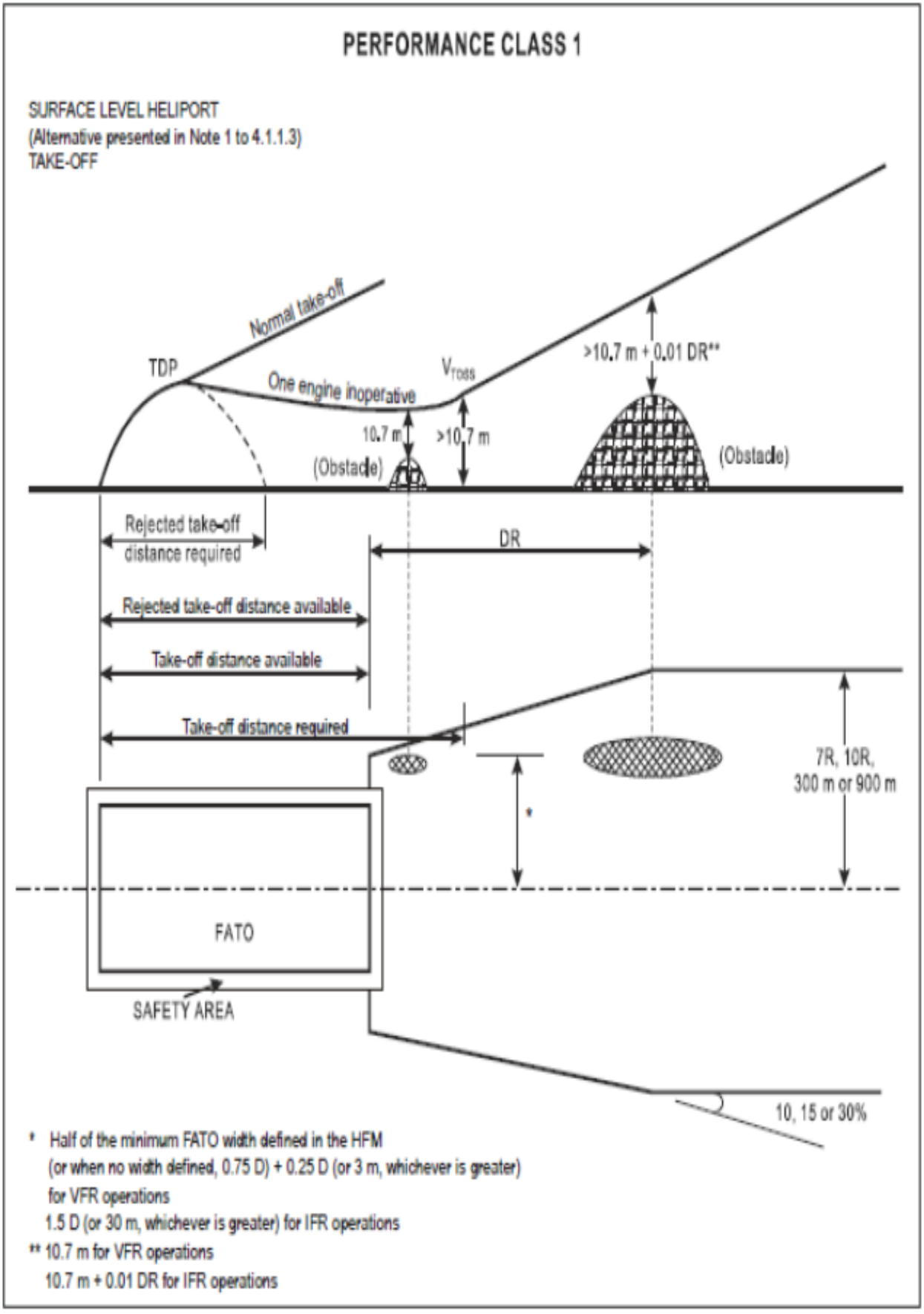

PERFORMANCE CLASS 1
SURFACE LEVEL HELIPORT
(Alternative presented in Note 1 to 4.1.1.3)
TAKE-OFF
Normal take-off
TDP
One engine inoperative
V_{TOSS}
>10.7 m + 0.01 DR**
10.7 m
>10.7 m
(Obstacle)
(Obstacle)
Rejected take-off distance required
DR
Rejected take-off distance available
Take-off distance available
Take-off distance required
7R, 10R, 300 m or 900 m
*
FATO
SAFETY AREA
10, 15 or 30%
* Half of the minimum FATO width defined in the HFM (or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 2

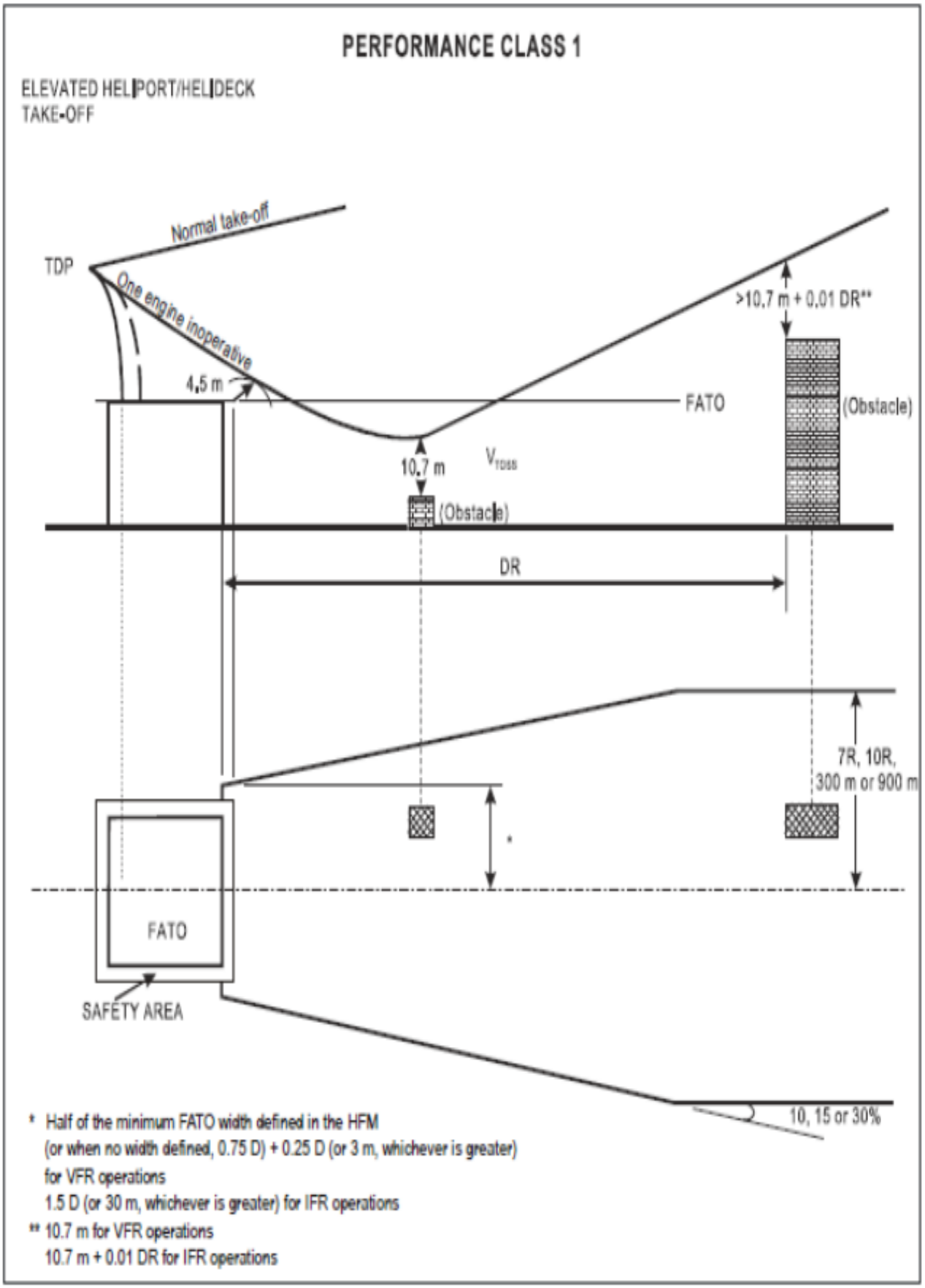

PERFORMANCE CLASS 1
ELEVATED HELIPORT/HELIDECK
TAKE-OFF
Normal take-off
TDP
One engine inoperative
4,5 m
FATO
>10,7 m + 0,01 DR**
(Obstacle)
10,7 m
V_{TOSS}
(Obstacle)
DR
7R, 10R,
300 m or 900 m
*
FATO
SAFETY AREA
10, 15 or 30%
* Half of the minimum FATO width defined in the HFM
(or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater)
for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 3

4.1.4 Approach, landing and balked landing (Figures 4 and 5)

The estimated landing mass at the destination or alternate shall be such that:

(a) it does not exceed the maximum landing mass specified in the flight manual for the procedure to be used and to achieve a rate of climb of 100 ft/min at 60 m (200 ft) and 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2;

(b) the landing distance required does not exceed the landing distance available unless the helicopter, with the critical engine failure recognized at LDP can, when landing, clear all obstacles in the approach path;

(c) in case of the critical engine failure occurring at any point after the LDP, it is possible to land and stop within the FATO; and

(d) in the event of the critical engine failure being recognized at the LDP or at any point before the LDP, it is possible either to land and stop within the FATO or to overshoot, meeting the conditions of 4.1.2.1 and 4.1.2.2.

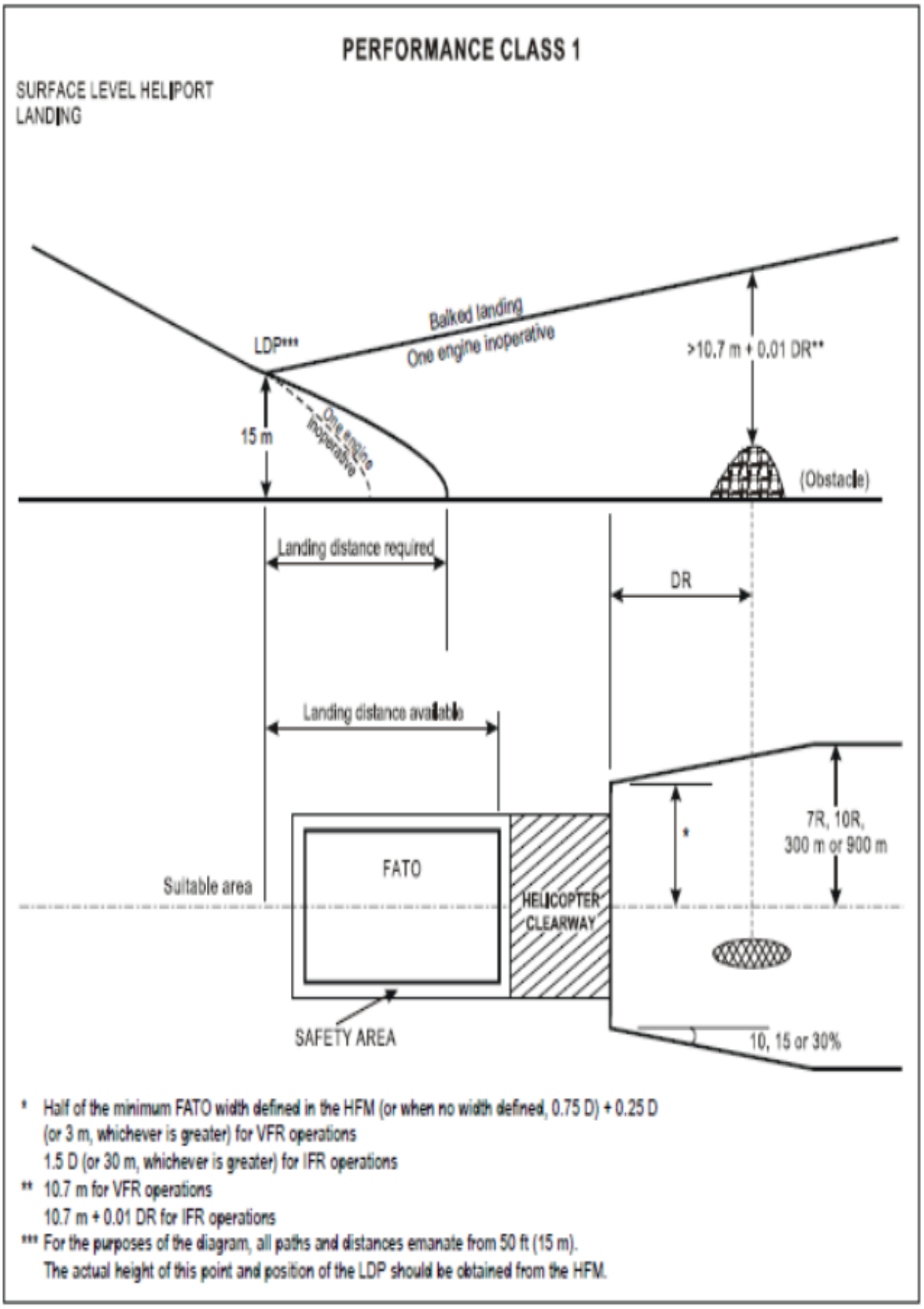

PERFORMANCE CLASS 1
SURFACE LEVEL HELIPORT
LANDING
LDP***
Balked landing
One engine inoperative
>10.7 m + 0.01 DR**
15 m
One engine inoperative
(Obstacle)
Landing distance required
DR
Landing distance available
7R, 10R,
300 m or 900 m
*
FATO
Suitable area
HELICOPTER CLEARWAY
SAFETY AREA
10, 15 or 30%
* Half of the minimum FATO width defined in the HFM (or when no width defined, 0.75 D) + 0.25 D
(or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** For the purposes of the diagram, all paths and distances emanate from 50 ft (15 m).
The actual height of this point and position of the LDP should be obtained from the HFM.

Figure 4

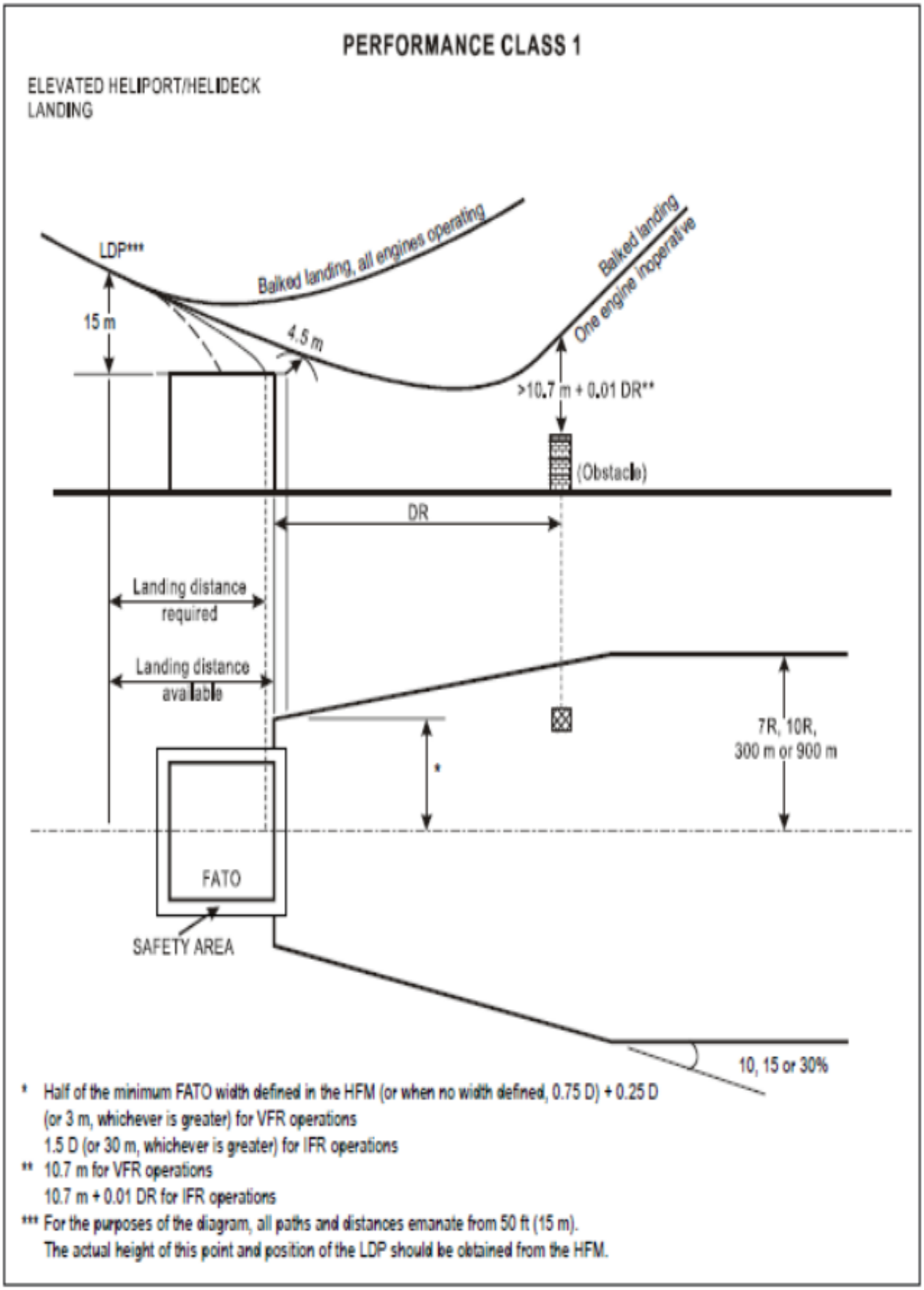

PERFORMANCE CLASS 1
ELEVATED HELIPORT/HELIDECK
LANDING
LDP***
Balked landing, all engines operating
Balked landing
One engine inoperative
15 m
4.5 m
>10.7 m + 0.01 DR**
(Obstacle)
DR
Landing distance required
Landing distance available
7R, 10R, 300 m or 900 m
*
FATO
SAFETY AREA
10, 15 or 30%
* Half of the minimum FATO width defined in the HFM (or when no width defined, 0.75 D) + 0.25 D (or 3 m, whichever is greater) for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** For the purposes of the diagram, all paths and distances emanate from 50 ft (15 m).
The actual height of this point and position of the LDP should be obtained from the HFM.

Figure 5

4.2 Operations in performance Class 2

4.2.1 Take-off (Figures 6 and 7)

The mass of the helicopter at take-off shall not exceed the maximum take-off mass specified in the flight manual for the procedures to be used and to achieve a rate of climb of 150 ft/min at 300 m
(1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2.

4.2.2 Take-off flight path

From DPATO or, as an alternative, no later than 60 m (200 ft) above the take-off surface with the critical engine inoperative, the conditions of 4.1.2.1 and 4.1.2.2 shall be met.

4.2.3 En route

The requirements of 4.1.3 shall be met.

4.2.4 Approach, landing and balked landing (Figures 8 and 9)

The estimated landing mass at the destination or alternate shall be such that:

(a) it does not exceed the maximum landing mass specified in the flight manual for a rate of climb of 150 ft/min at 300 m (1 000 ft) above the level of the heliport with the critical engine inoperative and the remaining engines operating at an appropriate power rating, taking into account the parameters specified in 2.2;

(b) it is possible, in case of the critical engine failure occurring at or before the DPBL, either to perform a safe forced landing or to overshoot, meeting the requirements of 4.1.2.1 and 4.1.2.2.

Note: Only obstacles as specified in 2.4 should be considered

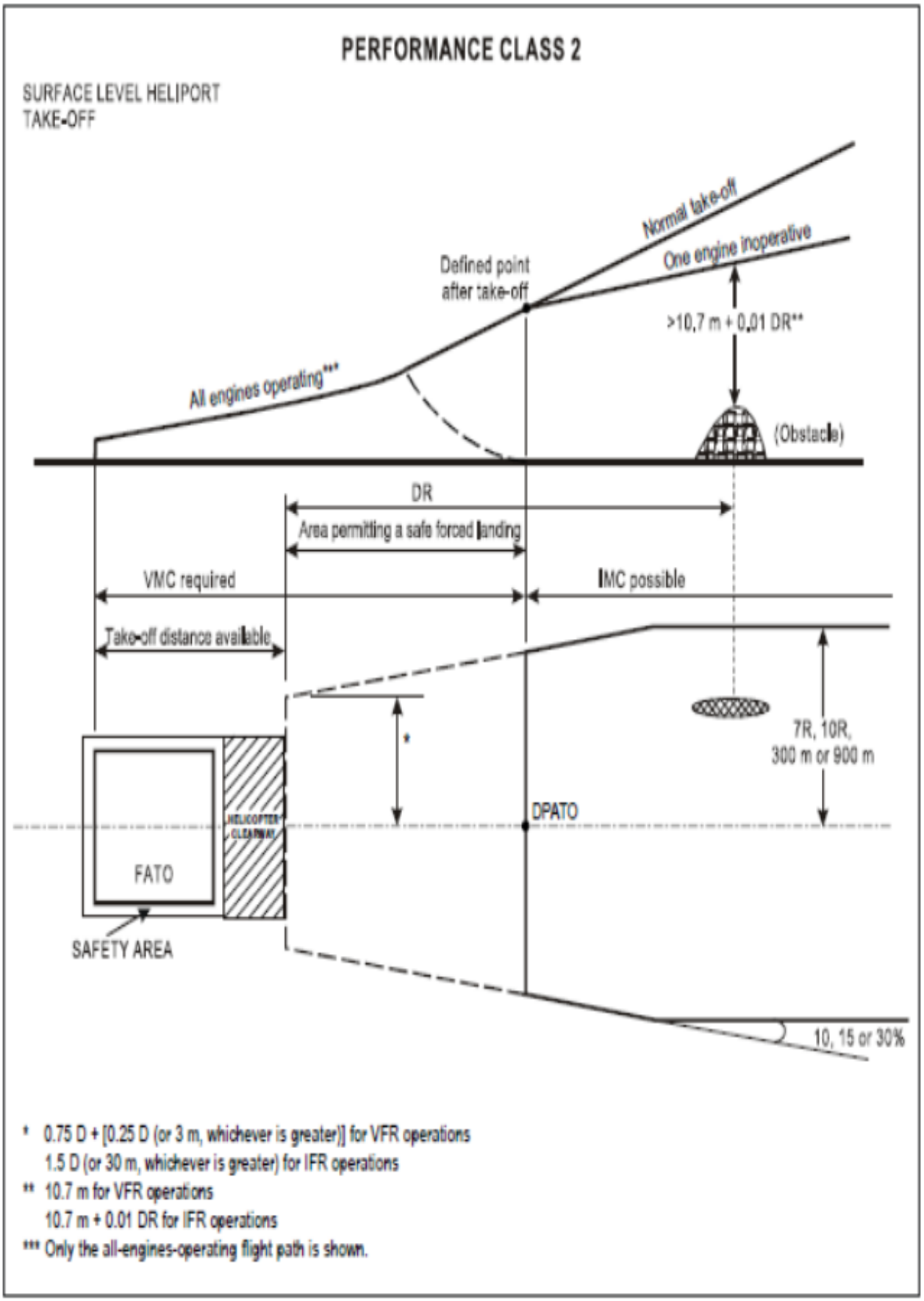

PERFORMANCE CLASS 2
SURFACE LEVEL HELIPORT
TAKE-OFF
Normal take-off
One engine inoperative
Defined point after take-off
>10,7 m + 0,01 DR**
All engines operating***
(Obstacle)
DR
Area permitting a safe forced landing
VMC required
IMC possible
Take-off distance available
*
7R, 10R, 300 m or 900 m
DPATO
HELICOPTER CLEARWAY
FATO
SAFETY AREA
10, 15 or 30%
* 0.75 D + [0.25 D (or 3 m, whichever is greater)] for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** Only the all-engines-operating flight path is shown.

Figure 6

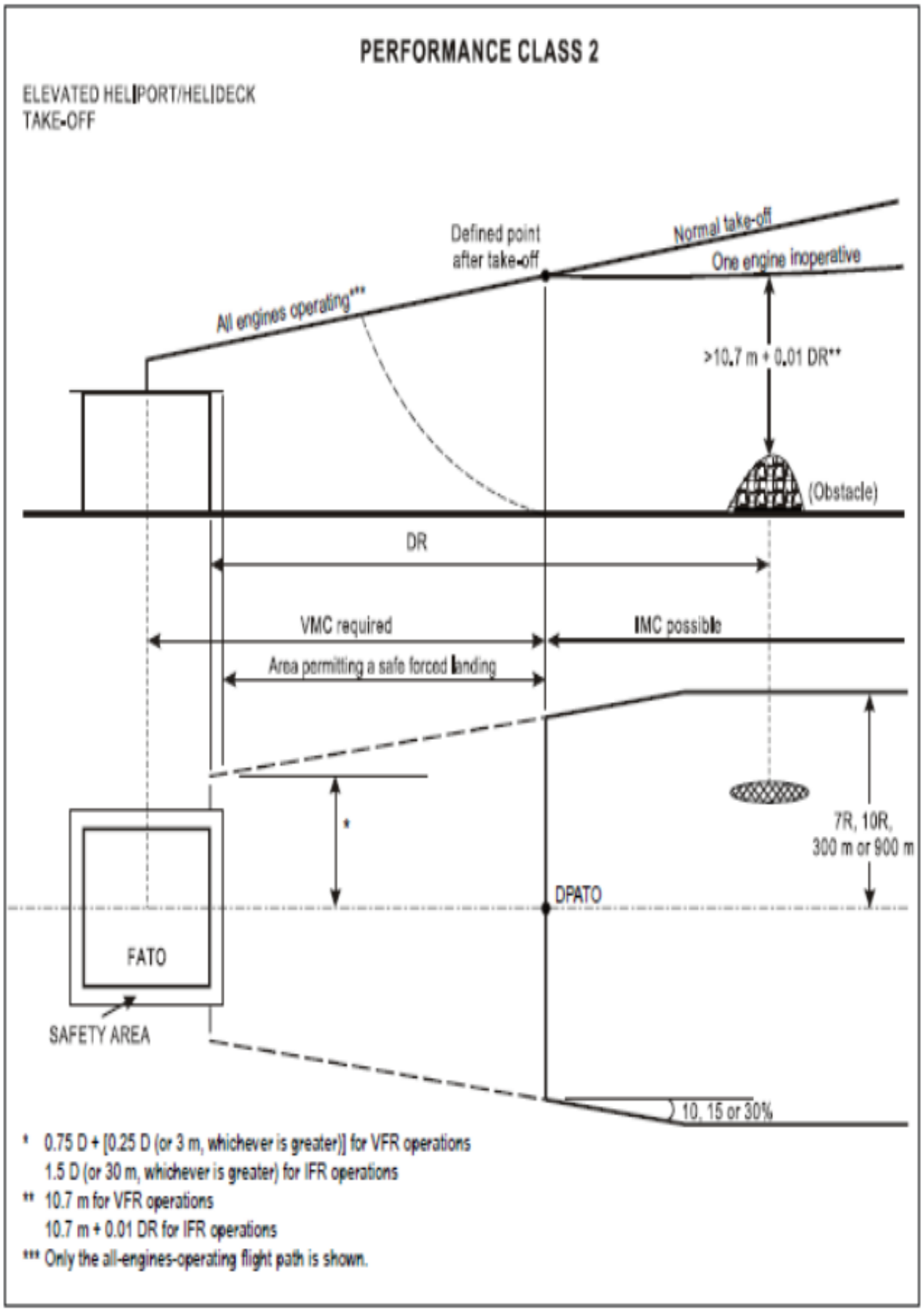

PERFORMANCE CLASS 2
ELEVATED HELIPORT/HELIDECK
TAKE-OFF
Defined point after take-off
Normal take-off
One engine inoperative
All engines operating***
>10.7 m + 0.01 DR**
(Obstacle)
DR
VMC required
IMC possible
Area permitting a safe forced landing
*
7R, 10R, 300 m or 900 m
DPATO
FATO
SAFETY AREA
10, 15 or 30%
* 0.75 D + [0.25 D (or 3 m, whichever is greater)] for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations
*** Only the all-engines-operating flight path is shown.

Figure 7

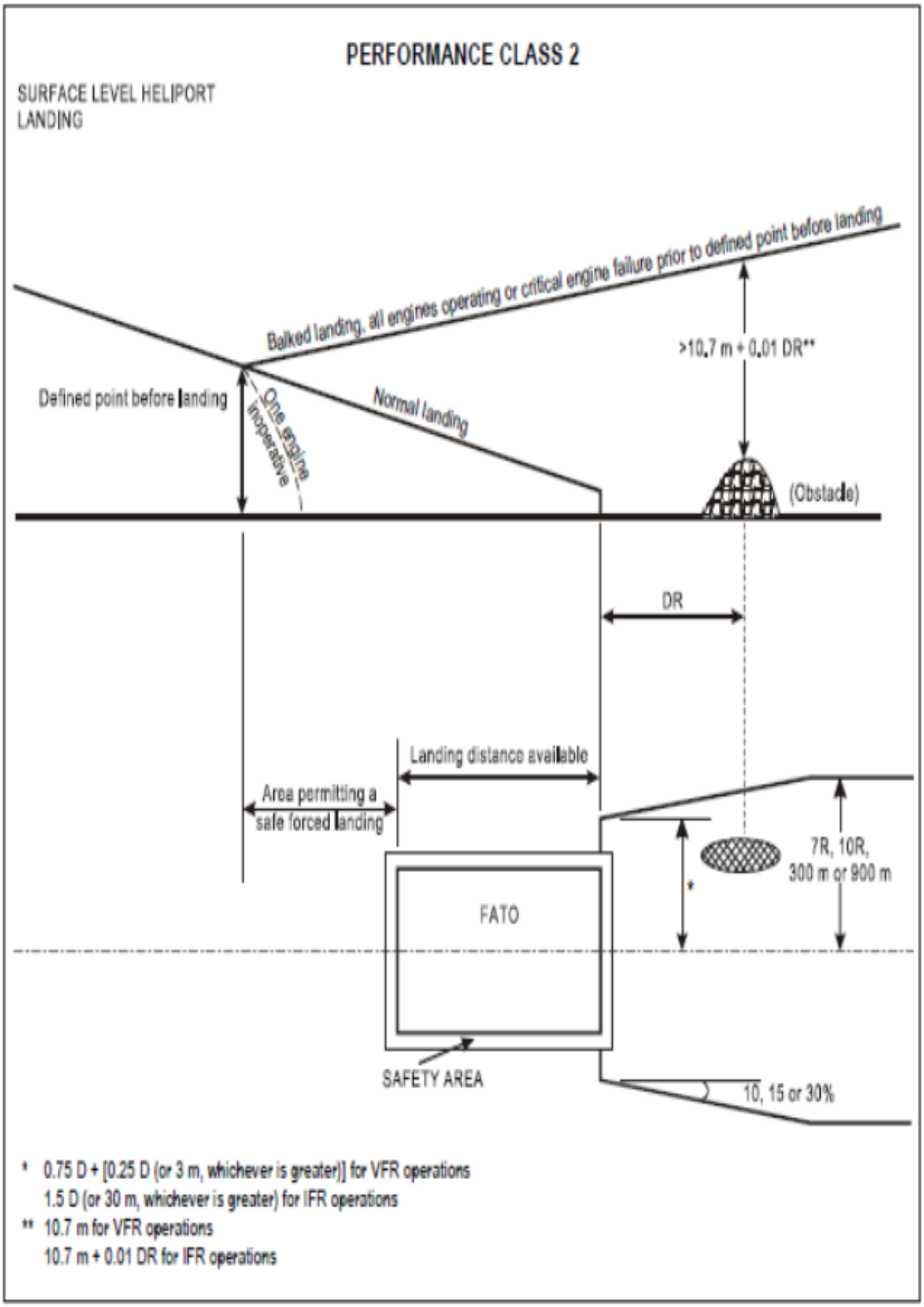

PERFORMANCE CLASS 2
SURFACE LEVEL HELIPORT LANDING
Balked landing, all engines operating or critical engine failure prior to defined point before landing
>10.7 m + 0.01 DR**
Defined point before landing
One engine inoperative
Normal landing
(Obstacle)
DR
Landing distance available
Area permitting a safe forced landing
7R, 10R, 300 m or 900 m
*
FATO
SAFETY AREA
10, 15 or 30%
* 0.75 D + [0.25 D (or 3 m, whichever is greater)] for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 8

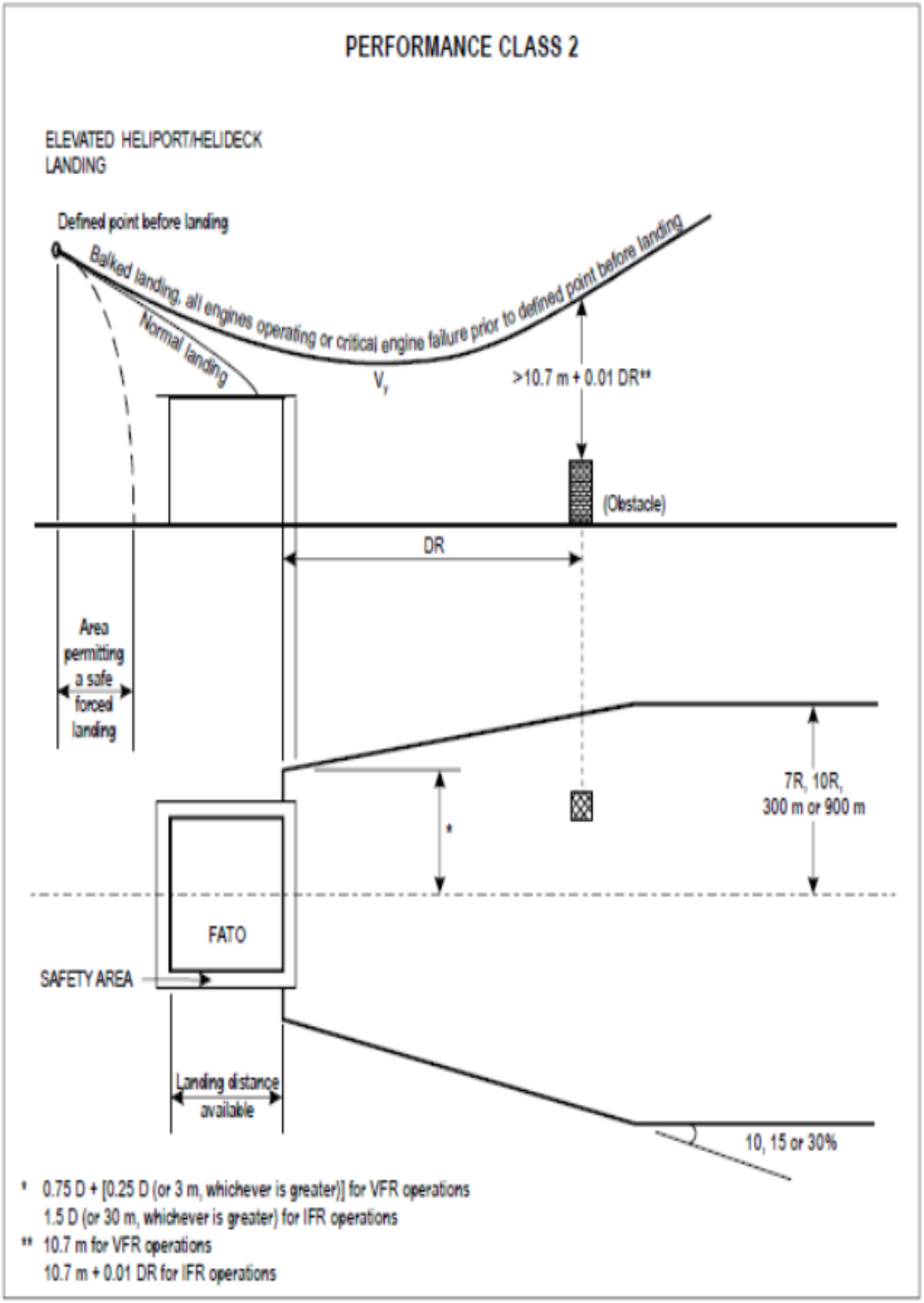

PERFORMANCE CLASS 2
ELEVATED HELIPORT/HELIDECK LANDING
Defined point before landing
Balked landing, all engines operating or critical engine failure prior to defined point before landing
Normal landing
V_y
>10.7 m + 0.01 DR**
(Obstacle)
DR
Area permitting a safe forced landing
*
7R, 10R, 300 m or 900 m
FATO
SAFETY AREA
Landing distance available
10, 15 or 30%
* 0.75 D + [0.25 D (or 3 m, whichever is greater)] for VFR operations
1.5 D (or 30 m, whichever is greater) for IFR operations
** 10.7 m for VFR operations
10.7 m + 0.01 DR for IFR operations

Figure 9

4.3 Operations in performance Class 3

4.3.1 Take-off

The mass of the helicopter at take-off shall not exceed the maximum take-off mass specified in the flight manual for a hover in ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2. 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 mass specified for a hover out of ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2.

4.3.2 Initial climb

The take-off mass shall be such that the climb path provides adequate vertical clearance above all obstacles located along the climb path, all engines operating.

4.3.3 En route

The take-off mass is such that it is possible to achieve the minimum flight altitudes for the route to be flown, all engines operating.

4.3.4 Approach and landing

The estimated landing mass at the destination or alternate shall be such that:

(a) it does not exceed the maximum landing mass specified in the flight manual for a hover in ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2. If conditions are such that a hover in ground effect is not likely to be established, the take-off mass should not exceed the maximum mass specified for a hover out of ground effect with all engines operating at take-off power, taking into account the parameters specified in 2.2;

(b) it is possible to perform a balked landing, all engines operating, at any point of the flight path and clear all obstacles by an adequate vertical interval.

SUBPART E - INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

CAR OPS 4.401 General

(a) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment and flight documents prescribed in the following paragraphs 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 acceptable to the Authority as the State of Registry.

(b) 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 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.

(c) A flight shall not be commenced when any of the helicopter's instruments, items of equipment or functions required for the intended flight are inoperative or missing, unless;

(1) the helicopter is operated in accordance with the MEL, if established; or

(2) the helicopter is subject to a permit to fly issued in accordance with the applicable airworthiness requirements.

CAR OPS 4.403 Instruments

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 maneuvers and observe the operating limitations of the helicopter in the expected operating conditions.

CAR OPS 4.405 Equipment

A helicopter on all flights shall be equipped with, or carry on board;

(a) an accessible first-aid kit (Refer to AMC OPS 3.745 to CAR OPS 3 for example of content)

(b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the helicopter. At least one shall be located in:

(1) the pilot's compartment; and

(2) each passenger compartment that is separate from the pilot's compartment and not readily accessible to the pilot or co-pilot; and

(c) (1) a seat or berth for each person who is aged 24 months or more; and

(2) a seat belt for each seat and restraining belts for each berth;

(d) the following manuals, charts and information:

(1) the flight manual or other documents or information concerning any operating limitations prescribed for the helicopter by the certificating authority of the State of Registry, required for the application of CAR OPS 4, Subpart C;

(2) any specific approval issued by the Authority under CAR OPS 4.107 for the operation(s) to be conducted.

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

(4) procedures, as prescribed in CAR 180, for pilots-in-command of intercepted helicopter;

(5) a list of visual signals for use by intercepting and intercepted helicopter, as contained in CAR 180; and

(6) the journey log book for the helicopter.

(e) where the helicopter is fitted with fuses that are accessible in flight, spare electrical fuses of appropriate ratings for replacement of those fuses.

CAR OPS 4.407 Fire Extinguishing Agent

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 requirements of the Authority as the State of Registry; and

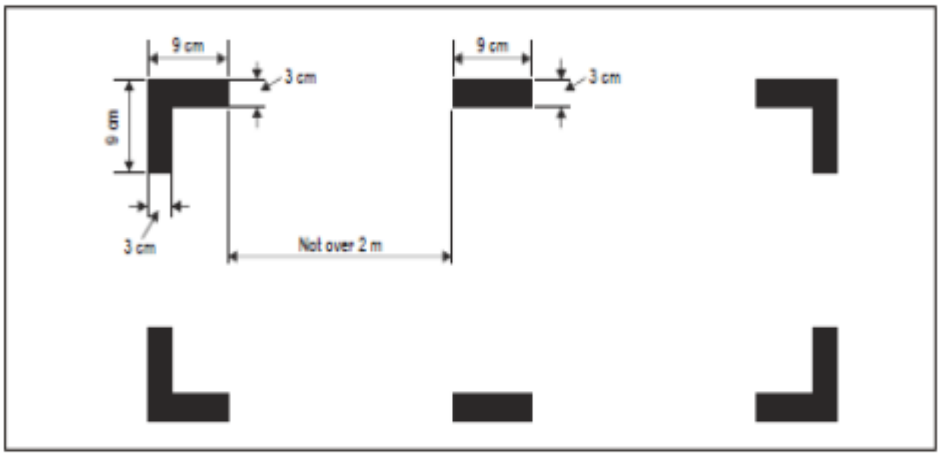
(b) not be of a type listed in Annex A, Group II of the Montreal Protocol on Substances That Deplete the Ozone Layer, 8th Edition, 2009.

CAR OPS 4.409 Marking of Break-in Points

(a) If areas of the fuselage suitable for break-in by rescue crews in emergency are marked on a helicopter such areas shall be marked as shown below (see figure following). The colour of the markings shall be red or yellow, and if necessary they shall be outlined in white to contrast with the background.

(b) If the corner markings are more than 2 m apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 m between adjacent markings.

Note: This regulation does not require any helicopter to have break-in areas.



CAR OPS 4.411 Instruments and Equipment - Day VFR

All helicopters operated under VFR by day shall;

(a) be equipped with;

(1) a magnetic compass,

(2) a sensitive pressure altimeter,

(3) an airspeed indicator,

(4) such additional equipment as may be prescribed by the Authority.

(b) Equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

CAR OPS 4.413 Instruments and Equipment - Night VFR

All helicopters operated under VFR by night shall be equipped with;

(a) the equipment specified in CAR OPS 4.411;

(b) an attitude indicator (artificial horizon) for each required pilot;

(c) a slip indicator;

(d) a heading indicator (directional gyroscope);

(e) a rate of climb and descent indicator; and

(f) such additional equipment as may be prescribed by the Authority.

CAR OPS 4.415 Operating Lights for Night Operations

All helicopters operated at night shall be equipped with the following lights;

(a) an anti-collision light system;

(b) navigation/position lights;

(c) a landing light;

Note: The landing light should be trainable, at least in the vertical plane.

(d) illumination for all flight instruments and equipment that are essential for the safe operation of the helicopter;

(e) lights in all passenger compartments; and

(f) an independent portable light for each crew member station.

CAR OPS 4.417 Instruments and Equipment - IFR

All helicopters when operated in accordance with the instrument flight rules, or when the helicopter cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be;

(a) equipped with;

(1) a magnetic compass;

(2) a sensitive pressure altimeter;

(3) an airspeed indicating system with a means of preventing malfunctioning due to either condensation or icing;

(4) a slip indicator;

(5) an attitude indicator (artificial horizon) for each required pilot and one additional attitude indicator;

(6) a heading indicator (directional gyroscope);

(7) equipped with a means of indicating when the supply of power to the gyroscopic instruments is adequate;

(8) a means of indicating on the flight deck the outside air temperature,

(9) a rate of climb and descent indicator

(10) such additional equipment as may be prescribed by the Authority; and

(11) if operated by night, the lights specified in CAR OPS 4.415.

(b) equipped with, or shall carry, a means of measuring and displaying the time in hours, minutes and seconds.

CAR OPS 4.419 Flight Over Water

(a) Means of flotation

All helicopters intended to be flown over water shall be fitted with a permanent or rapidly deployable means of flotation so as to ensure a safe ditching of the helicopter when:

(1) engaged in offshore operations or other over-water operations as prescribed by the Authority, as the State of Registry; or

(2) flying at a distance from land when;

(i) engaged in offshore operations; or

(ii) flying over water in a hostile environment at a distance from land corresponding to more than 10 minutes at normal cruise speed when operating in performance Class 1 or 2; or

(iii) flying over water in a non-hostile environment at a distance from land corresponding to more than 30 minutes at normal cruise speed when operating in performance Class 1; or

(iv) flying over water beyond autorotational or safe forced landing distance from land when operating in performance Class 3.

(b) Emergency equipment

Helicopters operating in accordance with the provisions of paragraph (a) above shall be equipped with:

(1) one life jacket, or equivalent individual flotation device, for each person on board, stowed in a position easily accessible from the seat of the person for whose use it is provided;

(2) when not precluded by consideration related to the type of helicopter used, life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken; and

(3) equipment for making the pyrotechnical distress signals described in ICAO Annex 2.

(c) When taking off or landing at a heliport where, in the opinion of the Authority, as State of the Operator, the take-off or approach path is so disposed over water that in the event of a mishap there would be likelihood of a ditching, at least the equipment required in paragraph (b) shall be carried.

(d) Each life jacket and equivalent individual flotation device shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons.

(e) On any helicopter for which the individual certificate of airworthiness is first issued on or after 01 January 1991, at least 50 per cent of the life rafts carried should be deployable by remote control.

(f) Rafts which are not deployable by remote control and which have a mass of more than 40 kg should be equipped with some means of mechanically assisted deployment.

CAR OPS 4.421 Flights over Designated Land Areas

Helicopters, when operated across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult, shall be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown.

CAR OPS 4.423 High Altitude Flights

(a) Non-pressurised helicopters intended to be operated at high altitudes shall carry equipment for storing and dispensing the oxygen supplies required by CAR OPS 4.225(a).

(b) Pressurised helicopters intended to be operated at high altitudes should carry emergency oxygen storage

and dispensing equipment capable of storing and dispensing the oxygen supplies required by CAR OPS 4.225(b).

CAR OPS 4.425 Noise Certification

All helicopters required to comply with the noise certification standards of ICAO Annex 16 shall carry a document attesting noise certification in the English language.

CAR OPS 4.427 Cockpit Voice Recorders

(See Appendix 1 to CAR OPS 4.427)

(See Appendix 1 to CAR OPS 4.427 to 4.433 inclusive)

(See Appendix 2 to CAR OPS 4.427 to 4.433 inclusive)

(a) Helicopters with an MCTOM of more than 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) 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 its operation.

(d) CVRs and CARS shall not use magnetic tape or wire.

CAR OPS 4.429 Flight Data Recorders

(See Appendix 1 to CAR OPS 4.427 to 2.433 inclusive)

(See Appendix 2 to CAR OPS 4.427 to 2.433 inclusive)

(See Appendix 1 to CAR OPS 4.429)

(See Appendix 2 to CAR OPS 4.429)

(See Appendix 3 to CAR OPS 4.429)

(See Appendix 4 to CAR OPS 4.429)

(a) Helicopters with a MCTOM of more than 7 000 kg, or having a passenger configuration of more than nineteen, and first issued with an individual C of A on or after 01 January 1989 shall be equipped with a FDR which shall record at least the parameters 1 – 30 listed in the Appendix 3 to CAR OPS 4.429 unless exempted under sub-paragraph (d) below.

(b) Helicopters with a MCTOM of more than 3175 kg and first issued with an individual C of A on or after 01 January 2016 and having a passenger seating configuration, excluding any pilot seats of 10 or more, shall be equipped with a FDR shall be equipped with a FDR which shall record at least the parameters 1 – 48 listed in the Appendix 3 to CAR OPS 4.429 unless exempted under subparagraph (e) below.

(c) FDRs, ADRS, AIRs or AIRS shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

Note: There is no requirement for helicopters to be fitted with ADRS. Only those helicopters equipped with ADRS need to refer to Appendix 4 to CAR OPS 4.429 regarding the parameters for ADRS.

(d) All FDRs shall retain the information recorded during at least the last 10 hours of their operation.

(e) FDRs that meet the current parameter certification requirements of the FAA, Transport Canada or EASA in respect to private air transport operations shall be exempt from the parameter requirements of CAR OPS 4.429.

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

CAR OPS 4.431 Data Link Recording

(See Appendix 1 to CAR OPS 4.431)

(a) All helicopters for which the individual certificate of airworthiness is first issued on or after 01 January 2016, which use any of the data link communications applications referred to in Appendix 1 to CAR OPS 4.431 and are required to carry a CVR, shall record the data link communications 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 install and utilize use any of the data link communications applications listed referred to in Appendix 1 to CAR OPS 4.431 shall record the data link communications messages on a crash-protected flight recorder unless the data link communications equipment is compliant with a type design or aircraft modification first approved prior to 01 January 2016.

(c) The recorder shall use a digital method of recording and storing data and information and a method for readily retrieving that data. The recording method shall allow the data to match the data recorded on the ground and also be correlated to the recorded cockpit audio.

(d) The minimum recording duration shall be equal to the duration of the CVR.

(e) The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR contained in Appendix 1 to CAR OPS 4.427.

CAR OPS 4.433 Flight Data and Cockpit Voice Combination Recorder

Compliance with CVR requirements and FDR requirements may be achieved by:

(a) one flight data and cockpit voice combination recorder if the helicopter has to be equipped with a CVR or an FDR; or

(b) two flight data and cockpit voice combination recorders if the helicopter has to be equipped with a CVR and an FDR.

CAR OPS 4.435 Emergency Locator Transmitter (ELT)

(a) All helicopters operating in performance Class 1 and 2 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in CAR OPS 4.419(a)(1), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

(b) All helicopters operating in performance Class 3 shall be equipped with at least one automatic ELT and, when operating on flights over water as described in CAR OPS 4.419(a)(2), with at least one automatic ELT and one ELT(S) in a raft or life jacket.

(c) ELT equipment carried to satisfy the requirements shall operate in accordance with the relevant provisions of ICAO Annex 10, Volume III.

Note 1: The judicious choice of numbers of ELTs, their type and placement on the helicopter and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for helicopters operating over water or land, including areas especially difficult for search and rescue.

Note 2: Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

CAR OPS 4.437 Pressure-Altitude Reporting Transponder

Unless exempted by the appropriate authorities responsible for the airspace, all helicopters shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of ICAO Annex 10, Volume IV.

CAR OPS 4.439 Microphones

All flight crew members required to be on flight deck duty should communicate through boom or throat microphones.

CAR OPS 4.441 Helicopters Equipped with ALS, HUD or Equivalent Displays, EVS, SVS and/or CVS

Notwithstanding CAR OPS 4.203(b), (c) and (d), where helicopters are equipped with automatic landing systems, a HUD and/or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, criteria for the use of such systems to gain operational benefit for the safe operation of the helicopter shall be approved by the Authority.

CAR OPS 4.443 Electronic Flight Bags (EFB)

(a) EFB equipment

Where portable EFBs are used on board a helicopter, the pilot-in-command and the owner shall ensure that they do not affect the performance of the helicopter systems, equipment or the ability to operate the helicopter.

(b) EFB functions

(1) Where EFBs are used on board a helicopter the pilot-in-command and/or the owner shall:

(i) assess the safety risk(s) associated with each EFB function;

(ii) establish the procedures for the use of, and training requirements for, the device and each EFB function; and

(iii) 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.

(2) The Authority, as State of the Registry shall issue a specific approval for the operational use of EFB functions to be used for the safe operation of helicopters.

(c) EFB specific approval

When issuing a specific approval for the operational use of EFBs, the State of Registry shall ensure that:

(1) the EFB equipment and its associated installation hardware, including interaction with helicopter systems if applicable, meet the appropriate airworthiness certification requirements;

(2) the owner has assessed the risks associated with the operations supported by the EFB function(s);

(3) the owner has established requirements for redundancy of the information (if appropriate) contained and displayed by the EFB function(s);

(4) the owner has established and documented procedures for the management of the EFB function(s) including any databases it may use; and

(5) the owner has established and documented the procedures for the use of, and training requirements for, the EFB function(s).

CAR OPS 4.445 Documents to be carried

(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 4.446 Manuals to be carried

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 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.

CAR OPS-4.447 Additional information and forms to be carried

(a) An operator shall ensure that, in addition to the documents and manuals prescribed in CAR OPS-4.445 and CAR OPS-4.446, 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 3.1212(d) and IEM-2 OPS-3.1260(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.

Appendix 1 to CAR OPS 4.427

Cockpit Voice Recorder (CVR) and Cockpit Audio Recording System (CARS)

(See CAR OPS 4.427)

(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;
(v) voice communications 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 CAR OPS 4.427 to CAR OPS 4.433 Inclusive

Flight Recorders – General

(See CAR OPS 4.427 to CAR OPS 4.433)

Note 1: The following applies to all crash protected flight recorders which comprise one or more of the following:

(1) a flight data recorder (FDR),

(2) a cockpit voice recorder (CVR)

(3) an airborne image recorder (AIR),

(4) 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:

(1) an aircraft data recording system (ADRS),

(2) a cockpit audio recording system (CARS),

(3) an airborne image recording system (AIRS)

(4) 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 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 helicopter 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 crash protected 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 recorders without jeopardising service to essential or emergency loads.

(f) The lightweight flight recorders shall be connected to a power source having the characteristics which ensure proper and reliable recording in the operational environment.

(g) 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.

(h) Means shall be provided for an accurate time correlation between the flight recorder systems functions.

(i) 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.

(j) [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: The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required by this Appendix.

(k) Flight recorders shall not be switched off during flight time.

(l) To preserve flight recorder records, flight recorders shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined by the investigating authority.

(m) The pilot-in-command, and/or the owner/operator, or in the case where it is leased, the lessee, 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 by the investigating authority.

(n) Operational checks and evaluations of recordings from the flight recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Appendix 2 to CAR OPS 4.427 to CAR OPS 4.433 Inclusive

Inspection of Flight Recorder Systems

(See CAR OPS 4.427 to CAR OPS 4.433)

(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 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 helicopter's electrical bus system need not be checked if their serviceability can be detected by other helicopter systems;

(3) 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;

(4) 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 helicopter, the CVR or CARS shall record test signals from each helicopter source and from relevant external sources to ensure that all required signals meet intelligibility standards;

(5) 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

(6) 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 helicopter, the AIR or AIRS shall record test images from each helicopter source and from relevant external sources to ensure that all required images meet recording quality standards.

(7) an examination of the recorded messages on the DLR or DLRS shall be carried out by replay of the DLR or DLRS recording.

(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 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 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 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.

Appendix 1 to CAR OPS 4.429

Flight Data Recorder (FDR) and Aircraft Data Recording Systems (ADRS)

(See CAR OPS 4.429)

(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 paragraphs below in Appendix 3 to CAR OPS 4.429. 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) The following parameters shall satisfy the requirements for flight path and speed;

— Pressure altitude

— Indicated airspeed or calibrated airspeed

— Heading (primary flight crew reference)

— Pitch attitude

— Roll attitude

— Engine thrust/power

— Landing-gear status*

— Total or outside air temperature*

— Time*

— Navigation data*: drift angle, wind speed, wind direction, latitude/longitude

— Radio altitude*

(3) If further FDR recording capacity is available, recording of the following additional information shall be considered:

(i) operational information from electronic displays, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS).

(ii) additional engine parameters (EPR, N1, fuel flow etc.)

(4) The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in

Appendix 4 to CAR OPS 4.429.

(5) If further ADRS recording capacity is available, the recording of any parameters from 8 onwards listed in Appendix 4 to CAR OPS 4.429 shall be considered.

Note: There is no requirement for helicopters to be equipped with ADRS. Only those helicopters equipped with ADRS need to refer to Appendix 4 to CAR OPS 4.429 regarding the parameters for ADRS.

(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 CAR OPS 4.429

Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS)

(See CAR OPS 4.429)

(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 3 to CAR OPS 4.429

Parameter Characteristics for Flight Data Recorders

(See CAR OPS 4.429)

Serial No.	Parameter	Measurement Range	Maximum Sampling and recording Interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions
1	Time (UTC when available, otherwise relative time count or GNSS time sync)	24 hours	4	±0·125% per hour	1 second
2	Pressured altitude	-300 m (-1 000 ft) to maximum certificated altitude of aircraft +1500 m (+5000 ft)	1	±30 m to ±200m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed	As the installed pilot display measuring system	1	±3 %	1kt
4	Heading	360º	1	±2º	0·5º
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	±75º or 100% usable range whichever is greater	0.5	±2º	0·5º
7	Roll attitude	±180º	0.5	±2º	0·5º
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.

Serial No.	Parameter	Measurement Range	Maximum Sampling and recording Interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions
10	Main rotor: Main rotor speed Rotor brake	 50-130% Discrete	 0.51	 ±2%	 0.3% of full range
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	±2º C	±3º C
14*	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discrete	1		
15*	Stability augmentation system engagement	Discrete	1		
16*	Main gearbox oil pressure	As installed	1	As installed	6.895 kN/m^2 (1 psi)
17*	Main gearbox oil temperature	As installed	2	As installed	1º C

Serial No.	Parameter	Measurement Range	Maximum Sampling and recording Interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions
18	Yaw rate	±400º/second	0.25	±1.5% maximum range excluding datum error of ±5%	±2º/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 ±0.05g	0·004 g
21	Lateral acceleration	±1 g	0.25	±0.015 g excluding a datum error of ±0.05g	0·004 g
22*	Radio altitude	-6 m to 750 m (-20 ft to +2500 ft)	1	±0.6m (±2 ft) or ±3% whichever is greater below 150m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500ft) 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
24*	Horizontal beam deviation	Signal range	1	±3%	0·3% of full range
25	Marker beacon passage	Discrete	1		
26	Warnings	Discrete(s)	1		

Serial No.	Parameter	Measurement Range	Maximum Sampling and recording Interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions
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	1852 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 or gear selector position	Discrete	4		
31*	Engine exhaust gas temperature	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	1	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 No.	Parameter	Measurement Range	Maximum Sampling and recording Interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions
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, co-pilot)	Discrete(s)	4		
47*	Multi-function/engine/alerts display format	Discrete	4		
48*	Event marker	Discrete	1		

Serial No.	Parameter	Measurement Range	Maximum Sampling and recording Interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions
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)	Discrete (s)	1	As installed	
50*	TCAS/ACAS (traffic alert and collision avoidance system) and (operational status)	Discrete (s)	1	As installed	
51*	Primary flight controls – pilot input forces	Full range	0.125 (0.0625 recommended)	±3% unless higher accuracy is uniquely required	0.5% of operating range
52*	Computed centre of gravity	As installed	64	As installed	1% of full range
53*	Helicopter computed weight	As installed	64	As installed	1% of full range

Appendix 4 to CAR OPS 4.429

Parameter Characteristics for Aircraft Data Recording Systems (ADRS)

(See CAR OPS 4.429)

SL. No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading: a) Heading (Magnetic or Time) b) Yaw rate	 ±180° ±300°/s	 1 0.25	 ±2^0 ±1% + drift of 360^0/h	 0.5^0 2^0/s	^{0} Heading is preferred, if not available, yaw rate shall be recorded
2	Pitch: a) Pitch attitude b) Pitch rate	 ±90° 300°/s	 0.25 0.25	 ±2^0 ±1% + drift of 360^0/h	 0.5^0 2^0/s	^{0} Pitch Attitude is preferred, if not available, pitch rate shall be recorded
3	Roll: a) Roll attitude b) Roll rate	 ±180° 300°/s	 0.25 0.25	 ±2^0 ±1% + drift of 360^0/h	 0.5^0 2^0/s	^{0} If not available, roll rate shall be recorded

SL. No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
4	Positioning system					
	a) Time	24 hours	1	±0.5 s	0.1 s	UTC time preferred where available
	b) Latitude/ longitude	Latitude: ±90° Longitude: ±180°	2 (1 if available)	As installed (0.00015^0 recommended	0.00005^0	
	c) Altitude	-300 m (-1000 ft) to maximum certificated altitude of aircraft +1500 m (5000ft)	2 (1 if available)	As installed (±15 m (±50ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0-1000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
	e) Track	0.360^0	2 (1 if available)	As installed (±5 kt recommended)	0.5^0	
	f) Estimated error	Available rage	2 (1 if available)	As installed	As installed	Shall be recorded if readily available

SL. No.	Parameter name	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 ±0.45 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 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 n (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	-50^0 to $+90^0$C or available sensor range	2	As installed (±2^0C recommended)	1^0C	

SL. No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
10	Indicated air speed	As 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	
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

SL. No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
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/N_1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
18	Engine gas generator speed (Ng) (*)	0-150%	Each engine each second	As installed	0.2% of full range	* Only for turbine-enined helicopters
19	Free power turbine speed (Nf) (*)	0-150%	Each engine each second	As installed	0.2% of full range	* Only for turbine-enined helicopters
20	Collective pitch	Full range	0.5	As installed	0.1% full rage	

SL. No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
21	Coolant temperature (*)	Full range	1	As installed (±5^{0}C recommended)	1^{0}C	* Only for piston engine 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 engine 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 CAR OPS 4.431

Data Link Recorder (DLR) Applications to be Recorded

(See CAR OPS 4.431)

(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 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 helicopter.

(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 application used to log on to or initiate data link services. 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 inn 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

Item No.	Application type	Application description	Recording content
4	Flight information	This includes any services 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-NPTAM) 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 aeroplane 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 aeroplane.

*: Application to be recorded only as far as is practicable given the architecture of the system.

SUBPART F - COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

CAR OPS 4.501 Communication Equipment

(a) A helicopter to be operated in accordance with the instrument flight rules or at night shall be equipped with radio communication equipment capable of conducting two-way communication with those aeronautical stations and on those frequencies to meet airspace requirements.

(b) When compliance with paragraph (a) requires that more than one communication equipment unit be provided, each shall be independent of the other or others to the extent that a failure in any one will not result in failure of any other.

(c) A helicopter to be operated in accordance with VFR, but as a controlled flight, shall, unless exempted by the appropriate authority, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

(d) A helicopter to be operated on extended over water flights or flights over designated areas shall, unless exempted by the appropriate authority responsible for that airspace, be provided with radio communication equipment capable of conducting two-way communication at any time during flight with such aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

(e) Radio communication equipment, if required by paragraphs (a) to (d) above, shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

(f) For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), a helicopter shall, in addition to the requirements specified above;

(1) be provided with communication equipment which will enable it to operate in accordance with the prescribed RCP specification(s);

(2) have information relevant to the helicopter RCP specification capabilities listed in the flight manual or other helicopter documentation, approved by the State of Design or State of Registry; and

(3) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter RCP specification capabilities included in the MEL.

(g) The Authority, as the State of Registry, shall establish criteria for operations where an RCP specification for PBC has been prescribed.

(h) When establishing criteria for operations where an RCP specification for PBC has been prescribed, ensure that the operator/owner 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.

(i) The Authority shall ensure that, in respect of those helicopters mentioned in sub-paragraph (f) above, adequate provisions exist for:

(1) receiving the reports of observed communication performance issued by monitoring programmes; and

(2) taking immediate corrective action for individual helicopters, helicopter types or operators, identified in such reports as not complying with the RCP specification.

CAR OPS 4.503 Navigation Equipment

A helicopter shall be equipped with navigation equipment that will enable it to proceed in accordance with:

(a) the ATS flight plan, if applicable; and

(b) the requirements of air traffic services. except when, if not so precluded by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

CAR OPS 4.505 Performance Based Navigation

(a) For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, a helicopter shall, in addition to the requirements specified in CAR OPS 4.503:

(1) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s);

(2) have information relevant to the helicopter navigation specification capabilities listed in the flight manual or other helicopter documentation, approved by the State of Design or State of Registry; and

(3) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter navigation specification capabilities included in the MEL.

(b) The Authority, as the State of Registry, shall establish criteria for operations where a navigation specification for PBN has been prescribed.

(c) When establishing criteria for operations where a navigation specification for PBN has been prescribed, ensure that the operator/owner 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.

(d) The Authority, as the State of Registry, shall issue a specific approval for operations based on PBN authorisation required (AR) navigation specifications.

(e) The helicopter shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the helicopter to navigate in accordance with CAR OPS 4.503 and this regulation.

Note: For international general aviation, this requirement may be met by means other than the duplication of equipment.

(f) 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.

CAR OPS 4.507 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) where the helicopter is operated in accordance with a MEL, have information relevant to the helicopter RSP specification capabilities included in the MEL.

(c) The Authority, as the State of the Registry, shall establish criteria for operations where an RSP specification for PBS has been prescribed.

(d) In establishing criteria for operations where an RSP specification for PBS has been prescribed, the Authority shall require that the operator/owner 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.

(e) The Authority, as the State of Registry, 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 4.509 Electronic Navigation Data Management

(a) An operator of helicopter shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the State of Registry has approved the operator's procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the equipment that will use them. The State of Registry shall ensure that the operator continues to monitor both process and products.

(b) An operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all helicopters that require it.

SUBPART G - MAINTENANCE

Note: For the purpose of this chapter "helicopter" includes: engines, power transmissions, rotors, components, accessories, instruments, equipment and apparatus including emergency equipment.

CAR OPS 4.601 Owner's Maintenance Responsibilities

(a) The owner of a helicopter, or in the case where it is leased, the lessee, shall ensure, in accordance with the applicable regulations contained in CAR M, that;

(1) the helicopter is maintained in an airworthy condition;

(2) the operational and emergency equipment necessary for an intended flight is serviceable; and

(3) the certificate of airworthiness of the helicopter remains valid.

(b) The owner or the lessee shall not operate the helicopter unless it is maintained and released to service under a system acceptable to the State of Registry.

(c) The owner or the lessee shall not operate a helicopter unless maintenance on the helicopter, including any associated engine, rotor and part is carried out, and released to service by an organisation appropriately approved/accepted in accordance with CAR 145 except that pre-flight inspections need not necessarily be carried out by the CAR 145 organisation.

(d) When the maintenance release is not issued by an approved maintenance organisation, the person signing the maintenance release shall be licensed in accordance with ICAO Annex 1.

(e) The owner or the lessee shall ensure that the maintenance of the helicopter is performed in accordance with a maintenance programme acceptable to the Authority as the State of Registry.

(f) The owner or the lessee shall appoint an Airworthiness Coordinator who shall be responsible for the control of the maintenance system and the maintenance control manual, if applicable.

CAR OPS 4.603 Continuing Airworthiness Records

(a) The owner of a helicopter, or in the case where it is leased, the lessee, shall ensure that the following records are kept for the periods mentioned in (b) below:

(1) the total time in service (hours, calendar time and cycles, as appropriate) of the helicopter and all life limited components;

(2) the current status of compliance with all applicable mandatory continuing airworthiness information;

(3) appropriate details of modifications and repairs to the helicopter;

(4) the time in service (hours, calendar time and cycles, as appropriate) since the last overhaul of the helicopter or its components subject to a mandatory overhaul life;

(5) the current status of the helicopter's compliance with the maintenance programme; and

(6) the detailed continuing airworthiness records to show that all requirements for the signing of a maintenance release have been met.

(b) The records in (a)(1) to (5) above shall be kept for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service and the records in (a)(6) for a minimum period of one year after the signing of the maintenance release.

(c) In the event of a temporary change of owner or lessee, the records shall be made available to the new owner or lessee. In the event of any permanent change of owner or lessee, the records shall be transferred to the new owner or lessee.

(d) The operator shall ensure that a system has been established to keep, in a form and format that ensures readability, security and integrity of the records at all times and is acceptable to the Authority.

Note: The form and format of the records may include, for example, paper records, film records, electronic records or any combination thereof.

CAR OPS 4.605 Modifications and repairs

All modifications and repairs shall comply with airworthiness requirements acceptable to the Authority, as the State of Registry. Procedures shall be established to ensure that the substantiating data supporting compliance with the airworthiness requirements are retained.

CAR OPS 4.607 Maintenance Release

(a) A maintenance release shall be completed and signed, as prescribed by the Authority, as the State of Registry, to certify that the maintenance work performed has been completed satisfactorily and in accordance with data and procedures as stated in CAR M.

(b) When maintenance is carried out by an approved maintenance organisation, the maintenance release shall be issued by the approved maintenance organisation in accordance with the provisions of CAR 145.

(c) When maintenance is not carried out by an approved maintenance organisation, the maintenance release shall be completed and signed by a person appropriately licensed in accordance with ICAO Annex 1 to certify that the maintenance work performed has been completed satisfactorily and in accordance with approved data and the procedures as stated in CAR M.

CAR OPS 4.611 Maintenance Programme

(a) The operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, acceptable to the State of Registry, containing the information;

(1) maintenance tasks and the intervals at which these are to be performed, taking into account the anticipated utilisation of the helicopter;

(2) when applicable, a continuing structural integrity programme;

(3) procedures for changing or deviating from (a) and (b) above as approved by the State of Registry; and

(4) when applicable and approved by the State of Registry, condition monitoring and reliability programme descriptions for helicopter systems, components and engines.

(b) Maintenance tasks and intervals that have been specified as mandatory in approval of the type design, or approved changes to the maintenance programme, shall be identified as such.

Note: The maintenance programme should be based on maintenance programme information made available by the State of Design or by the organisation responsible for the type design, and any additional applicable experience.

(c) The design and application of the operator's maintenance programme shall observe Human Factors principles according to the State of Registry's guidance material.

(d) Copies of all amendments to the maintenance programme shall be furnished promptly to all organisations or persons to whom the maintenance programme has been issued.

CAR OPS 4.613 Continuing Airworthiness Information

The owner of a helicopter over 3175 kg maximum certificated take-off mass, or in the case where it is leased, the lessee, shall, as required by the Authority, ensure that the information resulting from maintenance and operational experience with respect to continuing airworthiness is transmitted to the organisation responsible for type design of that helicopter.

CAR OPS 4.615 Technical log

The operator of a helicopter certificated for a maximum take-off mass exceeding 3175 kg shall provide a Technical Log for the helicopter in accordance with the requirements of CAR M.

SUBPART H - FLIGHT CREW

CAR OPS 4.701 Qualifications

(a) The pilot-in-command shall:

(1) ensure that each flight crew member holds a valid licence issued by the Authority, as the State of Registry, or if issued by another Contracting State, rendered valid by the Authority as the State of Registry;

(2) ensure that flight crew members are properly rated; and

(3) be satisfied that flight crew members have maintained competency.

(b) The pilot-in-command of a helicopter equipped with an airborne collision avoidance system (ACAS II) shall ensure that each flight crew member has been appropriately trained to competency in the use of ACAS II equipment and the avoidance of collision.

CAR OPS 4.703 Composition of the Flight Crew

The number and composition of the flight crew shall not be less than that specified in the flight manual or other documents associated with the certificate of airworthiness.