Civil Aviation Authority

CAR OPS-1

Civil Aviation Regulation

Commercial Air Transport Operations

Effective: 1st April 2023

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

(President of Civil Aviation Authority)

CORRIGENDUM OF AMENDMENTS

No.	Rev.	Year	Description
01	00	1999	Original Issue
02	01	2010	Amendment to Original Issue
03	02	2011	Amendment to Rev.1
04	03	2012	Amendment to Rev.2
05	04	2021	The regulation has been comprehensively amended/ updated to Rev.3, to include: • Latest information from relevant ICAO Annexes 2, 3, 6, 8, 14. 16 and 18, Docs and State Letters in accordance with the State's EFOD; • SUBPART T to cover the introduction and operation of certified seaplanes within Oman; • Editing/ formatting changes; and • Users are required to read all sections.
06	05	2023	The regulation has been comprehensively amended/ updated to Rev.4, to include: • Latest information from relevant ICAO Annexes 2, 3, 6, 8, 14. 16 and 18, Docs and State Letters in accordance with State's EFOD; • Editing/ formatting changes; and. • Users are required to read all sections.

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GLOSSARY OF TERMS AND ABBREVIATIONS

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

ACAS II	Airborne Collision Avoidance System
AC	Advisory Circular
ACC	Area Control Centre
ACCID	Accident
ADREP	Accident/Incident Reporting System
AFIS	Aerodrome Flight Information Service
AFTN	Aeronautical Fixed Telecommunication Network
AIC	Aeronautical Information Circular
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Service
A/C	Aircraft
AMC	Acceptable Means of Compliance
AMSL	Above Mean Sea Level
AOC	Air Operator Certificate
APP	Approach Control Office
ARO	Air Traffic Services Reporting Office
ATC	Air Traffic Control
ATS	Air Traffic Service
CAA	Civil Aviation Authority
CAR	Civil Aviation Regulation
CFMU	Central Flow Management Unit
COM	Communications/Equipment
FIC	Flight Information Centre
FIS	Flight Information Service
GM	Guidance Material
IATA	International Air Transport Association
ICAO	International Civil Aviation Organisation
IEM	Interpretative Explanatory Material
IIC	Investigator in Charge
INCID	Serious Incident
ISA	International standard atmosphere
Minister	Minister of Transport, Communication and IT
NOTAM	Notice to Airmen
NPA	Notice of Proposed Amendment
OTSB	Oman Transport Safety Bureau
PL	Policy Lead
RCC	Rescue Co-ordination Centre of the Sultanate
RNAV	Area Navigation
SAR	Search and Rescue
SIGMET	Significant Meteorological Report
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
TCAS	Traffic Alert and Collision Avoidance System (TCAS II or TCAS X)

TL	Technical Lead
UTC	Universal Time Coordinated
VHF	Very High Frequency
WX	Weather

FOREWORD

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

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

(c) CAR OPS-1 prescribes the requirements for:

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

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

(d) Amendments to the text in CAR OPS-1 in revised editions are issued as a complete amendment of pages contained within.

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

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

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

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

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

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

SUBPART A – APPLICABILITY

SECTION 1 – REQUIREMENTS

CAR OPS-1.001 Applicability

(a) CAR–OPS 1 prescribes requirements applicable to the operation of any civil aeroplane for the purpose of commercial air transportation by any operator whose principal place of business is in the Sultanate of Oman.

(b) CAR–OPS 1 does not apply to aeroplanes when used in military, customs and police services; nor:

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

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

CAR OPS-1.002 Transition Period

(a) All new applications by operators shall be in full compliance with this revision of CAR OPS-1.

(b) All operators are required to be compliant with this regulation by the 1st April 2023, unless approval has been granted by the Authority upon application.

CAR OPS-1.003 Terminology

Terms used in this Subpart and not defined in CAR–1 have the following meaning:

(a) ***Agreement summary***. When an aircraft is operated 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 very clearly which functions and duties are transferred by the State of Registry to that other State.

(b) ***Air Transport Operator.*** An Air Transport Operator is a commercial operator of an aeroplane engaged in transportation of passengers, cargo and mail for remuneration or hire offering service to the public on demand and not to a published schedule.

(c) ***Aircraft tracking.*** A process, established by the operator, that maintains and updates, at standardized intervals, a ground-based record of the four-dimensional position of individual aircraft in flight.

(d) ***Commercial Air Transport Operator.*** A Commercial Air Transport operator of an aircraft engaged in the transportation of passengers, cargo or mail for remuneration or hire and offering services to the public in accordance with a published schedule.

(e) ***Commercial Activities.*** Unless otherwise specified by the Authority, the following operations are categorized as commercial operations;

(1) Sightseeing flights (A to A or A to B within Oman airspace);

(2) Aerial work operations, including:

i. Agricultural operations

ii. External load operations
iii. Aerial photography and survey
iv. Aerial advertising
v. Air shows and aerial demonstrations
vi. Carriage and dropping of parachutists (operator of aircraft)
vii. Navigation aid calibration
viii. Other activities as determined by the Authority.

(f) ***Complex motor-powered aircraft.*** An aircraft certificated with a MCTOW exceeding 5700kg, or certificated for a MAPSC of more than nineteen (19), or certificated for operation with a minimum crew of at least two pilots, or equipped with (a) turbojet engine(s) or more than one turboprop engine, or is a helicopter certificated for a MCTOW exceeding 3175kg, or certificated for a MAPSC of more than nine (9), or certificated for operation with a minimum crew of at least two (2) pilots.

(g) ***Contaminated runway.*** A runway is contaminated when a significant portion of the runway surface area (whether in isolated areas or not) within the length and width being used is covered by one or more of the substances listed in the runway surface condition descriptors.

Note: Applicable from the 4th Nov 2021. Further information on runway surface condition can be found in Annex 14, Vol 1, Definitions

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

(i) ***Dry runway.*** A runway is considered dry if its surface is free of visible moisture and not contaminated within the area intended to be used.

(j) ***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.

Note: Guidance on the development and organization of a flight safety documents system is provided in ICAO Annex 6, Attachment F.

(k) ***Operator.*** An operator means a person, organisation or enterprise engaged in or offering to engage in an aeroplane operation. The definition, as used in this Part, applies to Private and Commercial operators as applicable.

(l) ***Private Operator.*** Private operator means a person, organisation or enterprise engaged in the carriage of persons or cargo not for hire or reward.

(m) ***Upset Prevention and Recovery Training (UPRT) definitions:***

(1) 'Aeroplane upset prevention and recovery training' means a combination of theoretical knowledge and flying training with the aim of providing flight crew with the required competencies to prevent or recover from aeroplane upsets.
(2) '***Aeroplane upset'*** means an undesired airplane state characterized by unintentional divergences from parameters normally experienced during operations. An airplane upset may involve pitch and/or bank angle divergences as well as inappropriate airspeeds for the conditions.
(3) ***'Angle of attack (AOA)'*** means the angle between the oncoming air, or relative wind, and a defined reference line on the aeroplane or wing.
(4) ***'Approach-to-stall'*** means flight conditions bordered by the stall warning and stall.
(5) ***'Competency'*** means a combination of skills, knowledge, and attitudes required to perform a task to the prescribed standard.

(6) ***'Energy state'*** means how much of each kind of energy (kinetic, potential or chemical) the aeroplane has available at any given time.

(7) ***'Error'*** means an action or inaction by the flight crew that leads to deviations from organisational or flight crew intentions or expectations.

(8) ***'Error management'*** means the process of detecting and responding to errors with countermeasures that reduce or eliminate the consequences of errors, and mitigate the probability of further errors or undesired aircraft states.

(9) ***'First indication of a stall'*** means the initial aural, tactile or visual sign of an impending stall, which can be either naturally or synthetically induced.

(10) ***'Flight crew resilience'*** means the ability of a flight crew member to recognise, absorb and adapt to disruptions.

(11) ***'Fidelity level'*** means the level of realism assigned to each of the defined FSTD features.

(12) ***'Flight path'*** means the trajectory or path of the aeroplane travelling through the air over a given space of time.

(13) ***'Flight path management'*** means active manipulation, using either the aeroplanes automation or manual handling, to command the aeroplane flight controls to direct the aeroplane along a desired trajectory.

(14) ***'Load factor'*** factor means the ratio of a specified load to the weight of the aeroplane, the former being expressed in terms of aerodynamic forces, propulsive forces, or ground reactions.

(15) ***'Loss of control in flight (LOCI)'*** means a categorisation of an accident or incident resulting from a deviation from the intended flight path.

(16) ***'Manoeuvre-based training'*** means training that focuses on a single event or manoeuvre in isolation.

(17) ***'Negative training'*** means training which unintentionally introduces incorrect information or invalid concepts, which could actually decrease rather than increase safety.

(18) ***'Negative transfer of training'*** means the application (and 'transfer') of what was learned in a training environment (i.e., a classroom, an FSTD) to normal practice, i.e. it describes the degree to which what was learned in training is applied to actual normal practices. In this context, negative transfer of training refers to the inappropriate generalisation of knowledge and skill to a situation or setting in normal practice that does not equal the training situation or setting.

(19) ***'Post-stall regime'*** means flight conditions at an angle of attack greater than the critical angle of attack.

(20) ***'Scenario-based training'*** means training that incorporates manoeuvres into realworld experiences to cultivate practical flying skills in an operational environment.

(21) ***'Stall'*** means a loss of lift caused by exceeding the aeroplane's critical angle of attack.

Note: A stalled condition can exist at any attitude and airspeed, and may be recognised by continuous stall warning activation accompanied by at least one of the following:

(a) buffeting, which could be heavy at times;

(b) lack of pitch Authority and/or roll control; and

(c) *inability to arrest the descent rate.*

(22) ***'Stall Event'*** means an occurrence whereby the aeroplane experiences conditions associated with an approach-to-stall or a stall.

(23) ***'Stall (event) recovery procedure'*** means the manufacturer-approved aeroplane specific stall recovery procedure. If an OEM-approved recovery procedure does not exist, the aeroplane-specific stall recovery procedure developed by the operator, based on the stall recovery template contained in GM-3 CAR OPS- 1.945 & 1.965, may be used.

(24) ***'Stall warning'*** means a natural or synthetic indication provided when approaching a stall that may include one or more of the following indications:

(a) aerodynamic buffeting (some aeroplanes will buffet more than others);

(b) reduced roll stability and aileron effectiveness;

(c) visual or aural cues and warnings;

(d) reduced elevator (pitch) Authority;

(e) inability to maintain altitude or arrest rate of descent; and

(f) stick shaker activation (if installed).

Note: A stall warning indicates an immediate need to reduce the angle of attack.

(25) ***'Startle'*** means the initial short-term, involuntary physiological and cognitive reactions to an unexpected event that commence the normal human stress response.

(26) ***'Stick pusher'*** means a device that, automatically applies a nose down movement and pitch force to an aeroplane's control columns, to attempt to decrease the aeroplane's angle of attack. Device activation may occur before or after aerodynamic stall, depending on the aeroplane type.

Note: A stick pusher is not installed on all aeroplane types.

(27) ***'Stick shaker'*** means a device that automatically vibrates the control column to warn the pilot of an approaching stall.

Note: A stick shaker is not installed on all aeroplane types.

(28) ***'Stress (response)'*** means the response to a threatening event that includes physiological, psychological and cognitive effects. These effects may range from positive to negative and can either enhance or degrade performance.

(29) ***'Surprise'*** means the emotionally-based recognition of a difference in what was expected and what is actual.

(30) ***'Threat'*** means events or errors that occur beyond the influence of the flight crew, increase operational complexity and must be managed to maintain the margin of safety.

(31) ***'Threat management'*** means the process of detecting and responding to threats with countermeasures that reduce or eliminate the consequences of threats and mitigate the probability of errors or undesired aircraft states.

(32) ***'Train-to-proficiency'*** means approved training designed to achieve end-state performance objectives, providing sufficient assurances that the trained individual is capable to consistently carry out specific tasks safely and effectively.

Note: In the context of this definition, 'train-to-proficiency' can be replaced by 'training-to proficiency'.

(33) ***'Undesired aircraft state'*** means an outcome in which the aircraft is unnecessarily placed in a compromising situation that poses an increased risk to safety.

Note: Undesired states can be managed effectively, restoring margins of safety, or flight crew response(s) can induce an additional error, incident, or accident.

Note: All countermeasures are necessary flight crew actions. However, some countermeasures to threats, errors and undesired aircraft states that flight crew employ, build upon 'hard'/systemic-based resources provided by the aviation system.

(34) ***Wet runway.*** The runway surface is covered by any visible dampness or water up to and including three (3) mm deep within the intended area of use.

CAR OPS-1.004 Operating rules

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

SUBPART B — PROCEDURES

CAR OPS-1.005 General

(See Appendix 1 to CAR OPS-1.005(a) & AC to Appendix 1 to CAR OPS-1.005(a)

(a) An operator shall not operate an aeroplane for the purpose of commercial air transportation other than in accordance with CAR OPS-1. For operations of Performance Class B aeroplanes; alleviated requirements, can be found in Appendix 1 to CAR OPS-1.005(a).
(b) An operator regulated under this regulation shall comply with the requirements of CAR-M;
(c) Each aeroplane shall be operated in compliance with the terms of its Certificate of Airworthiness and within the approved limitations contained in its Aeroplane Flight Manual.
(d) Air Taxi and Aeroplane Emergency Medical Service (EMS) operations shall be conducted in accordance with the requirements contained in CAR OPS–1
(e) All Synthetic Training Devices (STD), such as Flight Simulators or Flight Training Devices (FTD), replacing an aeroplane for training and/or checking purposes are to be qualified in accordance with CAR-ORA (SUBPART-FSTD) requirements and user approved by the Authority for the exercises to be conducted.

CAR OPS-1.010 Exemptions

(1) The Authority may exceptionally and temporarily grant an exemption from the provisions of CAR OPS- 1 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.
(2) Application for any exemptions will be in accordance with CAR-10 – Exemptions and applied for on an individual basis.

CAR OPS-1.015 Operational Directives

(a) The Authority may direct by means of an Operational Directive that an operation shall be prohibited, limited or subject to certain conditions, in the interests of safe operations.
(b) Operational Directives state:
    (1) The reason for issue;
    (2) Applicability and duration; and
    (3) Action required by the operator(s).
(c) Operational Directives are supplementary to the provisions of CAR OPS-1.

CAR OPS-1.020 Laws, Regulations and Procedures – Operator’s Responsibilities

(a) An operator shall ensure that:
    (1) All employees are made aware that they shall comply with the laws, regulations and procedures of those States in which operations are conducted and which are pertinent to the performance of their duties; and
    (2) All crew members are familiar with the laws, regulations and procedures pertinent to the performance of their duties.

CAR OPS-1.025 Common Language

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

CAR OPS-1.030 Minimum Equipment Lists – Operator's Responsibilities

(a) An operator shall establish, for each aeroplane, a Minimum Equipment List (MEL) approved by the Authority. This shall be based upon, but no less restrictive than, the relevant Master Minimum Equipment List (MMEL) (if this exists) accepted by the Authority.
(b) An operator shall not operate an aeroplane other than in accordance with the MEL unless permitted by the Authority. Any such permission will in no circumstances permit operation outside the constraints of the MMEL.
(c) The operator shall include in the operations manual a minimum equipment list (MEL), approved by the Authority which will enable the pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative.
(d) Where the Authority is not the State of Registry, the Authority shall ensure that the MEL does not affect the aeroplane's compliance with the airworthiness requirements applicable in the State of Registry. (See 83 *bis Agreement Summary)*

CAR OPS-1.035 Quality system

(See AMC OPS-1.035 and IEM OPS-1.035)

(a) An operator shall establish one Quality System and designate one Quality Manager to monitor compliance with, and the adequacy of, procedures required to ensure safe operational practices and airworthy aeroplanes. Compliance monitoring must include a feed-back system to the Accountable Manager (See also CAR OPS-1.175(i) to ensure corrective action as necessary.
(b) The Quality System must include a Quality Assurance Programme that contains procedures designed to verify that all operations are being conducted in accordance with all applicable requirements, standards and procedures.
(c) The Quality System and the Quality Manager must be acceptable to the Authority.
(d) The quality system must be described in relevant documentation.
(e) Notwithstanding sub-paragraph (a) above, the Authority may accept the nomination of two Quality Managers, one for operations and one for maintenance, provided that the operator has designated one Quality Management Unit to ensure that the Quality System is applied uniformly throughout the entire operation.

CAR OPS-1.037 Safety Management

(See IEM OPS-1.037, AMC-1 OPS-1.037(c), AMC-2 OPS-1.037(e), AMC-3 OPS-1.037(f))

(a) An operator shall establish and implement a safety management system as specified by ICAO SMS Document 9859 and CAR-100 – Safety Management Systems which is acceptable to the Authority.
(b) A safety management system shall clearly define lines of safety accountability throughout the operator's organisation, including a direct accountability for safety on the part of senior management.
(c) An operator that operates aeroplanes of a maximum certificated take-off mass in excess of 27,000 kg shall establish and maintain a flight data analysis programme as part of its Safety Management System. (See AMC-1 OPS-1.037(c)).
(d) A flight data analysis programme shall contain adequate safeguards to protect the source(s) of the data.
(e) An operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system. (See AMC-2 OPS-1.037(e))
(f) The Safety management system shall include an occurrence reporting scheme to enable the collation and assessment of relevant incident and accident reports in order to identify adverse trends or to address deficiencies in the interests of flight safety. The Manager – SMS shall ensure

that the scheme protects the identity of the reporter and include the possibility that reports being submitted anonymously (See AMC-3 OPS 1.037 (f)).

(g) The Safety management system shall include evaluation of relevant information relating to accidents and incidents and the promulgation of related information, but not the attribution of blame.

(h) The Operator shall manage fatigue risks within the constraints of their approved Flight and Duty Time Schemes. If supplemental mitigations are required for Fatigue hazards identified as part of their SMS, operators shall introduce documented company rules to supplement the Flight and Duty Time scheme rules to demonstrably control their fatigue related risks.

(i) An operator shall ensure that a flight will not commence or continue as planned unless it has been ascertained by every reasonable means available that the airspace containing the intended route from departure aerodrome to arrival aerodrome, including the intended takeoff, destination and en-route alternate aerodromes, can be safely used for the planned operation. When intending to operate over or near any conflict zones, a risk assessment shall be conducted and appropriate risk mitigation measures shall be taken to ensure a safe flight.

(j) The operator shall, assess the level of rescue and firefighting service (RFFS) protection available at any aerodrome intended to be specified in the operational flight plan in order to ensure that an acceptable level of protection is available for the aeroplane intended to be used.

(k) The SMS manager shall implement and maintain an updated “safety risk register” accessible to the Authority, including fatigue hazards.

CAR OPS-1.040 Additional crew members

An operator shall ensure that crew members who are not required flight or cabin crew members, have also been trained in, and are proficient to perform, their assigned duties.

CAR OPS-1.050 Search & Rescue information

An operator shall ensure the pilot-in-command has available on board the aeroplane all the essential information concerning the search and rescue services in the area over which the aeroplane will be flown.

CAR–OPS 1.055 Information on emergency and survival equipment carried

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

CAR OPS-1.060 Ditching

An operator shall not operate an aeroplane with an approved passenger seating configuration of more than 30 passengers on overwater flights at a distance from land suitable for making an emergency landing, greater than 120 minutes at cruising speed, or 400 nautical miles, whichever is the lesser, unless the aeroplane complies with the ditching requirements prescribed in the applicable airworthiness code.

CAR OPS-1.065 Carriage of weapons of war and munitions of war

(See IEM OPS-1.065)

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

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

(1) Stowed in the aeroplane in a place which is inaccessible to passengers during flight; and
(2) In the case of firearms, unloaded, unless, before the commencement of the flight, approval has been granted by all States concerned that such weapons of war and munitions of war may be carried in circumstances that differ in part or in total from those indicated in this sub-paragraph.

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

CAR OPS-1.070 Carriage of sporting weapons and ammunition

(See IEM OPS-1.070)

(a) An operator shall take all reasonable measures to ensure that any sporting weapons intended to be carried by air are reported to him.
(b) An operator accepting the carriage of sporting weapons shall ensure that they are:
    (1) Stowed in the aeroplane in a place which is inaccessible to passengers during flight unless the Authority has determined that compliance is impracticable and has accepted that other procedures might apply; and
    (2) In the case of firearms or other weapons that can contain ammunition, are unloaded.
(c) Ammunition for sporting weapons may be carried in passengers' checked baggage, subject to certain limitations, in accordance with the Technical Instructions (See CAR OPS-1.1260(b)(5)).

CAR OPS-1.075 Method of carriage of persons

(a) An operator shall take all reasonable measures to ensure that no person is in any part of an aeroplane in flight which is not a part designed for the accommodation of persons unless temporary access has been granted by the commander to any part of the aeroplane:
    (1) For the purpose of taking action necessary for the safety of the aeroplane or of any person, animal or goods therein; or
    (2) In which cargo or stores are carried, being a part, which is designed to enable a person to have access thereto while the aeroplane is in flight.

CAR OPS-1.080 Duties of flight operations officer/flight dispatcher

(a) A flight operations officer/flight dispatcher in conjunction with a method of control and supervision of flight operations shall:
    (1) Assist the pilot-in-command in flight preparation and provide the relevant information; and
    (2) Assist the pilot-in-command in preparing the operational and ATS flight plans, sign when applicable and file the ATS flight plan with the appropriate ATS unit; and
    (3) Furnish the pilot-in-command while in flight, by appropriate means, with information which may be necessary for the safe conduct of the flight.
    (4) notify the appropriate ATS unit when the position of the aeroplane cannot be determined by an aircraft tracking capability, and attempts to establish communication are unsuccessful.
(b) In the event of an emergency, a flight operations officer/flight dispatcher shall:
    (1) initiate such procedures as outlined in the operations manual while avoiding taking any action that would conflict with ATC procedures; and
    (2) convey safety-related information to the pilot-in-command that may be necessary for the safe conduct of the flight, including information related to any amendments to the flight plan that become necessary in the course of the flight.

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

CAR OPS-1.085 Crew responsibilities

(See GM OPS-1.085(e)(3))

(a) A crew member shall be responsible for the proper execution of his duties that:
   (1) Are related to the safety of the aeroplane and its occupants; and
   (2) Are specified in the instructions and procedures laid down in the Operations Manual.

(b) A crew member shall:
   (1) Report to the commander any fault, failure, malfunction or defect which he believes may affect the airworthiness or safe operation of the aeroplane including emergency systems.
   (2) Report to the commander any incident that endangered, or could have endangered, the safety of operation; and
   (3) Make use of the operator's occurrence reporting schemes in accordance with AMC-3 OPS 1.037 (f). In all such cases, a copy of the report(s) shall be communicated to the commander concerned.

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

(d) A crew member shall not perform duties on an aeroplane:
   (1) While under the influence of any psychoactive substance that may affect his faculties in a manner contrary to safety;
   (2) Until a reasonable time period has elapsed after deep water diving;
   (3) Following blood donation except when a reasonable time period has elapsed
   (4) If he is in any doubt of being able to accomplish his assigned duties; or
   (5) If he knows or suspects that he is suffering from fatigue, or feels unfit to the extent that the flight may be endangered.

(e) A crew member shall be subject to appropriate requirements on the consumption of alcohol which shall be established by the operator and acceptable by the Authority, and which shall not be less restrictive than the following:
   A crew member shall not:
   (1) Consume alcohol less than 12 hours prior to the specified reporting time for flight duty or the commencement of standby;
   (2) Commence a flight duty period with a blood alcohol level in excess of 0·02 promille;
   (3) Consume alcohol during the flight duty period or whilst on standby.

(f) The pilot-in-command shall:
   (1) Be responsible for the safety of all crew members, passengers and cargo on board, when the doors are closed, until he leaves the aeroplane at the end of the flight;
   (2) Be responsible for the operation and safety of the aeroplane from the moment the aeroplane is ready to move for the purpose of taking off until the moment it finally comes to rest at the end of the flight and the engine(s) used as primary propulsion units are shut down;
   (3) Have Authority to give all commands he deems necessary for the purpose of securing the safety of the aeroplane and of persons or property carried therein;
   (4) Have Authority to disembark any person, or any part of the cargo, which, in his opinion, may represent a potential hazard to the safety of the aeroplane or its occupants;
   (5) Not allow a person to be carried in the aeroplane who appears to be under the influence of alcohol or drugs or Psychoactive substances to the extent that the safety of the aeroplane or its occupants is likely to be endangered;
   (6) Have the right to refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage poses any risk to the safety of the aeroplane or its occupants;
   (7) Ensure that all passengers are briefed on the location of emergency exits and the location and use of relevant safety and emergency equipment;
   (8) Ensure that all operational procedures and checklists specified in CAR OPS-1.210(b) are

complied with in accordance with the Operations Manual;

(9) Not permit any crew member to perform any activity during take-off, initial climb, final approach and landing except those duties required for the safe operation of the aeroplane;

(10) Not permit:

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

ii. A cockpit voice recorder to be disabled or switched off during flight unless he believes that the recorded data, which otherwise would be erased automatically, should be preserved for incident or accident investigation nor permit recorded data to be manually erased during or after flight in the event of an accident or an incident subject to mandatory reporting;

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

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

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

(14) Be responsible for the journey log book or the general declaration containing the information listed in CAR OPS-1.1055.

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

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

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

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

CAR OPS-1.090 Authority of the commander

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

CAR OPS-1.095 Authority to taxi an aeroplane

(a) An operator shall take all reasonable steps to ensure that an aeroplane in his charge is not taxied on the movement area of an aerodrome by a person other than a flight crew member, unless that person, seated at the controls:

(1) Has been duly authorised by the operator or a designated agent and is competent to;

i. taxi the aeroplane;

ii. use the radio telephone; and

(2) Has received instruction in respect of aerodrome layout, routes, signs, marking, lights, air traffic control signals and instructions, phraseology and procedures, and is able to conform to the operational standards required for safe aeroplane movement at the aerodrome.

CAR OPS-1.100 Admission to flight deck

(a) An operator must ensure that no person, other than a flight crew member assigned to a flight, is admitted to, or carried in, the flight deck unless that person is:
   (1) An operating crew member;
   (2) A representative of the Authority responsible for certification, licensing or inspection if this is required for the performance of his official duties; or
   (3) Permitted by, and carried in accordance with instructions contained in the Operations Manual.

(b) The commander shall ensure that:
   (1) In the interests of safety, admission to the flight deck does not cause distraction and/or interfere with the flight's operation; and
   (2) All persons carried on the flight deck are made familiar with the relevant safety procedures.

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

CAR OPS-1.105 Unauthorised carriage

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

CAR OPS-1.110 Portable electronic devices

(See AMC OPS-1.110 PED, GM-1 to AMC OPS-1.110, and GM-2 to AMC OPS-1.110)

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

CAR OPS-1.115 Psychoactive substances

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

CAR OPS-1.120 Endangering safety

(a) An operator shall take all reasonable measures to ensure that no person recklessly or negligently acts or omits to act:
   (1) So as to endanger an aeroplane or person therein;
   (2) So as to cause or permit an aeroplane to endanger any person or property.

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

CAR OPS-1.125 Documents to be carried

(See AMC OPS-1.125(a)(10) and Appendix 1 to CAR OPS-1.125)

(a) An operator shall ensure that the following are carried on each flight:
   (1) The Certificate of Registration;
   (2) The Certificate of Airworthiness;
   (3) The original or a certified copy of the Noise Certificate (if applicable), including an English translation, where one has been provided by the Authority responsible for issuing the noise certificate;

(4) The original or a certified true copy of the Air Operator Certificate and a copy of Operations Specification relevant to the aeroplane 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-1.130 Manuals to be carried

(See: AMC OPS-1.130, AMC OPS-1.135(b)) An operator shall ensure that:

(1) The current parts of the Operations Manual relevant to the duties of the crew are carried on each flight
(2) Those parts of the Operations Manual which are required for the conduct of a flight are easily accessible to the crew on board the aeroplane; and
(3) The current Aeroplane Flight Manual is carried in the aeroplane unless the Authority has accepted that the Operations Manual prescribed in CAR OPS-1.1045, Appendix 1, Part B contains relevant information for that aeroplane.
(4) The current MEL manual which is in compliance
(5) The carriage of an approved electronic version of the Operations Manual is acceptable. The approval of Electronic Manuals requires an EFB approved in accordance with AMC OPS-1.135(b).

CAR OPS-1.135 Additional information and forms to be carried

(See AMC OPS-1.135(b), Appendix 1 to CAR OPS-1.135)

(a) An operator shall ensure that, in addition to the documents and manuals prescribed in CAR-OPS 1.125 and CAR OPS-1.130, the following information and forms, relevant to the type and area of operation, are carried on each flight:
(1) Operational Flight Plan containing at least the information required in CAR OPS-1.1060 Operational flight plan
(2) Operator's 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 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 IEM-2 OPS-1.1260(c) Scope – Dangerous goods carried by passengers or crew;
(9) Current maps and charts and associated documents as prescribed in CAR OPS-1.290 Flight preparation (b)(7)

(10) Passenger manifest, cargo manifest, mail declaration, navigation certificates etc.; (if applicable) and

(11) Forms to comply with the reporting requirements of the Authority and the operator.

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

CAR OPS-1.137 Electronic Flight Bag Approval

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

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

(b) the operator has assessed the safety risks associated with the operations supported by the EFB function(s);

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

(d) the operator has established and documented procedures for the management of the EFB function(s) including any database it may use; and

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

CAR OPS-1.138 Electronic Flight Bags (EFBs)

(See AMC OPS-1.138)

(a) Where portable EFBs are used on board an aeroplane, the operator shall ensure that they do not affect the performance of the aeroplane systems, equipment or the ability to operate the aeroplane.

(b) Where EFBs are used on board an aeroplane the operator shall:

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

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

(3) ensure that, in the event of an EFB failure, sufficient information is readily available to the flight crew for the flight to be conducted safely.

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

CAR OPS-1.140 Information retained on the ground

(a) An operator shall ensure that:

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

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

ii. The information is retained until it has been duplicated at the place at which it will be stored in accordance with CAR OPS-1.1065 Document storage periods; or, if this is impracticable,

iii. The same information is carried in a fireproof container in the aeroplane.

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

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

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

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

(4) Mass and balance documentation if required as CAR OPS-1.625 Mass and balance documentation refers); and

(5) Special loads notification.

CAR OPS-1.145 Power to conduct surveillance, inspections and audits

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

Note: See ICAO Annex 6, Appendix 5, plus the Guidance on the inspection, certification and continued surveillance of operations is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (ICAO Doc 8335) and the Airworthiness Manual (ICAO Doc 9760).

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

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

CAR OPS-1.150 Production of documentation and records

(a) An operator shall:

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

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

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

CAR OPS-1.155 Preservation of documentation

(a) An operator shall ensure that:

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

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

CAR OPS-1.160 Preservation, production and use of flight recorder recordings

(AC OPS-1.160(a)(1) & (2) Preservation of Recordings)

(a) Preservation of recordings

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

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

(3) Additionally, when the Authority so directs, the operator of an aeroplane on which

a flight recorder is carried shall preserve the original recorded data for a period of sixty (60) days unless otherwise directed by the investigating Authority.

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

i. Save the recordings for the period of operating time as required by CAR OPS1.715, 1.720, 1.725 and 1.727 except that, for the purpose of testing and maintaining flight data recorders, up to one hour of the oldest recorded material at the time of testing may be erased; and

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

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

(c) Use of recordings

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

(2) The flight data recorder recordings may not be used for purposes other than for the investigation of an accident or incident subject to mandatory reporting except when such records are:

i. Used by the operator for airworthiness or maintenance purposes only; or

ii. De-identified; or

iii. Disclosed under secure procedures.

CAR OPS-1.165 Leasing

(See AC OPS-1.165(c)(2) Leasing of aeroplanes between an Oman operator and any entity)

(a)Terminology – Terms used in this paragraph have the following meaning:

(1) Dry lease – Is when the aeroplane is operated under the AOC or authorization of the lessee.

(2) Wet lease – Is when the aeroplane is operated under the AOC or authorization of the lessor.

(3) Damp lease – Is when the aeroplane is operated under the AOC or authorization of the lessor with partial crew.

(b) General requirements for leasing:

(1) When an applicant for an AOC or an existing operator wishes to lease aircraft, the applicant or operator should provide to the Authority with the following information:

i. the aircraft type, model and serial number;

ii. the name and address of the registered owner;

iii. State of Registry, nationality and registration marks;

iv. Certificate of Airworthiness and statement from the registered owner that the aircraft fully complies with the airworthiness requirements of the State of Registry

v. Name, address and signature of lessee or person responsible for operational control of the aircraft under the lease agreement, including a statement that such individual and the parties to the lease agreement fully understand their respective responsibilities under the applicable regulations;

vi. copy of the lease agreement or description of lease provisions;

vii. duration of the lease; and

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

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

x. The lease must include the commencement and termination date of the lease.
xi. In the opinion of the CAA, the lease must be in the public interest.
xii. The lease must clearly identify who retains custody and operational control of the aircraft.
xiii. The lease must clearly identify who is responsible for the airworthiness of the leased aircraft.
xiv. The lease must clearly identify all parties to the lease.

(2) On completion of review and liaison with other competent authorities, determination as to which party to the lease agreement is in fact responsible for conduct of the operations will be made considering the responsibilities of the parties under the lease agreement for:
i. flight crewmember licensing and training;
ii. cabin crewmember training;
iii. airworthiness of the aircraft and the performance of maintenance;
iv. operational control, including dispatch and flight following;
v. scheduling of flight and cabin crew members; and
vi. signing the maintenance release.

(3) Issuance of a CAA approval is contingent upon the following criteria being met:
i The aircraft must be of a type and model eligible for a standard Omani Certificate of Airworthiness and comply with all environmental and operational requirements.
ii Regulatory control of the aircraft operation must be equivalent to that of an Omani aircraft operated by its Omani registered owner, and in keeping with provisions of the Operating Certificate or equivalent document.
iii The aircraft must be operated in accordance with a Minimum Equipment List (MEL), which is acceptable to the CAA.
iv The lease must identify the organization which will maintain the aircraft, and all maintenance approvals held by that organization.
v The aircraft will be maintained to a Maintenance Program approved /accepted by the CAA.
vi The appropriate training and certification for the maintenance and operational staff approved /accepted by the CAA.

(c) Leasing of aircraft between an Omani operator and any entity
(1) ***Dry lease-in***:
i. An Omani operator shall not dry lease-in an aircraft from an entity unless approved by the Authority. Any conditions which are part of this approval must be included in the lease agreement.
ii. An Omani operator shall ensure that, with regard to aircraft that are dry leased-in, any differences from the requirements prescribed in Subparts K, L, and/or CAR-M, are notified to and are acceptable to the Authority.
(2) ***Wet lease-in***:
Note: See AC OPS-1.165(c)(2) Leasing of aircraft between an Omani operator and any entity
i. An Omani operator shall not wet lease-in an aircraft from an entity without the approval of the Authority.
ii. An Omani operator shall ensure that, with regard to aircraft that are wet leased-in:
A. The safety standards of the lessor with respect to maintenance and operation are equivalent to CARs;

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

C. The aeroplane has a standard Certificate of Airworthiness issued in accordance with ICAO Annex 8;

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

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

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

A. The Authority has exempted the operator from the relevant provisions of CAR OPS-1 and, after the foreign regulatory Authority has accepted responsibility in writing for surveillance of the maintenance and operation of the aeroplane(s), has removed the aeroplane from its AOC; and

B. The aeroplane is maintained according to an approved maintenance programme.

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

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

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

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

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

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

(d) Leasing of aeroplanes at short notice:

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

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

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

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

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

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

Transfer of functions and duties as State of Registry under article 83bis of the Chicago Convention. *Note: See AMC OPS-1.165 (e)*

(1) Oman may, by agreement with other foreign State, accept the transfer of all or part of the foreign State's functions and duties as State of Operator in respect of a foreign

registered aircraft under Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention.

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

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

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

Transfer of functions and duties as State of Operator under article 83bis of the Chicago Convention. *Note: See AMC OPS 1.165 (f)*

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

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

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

(g) Foreign Registered Aircraft Leased to Omani Operators

Foreign registered aircraft proposed for use in an Omani commercial air service should normally be removed from the foreign register and subsequently registered in Oman, in the name of the Omani operator, for the term of the lease. Where this is not practical, the lessee must make an application to the CAA as required pursuant to CAR-OPS l.165. The maximum term of the lease where the aircraft may remain in foreign registration is one year.

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

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

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

of the aircraft by that state.

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

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

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

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

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

(j) Foreign Modifications

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

(1) When the aircraft being proposed for dry lease into Oman is from a country where a Bilateral Airworthiness Agreement or Technical Arrangement exists with Oman, the following factors shall be considered when determining a need for familiarisation of the modification:
   i type of modification and possible safety implications;
   ii type of operation proposed versus its previous role; and
   iii the service history of the leased aircraft.

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

(2) When the aircraft being proposed for any lease into Oman is from a country where no Bilateral Airworthiness Agreement or Technical Arrangement exists with Oman, the following factors shall be considered when determining eligibility requirements for installed modifications:
   i aircraft source of export, State of Design, and service history;
   ii type of operation proposed versus its previous role; and
   iii type of modification and possible safety implications.

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

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

(k) Oman Registered Commercial Aircraft Leased to Foreign Operators

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

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

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

The surveillance will ensure that aircraft leased to maintained to Omani standards.

(m) Omani Registered commercial Aircraft Leased to Other Omani Operators

The following additional conditions shall apply to Omani registered commercial aircraft when leased to other Omani Operators:

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

(n) Omani Operators Providing Wet/Damp lease Operations

(1) When performing wet/Damp lease operations, CAR-OPS I or CAR OPS 3 whichever is applicable, shall apply in addition to the lessee's civil aviation rules. Whichever rule (foreign or Omani) is more restrictive shall apply in each instance of application of the rules.
(2) In addition to the requirements of section 1.6, in the case where the aircraft is to be operated on behalf of a foreign operator in accordance with CAR-OPS l . 165, the agreement should be authorised by the foreign Operator's civil aviation authority. The authorisation should be by letter and must include authorisation for CAA inspectors to conduct necessary inspections of flight operations and maintenance facilities, personnel and/or documents, as deemed necessary, in the operating country.
(3) The lessor must submit to the CAA a letter stating they will reimburse the CAA for all travel, accommodation and other expenses incurred by the CAA to perform surveillance duties relating to the approval and continuing surveillance of such aircraft.
(4) When performing wet lease operations under CAR-OPS 1.165, the lessor must

maintain the aircraft in accordance with the conditions of its Maintenance Program. The lessor must have its Operation Manual amended to include any changes required to account for:

- i Location of maintenance facilities, personnel, spares supplies;
- ii Minimum Equipment List (MEL) compliance handling procedures, including
- iii submission of a copy or reference to the MEL that will be utilised and any required ii. changes with respect to the intended operation; and
- iv Changes and/or use of contract maintenance facilities.
- v The lessor must identify the aircraft Maintenance Program along with any proposed amendments as a result of the intended operation; and
- vi The agreement must clearly specify that the lessor retains airworthiness control and responsibility for the aircraft.

(o) The foregoing must be evaluated to determine if any changes are required to the aircraft inspection program, location of maintenance facilities, personnel, equipment, etc. prior to approving the arrangement.

(1) A base inspection of the foreign facilities shall be conducted by the CAA flight operations and airworthiness inspectors. Discussions with the foreign civil aviation authorities may be required, regarding compliance with any special airworthiness / operations conditions required by either the CAA or the foreign authorities prior to approving the arrangement.

(p) Foreign Operators Providing Wet Damp Lease to Omani Operators

(1) When performing wet lease operations for an Omani Operator, the foreign Operator shall be approved under CAR OPS 1.

(2) When performing wet lease operations, CAR-OPS l, or CAR OPS 3 whichever is applicable, shall apply in addition to the lessor's civil aviation rules. Whichever rule (foreign or Omani) is more restrictive shall apply in each instance of application of the rules.

(3) In addition to the requirements of section (b), the agreement must be authorised by the foreign Operator's civil aviation authority; e.g. operations specifications.

(4) The lessor must maintain the aircraft in accordance with the conditions of its Maintenance Program. The lessor may be required to have its Operation Manual amended to include any changes required to account for:

(5) location of maintenance facilities, personnel, spares supplies;

(6) Minimum Equipment List (MEL) compliance handling procedures, including

- i submission of a copy or reference to the MEL that will be utilised and any required
- ii changes with respect to the intended operation; and

(7) changes and/or use of contract maintenance facilities. In addition:

- i The lessor must identify the aircraft Maintenance Program along with any proposed amendments as a result of the intended operation; and
- ii The agreement must clearly specify that the lessor retains airworthiness control and responsibility for the aircraft.

(8) The lease agreement shall state that the Lessor has Operational Control of the aircraft.

(9) The foregoing must be evaluated to determine if any changes are required to the aircraft inspection program, location of maintenance facilities, personnel, equipment, etc. prior to approving the arrangement.

(q) Leased Aircraft subject to Long Term Airworthiness Directives

Certain airworthiness directives (ADs), such as the Corrosion Prevention and Corrosion Protection (CPCP) ADS, have long term implementation times and are subject to additional compliance requirements. Therefore, aircraft which are subject to these ADS must be inspected and the maintenance records reviewed to show conformity to that type design, with particular attention to the following (where & when applicable):

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

(r) Termination

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

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

CAR–OPS 1.170 Aircraft Operated under an Article 83 *bis* Agreement

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

(b) The Agreement Summary of an Article 83 *bis* agreement shall be accessible to a civil aviation safety inspector to determine which functions and duties are transferred under the agreement by the State of Registry to the State of the Operator, when conducting surveillance activities, such as ramp checks. (See AMC OPS-1.125(a)(10))

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

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

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

SECTION 2 – SUBPART B – ADVISORY CIRCULARS, ACCEPTABLE MEANS OF COMPLIANCE AND INTERPRETATIVE/ EXPLANATORY MATERIAL (AMC & IEM)

Appendix 1 to CAR OPS-1.005(a) Operations of performance Class B aeroplanes.

(See CAR OPS-1.005 General and AC to Appendix 1 to CAR OPS-1.005(a))

(a) Terminology:

(1) A to A. operation – Take-off and landing are made at the same place.

(2) A to B operations – Take-off and landings are made at different places.

(3) 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: See Appendix 1 to CAR OPS-1.005(a) Operations of performance Class B aeroplanes. Paragraph (7)

(b) Operations, to which this Appendix is applicable, may be conducted in accordance with the following alleviations.

(1) CAR OPS-1.035 – Quality System:

i. See: AMC OPS-1.175 for description of small and very small operators.

ii. In the case of a very small operator, the post of Quality Manager may be held by a nominated post-holder if external auditors are used. This applies also where the accountable manager is holding one or several of the nominated posts.

(2) CAR OPS-1.037 Accident prevention and flight safety programme:

Note: See AC to Appendix 1 to CAR OPS-1.005(a)

(3) CAR OPS-1.075 – Methods of carriage of persons:

i. Not required for VFR operations of single engine aeroplanes.

(4) CAR OPS-1.100 Admission to the flight deck:

i. For single pilot operations an operator must establish rules for the carriage of passengers in a pilot seat.

ii. The commander must ensure that when conducting single pilot operations;

A. Carriage of passengers in a pilot seat does not cause distraction and/or interference with the operation of the flight; and

B. The passenger occupying a pilot seat is made familiar with the relevant restrictions and safety procedures.

(5) CAR OPS-1.105 – Unauthorised Carriage:

i. Not required for VFR operations of single engine aeroplanes.

(6) CAR OPS-1.135 – Additional information and forms to be carried:

i. For A to A VFR operations of single engine aeroplanes by day, the following documents need not be carried:

A. Operational Flight Plan;

B. Aeroplane Technical Log;

C. NOTAM/AIS briefing documentation;

D. Meteorological Information;

E. Notification of special categories of passengers ... etc.; and

F. Notification of special loads including dangerous goods ... etc.

ii. For A to B VFR operations of single engine aeroplanes by day. Notification of special categories of passengers as described in CAR OPS-1.135 (a)(7) does not need to be carried.

iii. For A to B VFR operations by day, the Operational Flight Plan may be in a simplified form and must meet the needs of the type of operation.

(7) CAR OPS-1.215 – Use of Air Traffic Services:
   i. For VFR operations of single engine aeroplanes by day, non-mandatory contact with ATS shall be maintained to the extent appropriate to the nature of the operation. Search and rescue services must be ensured in accordance with CAR OPS-1.300.

(8) CAR OPS-1.225 – Aerodrome Operating Minima:
   i. For VFR operations, the standard VFR operating minima will normally cover this requirement. Where necessary, the operator shall specify additional requirements taking into account such factors as radio coverage, terrain, nature of sites for take-off and landing, flight conditions and ATS capacity

(9) CAR OPS-1.235 – Noise abatement procedures:
   i. Not applicable to VFR operations of single engine aeroplanes.

(10) CAR OPS-1.240 – Routes and Areas of Operation:
   i. Subparagraph (a)(1) is not applicable to A to A VFR operations of single engine aeroplanes by day.

(11) CAR OPS-1.250 – Establishment of minimum flight altitudes:
   i. For VFR operations by day, this requirement is applicable as follows. An operator shall ensure that operations are only conducted along such routes or within such areas for which a safe terrain clearance can be maintained and shall take account of such factors as temperature, terrain, unfavorable meteorological conditions (e.g. severe turbulence and descending air currents, corrections for temperature and pressure variations from standard values). (See CAR-180.101)

(12) CAR OPS-1.255 – Fuel Policy:
   i. For A to A Flights - An operator shall specify the minimum fuel contents at which a flight must end. This minimum, final reserve, fuel must not be less than the amount needed to fly for a period of forty-five (45) minutes.
   ii. For A to B Flights – An operator shall ensure that the pre-flight calculation of usable fuel required for a flight includes;
      A. Taxi fuel - Fuel consumed before take-off, if significant; and
      B. Trip fuel (Fuel to reach the destination); and
      C. Reserve fuel -
         (1) Contingency fuel - Fuel that is not less than five percent (5%) of the planned trip fuel or, in the event of in-flight re-planning, five percent (5%) of the trip fuel for the remainder of the flight; and
         (2) Final reserve fuel - Fuel to fly for an additional period of forty-five (45) minutes (piston engines) or thirty (30) minutes (turbine engines); and
      D. Alternate fuel - Fuel to reach the destination alternate via the destination, if a destination alternate is required
      E. Extra fuel – Fuel that the commander may require in addition to that required under subparagraphs (A) – (D) above.

(13) CAR OPS-1.265 Carriage of inadmissible passengers, deportees or persons in custody:
   i. For VFR operations of single engine aeroplanes and where it is not intended to carry inadmissible passengers, deportees or persons in custody, an operator is not required to establish procedures for the carriage of such passengers.

(14) CAR OPS-1.280 Passenger Seating:
   i. Not Applicable to VFR operations of single engine aeroplanes.

(15) CAR OPS-1.285 Passenger Briefing:
   i. Demonstration and briefing shall be given as appropriate to the kind of operations. In single pilot operations, the pilot may not be allocated tasks distracting him from his flying duties.

(16) CAR OPS-1.290 Flight Preparation:

i. Operational Flight Plan for A to A. operations - Not Required.

ii. A to B operations under VFR by day - An operator shall ensure that a simplified form of an operational flight plan which is relevant to the type of operation is completed for each flight.

(17) CAR OPS-1.295 Selection of aerodromes:

Not applicable to VFR operations. The necessary instructions for the use of aerodromes and sites for take-off and landing are to be issued with reference to CAR OPS-1.220.

(18) CAR OPS-1.310 Crew members at stations:

For VFR operations, instructions on this matter are required only where two pilot operations are conducted.

(19) CAR OPS-1.375 In-flight fuel management:

Appendix 1 to CAR OPS-1.375 is not required to be applied to VFR operations of single engine aeroplanes by day.

(20) CAR OPS-1.405 Commencement and continuation of approach: Not applicable to VFR operations.

(21) CAR OPS-1.410 Operating procedures - threshold crossing height:

Not applicable to VFR operations.

(22) CAR OPS-1.430 to 1.460, including appendices:

Not applicable to VFR operations.

(23) CAR OPS-1.530 Take-off:

i. Subparagraph (a) applies with the following addition. The Authority may, on a case-by-case basis, accept other performance data produced by the operator and based on demonstration and/or documented experience. Subparagraphs (b) and (c) apply with the following addition. Where the requirements of this paragraph cannot be complied with due to physical limitations relating to extending the runway and there is a clear public interest and necessity for the operation, the Authority may accept, on a case-by-case basis, other performance, not conflicting with the Aeroplane Flight Manual, data relating to special procedures, produced by the operator based on demonstration and/or documented experience.

ii. An operator wishing to conduct operations according to subparagraph (i) must have the prior approval of the Authority issuing the AOC. Such an approval will:

A. Specify the type of aeroplane;

B. Specify the type of operation;

C. Specify the aerodrome(s) and runways concerned;

D. Restrict the take-off to be conducted under VMC;

E. Specify the crew qualification, and

F. Be limited to aeroplanes where the first type certificate was first issued before 1 January 2005.

iii. The operation must be accepted by the state in which the aerodrome is located.

(24) Take-off Obstacle Clearance – Multi-Engine aeroplanes (also see CAR OPS-1.535):

i. Subparagraphs (a)(3), (a)(4), (a)(5), (b)(2), (c)(1), (c)(2) and the Appendix are not applicable to VFR operations by day.

ii. For IFR or VFR operations by day, sub-paragraphs (b) and (c) apply with the following variations.

A. Visual course guidance is considered available when the flight visibility is 1500 m or more

B. The maximum corridor width required is 300 m when flight visibility is 1500 m or more.

(25) Landing Destination and Alternate Aerodromes (also see CAR OPS-1.545):

i. The paragraph applies with the following addition. Where the requirements of this paragraph cannot be complied with due to physical limitations relating to extending the runway and there is a clear public interest and operational necessity for the operation, the Authority may accept, on a case- by-case basis, other performance data, not conflicting with the Aeroplane Flight Manual relating to special procedures, produced by the operator based on demonstration and/or documented experience.

ii. An operator wishing to conduct operations according to subparagraph (i) must have prior approval of the Authority issuing the AOC. Such an approval will:
   A. Specify the type of aeroplane;
   B. Specify the type of operation;
   C. Specify the aerodrome(s) and runways concerned;
   D. Restrict the final approach and landing to be conducted under VMC;
   E. Specify the crew qualification, and
   F. Be limited to aeroplanes where the type certificate was first issued before 1 January 2005.

iii. The operation must be accepted by the state in which the aerodrome is located.

(26) CAR OPS-1.550 Landing Dry Runways:

i. The paragraph applies with the following addition. Where the requirements of this paragraph cannot be complied with due to physical limitations relating to extending the runway and there is a clear public interest and operational necessity for the operation, the Authority may accept, on a case- by-case basis, other performance data, not conflicting with the Aeroplane Flight Manual, relating to special procedures, produced by the operator based on demonstration and/or documented experience.

ii. An operator wishing to conduct operations according to subparagraph (i) must have prior approval of the Authority issuing the AOC. Such an approval will:
   A. Specify the type of aeroplane;
   B. Specify the type of operation;
   C. Specify the aerodrome(s) and runways concerned;
   D. Restrict the final approach and landing to be conducted under VMC;
   E. Specify the crew qualification; and
   F. Be limited to aeroplanes where the first type certificate was issued before 1 January 2005.

iii. The operation must be accepted by the state in which the aerodrome is located.

(27) CAR OPS-1.640 Aeroplane operating lights:

The Authority may grant an exemption from some or all of the requirements of subparagraph (a) for the operation of single engine aeroplanes, operated under VFR by day local area flight / training flight, without an electrical generating system. This is subject to approval of any other state overflown.

(28) CAR OPS-1.650 Day VFR operations:

Paragraph 1.650 is applicable with the following addition. Single engine aeroplanes, first issued with an individual certificate of airworthiness before 22 May 1995, may be exempted from the requirements of subparagraphs (f), (g), (h) and (i) by the Authority if the fulfilment would require retrofitting.

(29) CAR-M Continuous Airworthiness Management Exposition

The CAME may be adapted to the operation to be conducted.

(30) CAR-M Operator's technical log system:

(31) CAR OPS-1.940 Composition of Flight Crew:

Subparagraphs (a)(2), (a)(4), and (b) are not applicable to VFR operations by day, except that (a)(4) must be applied in full where 2 pilots are required by CAR OPS-Part 1.

(32) CAR OPS-1.945 Conversion training and checking:

i. Subparagraph (a)(7) - Line flying under supervision (LIFUS) may be performed on any aeroplane within the applicable class. The amount of LIFUS required is dependent on the complexity of the operations to be performed.

ii. Subparagraph (a)(8) is not required.

(33) CAR OPS-1.955 Nomination as commander:

i. Subparagraph (b) applies as follows.

ii. The Authority may accept an abbreviated command course relevant to the type of operation conducted.

(34) CAR OPS-1.960 Commanders holding a Commercial Pilot License Subparagraph (a)(1)(i) is not applicable to VFR operations by day.

(35) CAR OPS-1.965 Recurrent training and checking:

i. Subparagraph (a)(1) shall be applied as follows for VFR operations by day. All training and checking shall be relevant to the type of operation and class of aeroplane on which the flight crew member operates with due account taken of any specialised equipment used.

ii. Subparagraph (a)(3(ii) applies as follows. Training in the aeroplane may be conducted by a Class Rating Examiner (CRE), a Flight Examiner (FE) or a Type Rating Examiner (TRE).

iii. Subparagraph (a)(4)(i) applies as follows. Operator proficiency check may be conducted by a Type Rating Examiner (TRE), Class Rating Examiner (CRE) or by a suitably qualified commander nominated by the operator and acceptable to the Authority, trained in CRM concepts and the assessment of CRM skills.

iv. Sub-paragraph (b)(2) shall be applicable as follows for VFR operations by day. - In those cases where the operations are conducted during seasons not longer than eight (8) consecutive months, one (1) operator proficiency check is sufficient. This proficiency check must be undertaken before commencing commercial air transport operations.

(36) CAR OPS-1.968 Pilot qualification for either pilot's seat:

Appendix 1 is not applicable to VFR operations of single engine aeroplanes by day.

(37) CAR OPS-1.975 Route and Aerodrome Competence:

i. For VFR operations by day, subparagraphs (b), (c) and (d) are not applicable, except that the operator shall ensure that in the cases where a special approval by the state of the aerodrome is required, the associated requirements are observed.

ii. For IFR operations or VFR operations by night, as an alternative to subparagraphs (b) - (d), route and aerodrome competence may be revalidated as follows.

A. Except for operations to the most demanding aerodromes, by completion of at least ten (10) sectors within the area of operation during the preceding twelve (12) months in addition to any required self-briefing.

B. Operations to the most demanding aerodromes may be performed only if:

1. The commander has been qualified at the aerodrome within the preceding thirty-six (36) months; by a visit as an operating flight crew member or as an observer.
2. The approach is performed in VMC from the applicable minimum sector altitude; and
3. An adequate self-briefing has been made prior to the flight

(38) CAR OPS-1.980 More than one type or variant:

i. Not applicable if operations are limited to single pilot classes of piston engine aeroplanes under VFR by day.

ii. For IFR and VFR Night Operations, the requirement in Appendix 1 to CAR OPS-1.980, subparagraph (d)(2)(i) for five hundred (500) hours in the relevant crew position before exercising the privileges of two (2) license endorsements, is reduced to one hundred (100) hours or sectors if one of the endorsements is related to a class. A check flight must be completed before the pilot is released for duties as Commander

(39) CAR OPS-1.981 Operation of helicopters and aeroplanes:
Subparagraph (a)(1) is not applicable if operations are limited to single pilot classes of piston engine aeroplanes.

(40) CAR OPS-1.1045 Operations Manual – structure and contents: See AMC OPS 1.1045 Operations Manual Contents

(41) CAR OPS-1.1060 Operational flight plan:
Not required for A to A VFR Day operation. For A to B VFR Day operations the requirement is applicable but the flight plan may be in a simplified form relevant to the kind of operations conducted. (cf. CAR OPS-1.135).

(42) CAR OPS-1.1070 MME – Maintenance Management Exposition:
The MME may be adapted to the operation to be conducted. (See AC to Appendix 1 to CAR OPS-1.005(a))

(43) CAR OPS-1.1070 CAME – Continuing Airworthiness Management Exposition:
The CAME may be adapted to the operation to be conducted. (See Appendix 1 to CAR OPS-1.005(a) Operations of performance Class B aeroplanes.)

(44) CAR OPS-1.1071 Aeroplane technical log:
Applicable as indicated for CAR-M Operator's technical log system.

(45) CAR OPS-1.1071 Aeroplane technical log:
Applicable as indicated for CAR OPS-1.1055. OMAN

(46) Subpart R - Transport of dangerous goods by air:

Note 1: (See Appendix 1 to CAR OPS-1.005(a) Operations of performance Class B aeroplanes & AC to Appendix 1 to CAR OPS-1.1005(a)) (46)CAR OPS- 1.1335 Security requirements:

Note 2: (See AC to Appendix 1 to CAR OPS-1.005(a) Operations of performance Class B aeroplanes, para (5))

(47) CAR OPS-1.1240 Training programmes:
The training programmes shall be adapted to the kind of operations performed. A self-study training programme may be acceptable for VFR operations.

(48) CAR OPS-1.1250 Aeroplane search procedure checklist: Not applicable for VFR operations by day.

AC to Appendix 1 to CAR OPS-1.005 (a) Operations of performance class B aeroplanes

(See Appendix 1 to CAR OPS-1.005(a))

(1) CAR OPS-1.037; Safety Management System.
   (a) For operations of performance class B aeroplanes, a simplified programme is sufficient which may consist of the following.
   (b) Collecting case-based material (such as accident reports relating to the type of operation) and submit/distribute that information material to the crew members concerned; or
   (c) Collection and use of information from flight safety seminars (such as AOPA flight safety seminars etc.)

(2) Appendix 2 to CAR OPS-1.175;
   (a) The management and organisation of an AOC holder Supervision - The supervision of personnel may be undertaken by the appropriate nominated post-holder(s) subject to time available.

(3) CAR OPS 1.1070; MME – Maintenance Management Exposition:
   (a) The MME can be simplified as relevant to the operation to be conducted.

(4) Subpart R; Transport of Dangerous goods by air
   (a) CAR OPS-1.1250, 1.1255, 1.1260, 1.1265, 1.1315, 1.1320 and 1.1325 are applicable to all operators.

(b) The remainder of this Subpart applies only when the operator seeks or holds an approval to carry dangerous goods.
(c) The requirement in CAR OPS-1.1265 may be fulfilled by the use of information pamphlets

(5) Subpart S; Security
(a) CAR OPS-1.1335 - Security requirements are applicable when operating in states where the national security programme applies to the operations covered in this Appendix.
(b) CAR OPS-1.1340 - Training programmes shall be adapted to the kind of operations performed. A self-study training programme may be acceptable for VFR operations.

(6) Appendix 1 to CAR OPS-1.005(a), subparagraph (a)(3)
(a) 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.

(7) CAR OPS-1.290(b)(2)
(a) Where a Configuration Deviation List (CDL) is provided for aeroplanes of this size, it is included in the Aeroplane Flight Manual (AFM) or an equivalent document.

AMC OPS-1.035 Quality System

(See CAR OPS-1.035)

(1) Introduction
(a) In order to show compliance with CAR OPS-1.035, an operator should establish his Quality System in accordance with the instructions and information contained in the following paragraphs:

(2) General
(a) Terminology – The terms used in the context of the requirement for an operator's Quality System have the following meanings:
i. Accountable Manager. The person acceptable to the Authority who has corporate Authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority, and any additional requirements defined by the operator.
ii. Quality Assurance. All those planned and systematic actions necessary to provide adequate confidence that operational and maintenance practices satisfy given requirements.
iii. Quality Manager. The manager, acceptable to the Authority, responsible for the management of the Quality System, monitoring function and requesting corrective actions.

(b) Quality Policy
i. An operator should establish a formal written Quality Policy Statement that is a commitment by the Accountable Manager as to what the Quality System is intended to achieve. The Quality Policy should reflect the achievement and continued compliance with CAR OPS-1 together with any additional standards specified by the operator.
ii. The Accountable Manager is an essential part of the AOC holder's management organisation. With regard to the text in CAR OPS-1.175 (i) and the above terminology, the term 'Accountable Manager' is intended to mean the Chief Executive / President / Managing Director / Director General / General Manager etc. of the operator's organisation, who by virtue of his position has overall responsibility (including financial) for managing the organisation.
iii. The Accountable Manager will have overall responsibility for the AOC holder's Quality System including the frequency, format and structure of the internal management evaluation activities as prescribed in subparagraph 4(i) below.

(c) Purpose of the Quality System
i. The Quality System should enable the operator to monitor compliance with CAR

OPS-1, the Operations Manual, the Operator's Maintenance Management Exposition, and any other standards specified by that operator, or the Authority,

(d) Quality Manager

i. The function of the Quality Manager to monitor compliance with, and the adequacy of, procedures required to ensure safe operational practices and airworthy aeroplanes, as required by CAR OPS-1.035(a), may be carried out by more than one person by means of different, but complementary, Quality Assurance Programmes.

ii. The primary role of the Quality Manager is to verify, by monitoring activity in the fields of flight operations, maintenance, crew training and ground operations, that the standards required by the Authority, and any additional requirements defined by the operator, are being carried out under the supervision of the relevant Nominated Post-holder.

iii. The Quality Manager should be responsible for ensuring that the Quality Assurance Programme is properly established, implemented and maintained.

iv. The Quality Manager should:

A. Have direct access to the Accountable Manager;

B. Not be one of the nominated post-holders to preserve the independence of the compliance monitoring function (for exceptions see para (v) below and CAR OPS-1.175); and

C. Have access to all parts of the operator's and, as necessary, any subcontractor's organisation.

v. In the case of small/very small operators (see paragraph 7(c) below), the posts of the Accountable Manager and the Quality Manager may be combined. However, in this event, independent personnel shall conduct quality audits.

(3) Quality System

(a) Introduction

i. The operator's Quality System should ensure compliance with and adequacy of operational and maintenance activities requirements, standards and operational procedures.

ii. The operator should specify the basic structure of the Quality System applicable to the operation.

iii. The Quality System should be structured according to the size and complexity of the operation to be monitored ('small operators' see also paragraph (7) below).

(b) Scope

i. As a minimum, the Quality System should address the following:

A. The provisions of CAR OPS-1;

B. The operator's additional standards and operating procedures;

C. The operator's Quality Policy;

D. The operator's organisational structure;

E. Responsibility for the development, establishment and management of the Quality System;

F. Documentation, including manuals, reports and records;

G. Quality Procedures;

H. Quality Assurance Programme;

I. The required financial, material, and human resources;

J. Training requirements.

ii. The quality system should include a feedback system to the Accountable Manager to ensure that corrective actions are both identified and promptly addressed. The feedback system should also specify who is required to rectify discrepancies and non-compliance in each particular case, and the procedure to be followed if corrective action is not completed within an appropriate timescale.

(c) Relevant Documentation

i. Relevant documentation includes the relevant part of the Operations Manual and the Operator's Maintenance Management Exposition, which may be included in a separate Quality Manual.

ii. In addition, relevant documentation should also include the following:

A. Quality Policy;
B. Terminology;
C. Specified operational standards;
D. A description of the organisation;
E. The allocation of duties and responsibilities;
F. Operational procedures to ensure regulatory compliance;
G. Accident Prevention and Flight Safety Programme;
H. The Quality Assurance Programme, reflecting;
- Schedule of the monitoring process;
- Audit procedures;
- Reporting procedures;
- Follow-up and corrective action procedures;
- Recording system;

I. The training syllabus; and
J. Document control.

(4) Quality Assurance Programme (See CAR OPS-1.035(b).)

(a) Introduction

i. The Quality Assurance Programme should include all planned and systematic actions necessary to provide confidence that all operations and maintenance are conducted in accordance with all applicable requirements, standards and operational procedures.

ii. When establishing a Quality Assurance Programme, consideration should, at least, be given to the paragraphs (4)(b) to (4)(i) below:

(b) Quality Inspection

i. The primary purpose of a quality inspection is to observe a particular event/action/document etc., in order to verify whether established operational procedures and requirements are followed during the accomplishment of that event and whether the required standard is achieved.

ii. Typical subject areas for quality inspections are:

A. Actual flight operations;
B. Ground De-icing/Anti-icing;
C. Flight Support Services;
D. Load Control;
E. Maintenance;
F. Technical Standards; and
G. Training Standards.

(d) Audit

i. An audit is a systematic, and independent comparison of the way in which an operation is being conducted against the way in which the published operational procedures say it should be conducted.

ii. Audits should include at least the following quality procedures and processes:

A. A statement explaining the scope of the audit;
B. Planning and preparation;
C. Gathering and recording evidence; and
D. Analysis of the evidence.

iii. Techniques which contribute to an effective audit are:

A. Interviews or discussions with personnel;
B. A review of published documents;
C. The examination of an adequate sample of records;

D. The witnessing of the activities which make up the operation; and
E. The preservation of documents and the recording of observations.

(e) Auditors

i. An operator should decide, depending on the complexity of the operation, whether to make use of a dedicated audit team or a single auditor. In any event, the auditor or audit team should have relevant operational and/or maintenance experience. The responsibilities of the auditors should be clearly defined in the relevant documentation.

(f) Auditor's Independence

i. Auditors should not have any day-to-day involvement in the area of the operation and/or maintenance activity which is to be audited. An operator may, in addition to using the services of full-time dedicated personnel belonging to a separate quality department, undertake the monitoring of specific areas or activities by the use of part-time auditors. An operator whose structure and size does not justify the establishment of full-time auditors, may undertake the audit function by the use of part-time personnel from within his own organisation or from an external source under the terms of an agreement acceptable to the Authority. In all cases the operator should develop suitable procedures to ensure that persons directly responsible for the activities to be audited are not selected as part of the auditing team. Where external auditors are used, it is essential that any external specialist is familiar with the type of operation and/or maintenance conducted by the operator.

ii. The operator's Quality Assurance Programme should identify the persons within the company who have the experience, responsibility and Authority to:

A. Perform quality inspections and audits as part of ongoing Quality Assurance;
B. Identify and record any concerns or findings, and the evidence necessary to substantiate such concerns or findings;
C. Initiate or recommend solutions to concerns or findings through designated reporting channels;
D. Verify the implementation of solutions within specific timescales;
E. Report directly to the Quality Manager.

(g) Audit Scope

i. Operators are required to monitor compliance with the operational procedures they have designed to ensure safe operations, airworthy aircraft and the serviceability of both operational and safety equipment. In doing so they should as a minimum, and where appropriate, monitor:

A. Organisation;
B. Plans and Company objectives;
C. Operational Procedures;
D. Flight Safety;
E. Operator certification (AOC/Operations specification);
F. Supervision;
G. Aircraft Performance;
H. All Weather Operations;
I. Communications and Navigational Equipment and Practices;
J. Mass, Balance and Aircraft Loading;
K. Instruments and Safety Equipment;
L. Manuals, Logs, and Records;
M. Flight and Duty Time Limitations, Rest Requirements, and Scheduling;
N. Aircraft Maintenance/Operations interface;
O. Use of the MEL;
P. Maintenance Programmes and Continued Airworthiness;

Q. Airworthiness Directives management;
R. Maintenance Accomplishment;
S. Defect Deferral;
T. Flight Crew;
U. Cabin Crew;
V. Dangerous Goods;
W. Security; Training.

(h) Audit Scheduling

i. A Quality Assurance Programme should include a defined audit schedule and a periodic review cycle area by area. The schedule should be flexible, and allow unscheduled audits when trends are identified. Follow-up audits should be scheduled when necessary to verify that corrective action was carried out and that it was effective.

ii. An operator should establish a schedule of audits to be completed during a specified calendar period. All aspects of the operation should be reviewed within every period of twelve (12) months in accordance with the programme unless an extension to the audit period is accepted as explained below. An operator may increase the frequency of audits at his discretion but should not decrease the frequency without the agreement of the Authority. It is considered unlikely that an interval between audits greater than twenty-four (24) months would be acceptable for any audit topic.

iii. When an operator defines the audit schedule, significant changes to the management, organisation, operation, or technologies should be considered as well as changes to the regulatory requirements.

(i) Monitoring and Corrective Action

i. The aim of monitoring within the Quality System is primarily to investigate and judge its effectiveness and thereby to ensure that defined policy, operational, and maintenance standards are continuously complied with. Monitoring activity is based upon quality inspections, audits, corrective action and follow- up. The operator should establish and publish a quality procedure to monitor regulatory compliance on a continuing basis. This monitoring activity should be aimed at eliminating the causes of unsatisfactory performance.

ii. Any non-compliance identified as a result of monitoring should be communicated to the manager responsible for taking corrective action or, if appropriate, the Accountable Manager. Such non-compliance should be recorded, for the purpose of further investigation, in order to determine the cause and to enable the recommendation of appropriate corrective action.

iii. The Quality Assurance Programme should include procedures to ensure that corrective actions are taken in response to findings. These quality procedures should monitor such actions to verify their effectiveness and that they have been completed. Organisational responsibility and accountability for the implementation of corrective action resides with the department cited in the report identifying the finding. The Accountable Manager will have the ultimate responsibility for resourcing the corrective action and ensuring, through the Quality Manager, that the corrective action has re-established compliance with the standard required by the Authority, and any additional requirements defined by the operator.

iv. Corrective action

A. Subsequent to the quality inspection/audit, the operator should establish:

1. The seriousness of any findings and any need for immediate corrective action;
2. The origin of the finding;
3. What corrective actions are required to ensure that the

noncompliance does not recur;
4. A schedule for corrective action;
5. The identification of individuals or departments responsible for implementing corrective action;
6. Allocation of resources by the Accountable Manager, where appropriate.

v. The Quality Manager should:
A. Verify that corrective action is taken by the manager responsible in response to any finding of non-compliance;
B. Verify that corrective action includes the elements outlined in sub-paragraph (h)(iv) above;
C. Monitor the implementation and completion of corrective action;
D. Provide management with an independent assessment of corrective action, implementation and completion;
E. Evaluate the effectiveness of corrective action through the follow-up process.

(j) Management Evaluation

i. A management evaluation is a comprehensive, systematic, documented review by the management of the quality system, operational policies and procedures, and should consider:
A. The results of quality inspections, audits and any other indicators;
B. The overall effectiveness of the management organisation in achieving stated objectives.

i. A management evaluation should identify and correct trends, and prevent, where possible, future non-conformities. Conclusions and recommendations made as a result of an evaluation should be submitted in writing to the responsible manager for action. The responsible manager should be an individual who has the Authority to resolve issues and take action.

ii. The Accountable Manager should decide upon the frequency, format, and structure of internal management evaluation activities.

(k) Recording

i. Accurate, complete, and readily accessible records documenting the results of the Quality Assurance Programme should be maintained by the operator. Records are essential data to enable an operator to analyse and determine the root causes of non-conformity, so that areas of non-compliance can be identified and addressed.

ii. The following records should be retained for a period of five (5) years:
A. Audit Schedules;
B. Quality inspection and Audit reports;
C. Responses to findings;
D. Corrective action reports;
E. Follow-up and closure reports; and
F. Management Evaluation reports.

(5) Quality Assurance Responsibility for Sub-Contractors

(a) Sub-Contractors

i. Operators may decide to sub-contract out certain activities to external agencies for the provision of services related to areas such as:
A. Ground De-icing/Anti-icing;
B. Maintenance;
C. Ground handling;
D. Flight Support (including Performance calculations, flight planning, navigation database and dispatch);
E. Training;

F. Manual preparation.

ii. The ultimate responsibility for the product or service provided by the sub-contractor always remains with the operator. A written agreement should exist between the operator and the sub-contractor clearly defining the safety related services and quality to be provided. The sub-contractor's safety related activities relevant to the agreement should be included in the operator's Quality Assurance Programme.

iii. The operator should ensure that the sub-contractor has the necessary authorisation/approval when required and commands the resources and competence to undertake the task. If the operator requires the sub-contractor to conduct activity which exceeds the sub-contractor's authorisation/approval, the operator is responsible for ensuring that the sub-contractor's quality assurance takes account of such additional requirements.

(6) Quality System Training

(a) General

i. An operator should establish effective, well planned and resourced quality related briefing for all personnel.

ii. Those responsible for managing the Quality System should receive training covering:

A. An introduction to the concept of the Quality System;
B. Quality management;
C. The concept of Quality Assurance;
D. Quality manuals;
E. Audit techniques;
F. Reporting and recording; and
G. The way in which the Quality System will function in the company.

iii. Time should be provided to train every individual involved in quality management and for briefing the remainder of the employees. The allocation of time and resources should be governed by the size and complexity of the operation concerned.

(b) Sources of Training

i. Quality management courses are available from the various National or International Standards Institutions, and an operator should consider whether to offer such courses to those likely to be involved in the management of Quality Systems. Operators with sufficient appropriately qualified staff should consider whether to carry out in-house training.

(7) Organisations with twenty (20) or less full-time employees

(a) Introduction

i. The requirement to establish and document a Quality System, and to employ a Quality Manager applies to all operators. References to large and small operators elsewhere in the requirements are governed by aircraft capacity (i.e. more or less than 20 seats) and by mass (greater or less than ten (10) tonnes Maximum Take-Off Mass). Such terminology is not relevant when considering the scale of an operation and the Quality System required. In the context of quality systems therefore, operators should be categorised according to the number of full-time staff employees.

(b) Scale of Operation

i. Operators who employ 5 or less full-time staff are considered to be 'very small' while those employing between 6 and 20 full time employees are regarded as 'small' operators as far as quality systems are concerned. Full-time in this context means employed for not less than 35 hours per week excluding vacation periods.

ii. Complex quality systems could be inappropriate for small or very small operators and the clerical effort required to draw up manuals and quality procedures for a complex system may stretch their resources. It is therefore accepted that such operators should tailor their quality systems to suit the size and complexity of their operation and allocate resources accordingly.

(c) Quality Systems for small/very small Operators

i. For small and very small operators it may be appropriate to develop a Quality Assurance Programme that employs a checklist. The checklist should have a supporting schedule that requires completion of all checklist items within a specified timescale, together with a statement acknowledging completion of a periodic review by top management. An occasional independent overview of the checklist content and achievement of the Quality Assurance should be undertaken.

ii. The 'small' operator may decide to use internal or external auditors or a combination of the two. In these circumstances it would be acceptable for external specialists and or qualified organisations to perform the quality audits on behalf of the Quality Manager.

iii. If the independent quality audit function is being conducted by external auditors, the audit schedule should be shown in the relevant documentation.

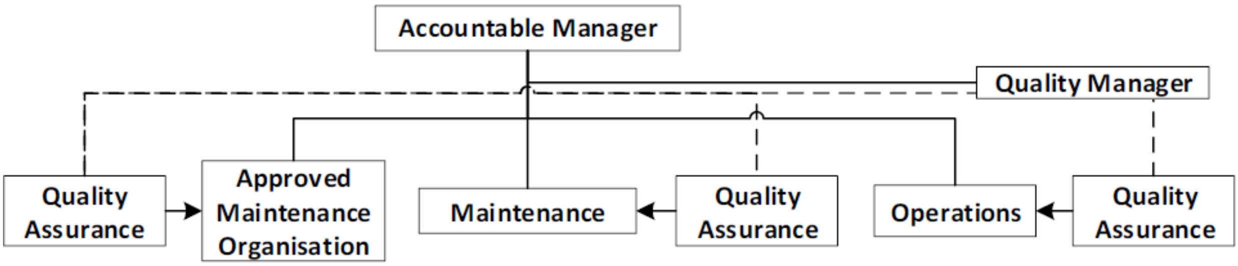
iv. Whatever arrangements are made, the operator retains the ultimate responsibility for the quality system and especially the completion and follow-up of corrective actions.

IEM OPS-1.035 Quality System – Organisation examples

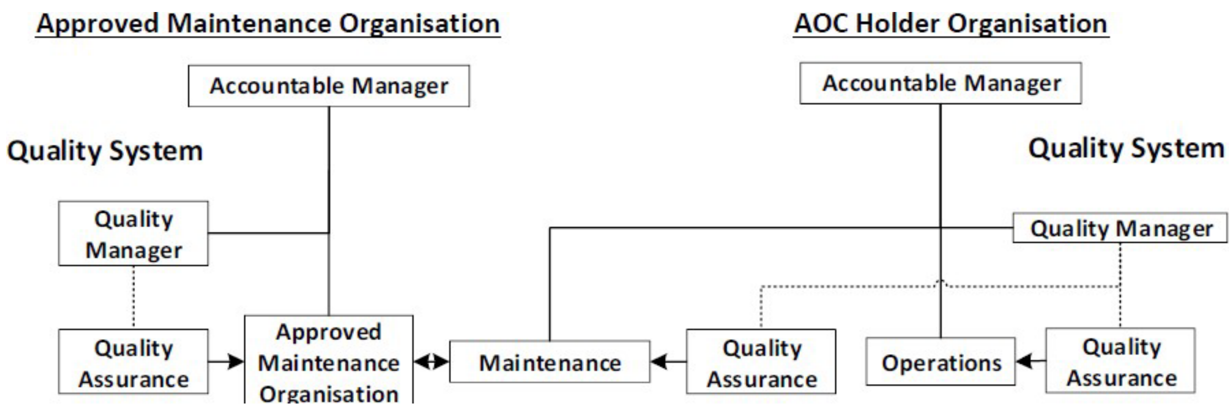
(See CAR OPS-1.035)

The following diagrams illustrate two typical examples of Quality organisations.

(1) Quality System within the AOC holder's organisation when the AOC holder also holds a AMO approval.



(2) Quality Systems related to an AOC holder's organisation where aircraft maintenance is contracted out to a approved organisation which is <u>not</u> integrated with the AOC/Authorisation holder:



Note: The Quality System and Quality Audit Programme of the AOC/Authorisation holder should *assure that the maintenance carried out by the approved organisation is in accordance with requirements specified by the AOC/Authorisation holder.*

IEM OPS-1.037 Safety Management

Guidance material for the establishment of a SMS can be found in ICAO Safety Management System Manual (Doc 9859)

AMC-1 OPS-1.037(c) Flight Data Monitoring Programme

(See CAR OPS-1.037(a)(4))

(1) Flight Data Monitoring (FDM) is the pro-active and non-punitive use of digital flight data from routine operations to improve aviation safety.

(2) The Accountable Manager and the SMS Manager are responsible for establishing and maintaining the FDM programme. The purpose of the FDM programme is the discovery and analysis of safety issues and the transmission of these to the relevant manager(s) responsible for the process(es) concerned. The latter are responsible for taking appropriate and practicable safety action within a reasonable period of time that reflects the severity of the issue.

Note: While an operator may contract the operation of a flight data analysis programme to another party the overall responsibility remains with the operator's safety management system.

(3) An FDM programme will allow an operator to:
- (a) Identify areas of operational risk and quantify current safety margins.
- (b) Identify and quantify operational risks by highlighting when non-standard, unusual or unsafe circumstances occur.
- (c) Use the FDM information on the frequency of occurrence, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues.
- (d) Put in place appropriate procedures for remedial action once an unacceptable risk, either actually present or predicted by trending, has been identified.
- (e) Confirm the effectiveness of any remedial action by continued monitoring.

(4) Flight Data Monitoring Analysis Techniques:
- (a) ***Exceedance Detection:*** This looks for deviations from flight manual limits, and standard operating procedures. A set of core events should be selected to cover the main areas of interest to the operator. A sample list is in the Appendix. The event detection limits should be continuously reviewed to reflect the operator's current operating procedures.
- (b) ***All Flights Measurement:*** A system that defines what is normal practice. This may be accomplished by retaining various snapshots of information from each flight.
- (c) ***Statistics:*** A series of measures collected to support the analysis process. These would be expected to include the numbers of flights flown and analysed, aircraft and sector details sufficient to generate rate and trend information.

(5) ***Flight Data Monitoring Analysis, Assessment and Process Control Tools:*** The effective assessment of information obtained from digital flight data is dependent on the provision of appropriate information technology tool sets. A programme suite may include: Annotated data trace displays, engineering unit listings, visualisation for the most significant incidents, access to interpretative material, links to other safety information, and statistical presentations.

(6) ***Education and Publication:*** Sharing safety information is a fundamental principle of aviation safety in helping to reduce accident rates. The operator should pass on the lessons learnt to all relevant personnel and, where appropriate, industry. Similar media to air safety systems may be used. These may include: Newsletters, flight safety magazines, highlighting examples in training and simulator exercises, periodic reports to industry and the regulatory Authority.

(7) Accident and incident data requirements specified in CAR OPS-1.160 take precedence over the requirements of an FDM programme. In these cases, the FDR data should be retained as part of the investigation data and may fall outside the de-identification agreements.

(8) Every crew member has a responsibility to report events described in CAR OPS-1.085(b) using the company occurrence reporting scheme detailed in CAR OPS-1.037(f). Mandatory Occurrence Reporting is a requirement under CAR OPS-1.420. Significant risk-bearing incidents detected by FDM will therefore normally be the subject of mandatory occurrence reporting by the crew. If this is not the case then they should submit a retrospective report that will be included under the safety management process without prejudice.

(9) The data recovery strategy should ensure a sufficiently representative capture of flight information to maintain an overview of operations. Data analysis should be performed sufficiently frequently to enable action to be taken on significant safety issues.

(10) The data retention strategy should aim to provide the greatest safety benefits practicable from the available data. A full data set should be retained until the action and review processes are complete; thereafter, a reduced data set relating to closed issues can be maintained for longer term trend analysis. Programme managers may wish to retain samples of de-identified full-flight data for various safety purposes (detailed analysis, training, benchmarking etc.).

(11) Data Access and Security policy should restrict information access to authorised persons. When data access is required for airworthiness and maintenance purposes, a procedure should be in place to prevent disclosure of crew identity.

(12) Procedure Document; this document is signed by all parties (airline management, flight crew member representatives nominated either by the union or the flight crew themselves) will, as a minimum, define:

- (a) The aim of the FDM programme.
- (b) A data access and security policy that should restrict access to information to specifically authorised persons identified by their position.
- (c) The method to obtain de-identified crew feedback on those occasions that require specific flight follow-up for contextual information; where such crew contact is required the authorised person(s) need not necessarily be the programme manager, or safety manager, but could be a third party (broker) mutually acceptable to unions or staff and management.
- (d) The data retention policy and accountability including the measures taken to ensure the security of the data.
- (e) The conditions under which, on rare occasions, advisory briefing or remedial training should take place; this should always be carried out in a constructive and non- punitive manner.
- (f) The conditions under which the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern.
- (g) The participation of flight crew member representative(s) in the assessment of the data, the action and review process and the consideration of recommendations.
- (h) The policy for publishing the findings resulting from FDM.

(13) Airborne systems and equipment used to obtain FDM data will range from an already installed full Quick Access Recorder, in a modern aircraft with digital systems, to a basic crash protected recorder in an older or less sophisticated aircraft. The analysis potential of the reduced data set available in the latter case may reduce the safety benefits obtainable. The operator shall ensure that FDM use does not adversely affect the serviceability of equipment required for accident investigation.

(14) It is recommended that an operator of an aeroplane of a maximum certificated take off mass in excess of 20,000 kg should establish and maintain a flight data monitoring programme as part of its SMS.

(15) The following table provides examples of FDM events that may be further developed using operator and aeroplane specific limits. The table is considered illustrative and not

exhaustive.

The event and parameter value should be documented and accessible to the flight crew member to give awareness to the reportable exceedance.

Event Group	Description
Rejected take-Off	High Speed Rejected take-off
Take-off Pitch	Pitch rate high on take-off Pitch attitude high during take-off
Unstick Speeds	Unstick speed high Unstick speed low
Height Loss in Climb-out	Initial climb height loss 20 ft AGL to 400 ft AAL Initial climb height loss 400 ft to 1500 ft AAL
Slow Climb-out	Excessive time to 1000 ft AAL after take-off
Climb-out Speeds	Climb out speed high below 400 ft AAL Climb out speed high 400 ft AAL to 1000 ft AAL Climb out speed low 35 ft AGL to 400 ft AAL Climb out speed low 400 ft AAL to 1500 ft AAL
High Rate of Descent	High rate of descent below 2000 ft AGL
Go-around	Go-around below 1000 ft AAL Go-around above 1000 ft AAL
Low Approach	Low on approach
Glideslope	Deviation under glideslope Deviation above glideslope (below 600 ft AGL)
Approach Power	Low power on approach
Approach Speeds	Approach speed high within 90 sec of touchdown Approach speed high below 500 ft AAL Approach speed high below 50 ft AGL Approach speed low within 2 minutes of touchdown
Landing Flap	Late land flap (not in position below 500 ft AAL) Reduced flap landing Flap load relief system operation
Landing Pitch	Pitch attitude high on landing Pitch attitude low on landing
Bank Angles	Excessive bank below 100 ft AGL Excessive bank 100 ft AGL to 500 ft AAL Excessive bank above 500 ft AGL Excessive bank near ground (below 20 ft AGL)
Abnormal Configuration	Take-off configuration warning Early configuration change after take-off (flap) Speed brake with flap Speed-brake on approach below 800 ft AAL Speed-brake not armed below 800 ft AAL

Normal Acceleration	High normal acceleration on ground High normal acceleration in flight flaps up (+/- increment) High normal acceleration in flight flaps down (+/- increment) High normal acceleration at landing
Ground Proximity Warning	GPWS operation - hard warning GPWS operation - soft warning GPWS operation - windshear warning GPWS operation - false warning
TCAS Warning	TCAS operation – Resolution Advisory
Margin to Stall/Buffet	Stick-shake False stick-shake Reduced lift margin except near ground Reduced lift margin at take-off Low buffet margin (above 20000 ft)
Flight Manual Limitations	Vmo exceedance Mmo exceedance Flap placard speed exceedance Gear down speed exceedance Gear selection up/down speed exceedance Flap/ Slat altitude exceedance Maximum operating altitude exceedance

AMC-2 OPS-1.037(e) Flight Safety Documents System

(See CAR OPS-1.037(e))

(1) It should be understood that the development of a flight safety documents system is a complete process, and changes to each document comprising the system may affect the entire system.

(a) It is important for operational documents to be consistent with each other, and consistent with regulations, manufacturer requirements and Human Factors principles. It is also necessary to ensure consistency across departments as well as consistency in application. Hence there is an emphasis on the introduction of the integrated approach, based on the notion of the operational documents are a complete system.

(b) The guidelines in this AMC address the major aspects of the operator’s flight safety documents system development process, with the aim of ensuring compliance with the guidelines given in Annex 6, Attachment G, which are based not only upon scientific research, but also upon current best industry practices, with an emphasis on a high degree of operational relevance.

(2) ***Organisational Requirements***

(a) A flight safety documents system shall be organized according to criteria which ensures easy access to information required for flight and ground operations contained in the various operational documents comprising the system, which also facilitates the management of the distribution and revision of operational documents.

(b) Information contained in a flight safety documents system shall be grouped according to the importance and use of the information, as follows:

i. time-critical information, e.g., information that can jeopardize the safety of the operation if not immediately available;

ii. time-sensitive information, e.g., information that can affect the level of safety or delay the operation if not available in a short time period;

iii. frequently used information;

iv. reference information, e.g., information that is required for the operation but does not fall under ii) or iii) above; and

v. information that can be grouped based on the phase of operation in which it is used.

(c) Time-critical information shall be placed early and prominently in the flight safety documents system.

(d) Time-critical information, time-sensitive information, and frequently used information shall be placed in cards and quick-reference guides.

(3) ***Validation of the Flight Safety Documents***

The flight safety documents system shall be validated before deployment, under realistic conditions. Validation shall involve the critical aspects of the information use, in order to verify its effectiveness. Interactions among all groups that can occur during operations shall also be included in the validation process.

(4) ***Design of the Flight Safety Documents System***

(a) A flight safety documents system shall maintain consistency in terminology and in the use of standard terms for common items and actions.

(b) Operational documents shall include a glossary of terms, acronyms and their standard definition, updated on a regular basis to ensure access to the most recent terminology. All significant terms, acronyms and abbreviations included in the flight documents system shall be defined.

(c) A flight safety documents system shall ensure standardization across document types, including writing style, terminology, use of graphics and symbols, and formatting across documents. This includes a consistent location of specific types of information, consistent use of units of measurement and consistent use of codes.

(d) A flight safety documents system shall include a master index to locate, in a timely manner, information included in more than one operational document.

Note: The master index must be placed in the front of each document and consist of no more than three levels of indexing. Pages containing abnormal and emergency information must be tabbed for direct access.

(e) A flight safety documents system shall comply with the requirements of the operator’s quality system, if applicable.

(5) ***Deployment of the Flight Safety Documents System***

Operators shall monitor deployment of the flight safety documents system, to ensure appropriate and realistic use of the documents, based on the characteristics of the operational environment and in a way, which is both operationally relevant and beneficial to operational personnel. This monitoring shall include a formal feedback system for obtaining input from operational personnel.

(6) ***Amendment Process***

(a) Operators shall develop an information gathering, review, distribution and revision control system to process information and data obtained from all sources relevant to the type of operation conducted, including, but not limited to, the State of the Operator, State of design, State of Registry, manufacturers and equipment vendors.

Note: Manufacturers provide information for the operation of specific aircraft that emphasizes the aircraft systems and procedures under conditions that may not fully match the requirements of operators. Operators shall ensure that such information meets their specific needs and approved by the CAA.

(b) Operators shall develop an information gathering, review and distribution system to process information resulting from changes that originate within the operator, including:

i. changes resulting from the installation of new equipment;
ii. changes in response to operating experience;
iii. changes in the operator's policies and procedures;
iv. changes in the operator certificate; and
v. changes for purposes of maintaining cross fleet standardisation

Note: Operators shall ensure that crew coordination philosophy, policies and procedures are specific to their operation.

(c) A flight safety documents system shall be reviewed:
i. on a regular basis (at least once a year);
ii. after major events (mergers, acquisitions, rapid growth, downsizing, etc.);
iii. after technology changes (introduction of new equipment); and
iv. after changes in safety regulations.

(d) Operators shall develop methods of communicating new information. The specific methods shall be responsive to the degree of communication urgency.

Note: As frequent changes diminish the importance of new or modified procedures, it is desirable to minimize changes to the flight safety documents system.

(e) New information shall be reviewed and validated considering its effects on the entire flight safety documents system.

(f) The method of communicating new information shall be complemented by a tracking system to ensure currency by operational personnel. The tracking system shall include a procedure to verify that operational personnel have the most recent updates.

AMC-3 OPS-1.037(f) Occurrence Reporting Scheme

(See CAR OPS-1.037(f))

(1) The overall objective of the scheme described in CAR OPS-1.037(f) is to use reported information to improve the level of flight safety and not to attribute blame.

(2) The detailed objectives of the scheme are:
(a) To enable an assessment of the safety implications of each relevant incident and accident to be made, including previous similar occurrences, so that any necessary action can be initiated; and
(b) To ensure that knowledge of relevant incidents and accidents is disseminated so that other persons and organisations may learn from them.

(3) The scheme is an essential part of the overall monitoring function; it is complementary to the normal day to day procedures and 'control' systems and is not intended to duplicate or supersede any of them. The scheme is a tool to identify those occasions where routine procedures have failed. (Occurrences that have to be reported and responsibilities for submitting reports are described in CAR OPS-1.420.)

(4) Occurrences shall remain in the database when judged reportable by the person submitting the report as the significance of such reports may only become obvious at a later date.

IEM OPS-1.065 Carriage of weapons of war and munitions of war

(See CAR OPS-1.065)

(1) There is no internationally agreed definition of weapons of war and munitions of war. Some States may have defined them for their particular purposes or for national need.

(2) It should be the responsibility of the operator to check, with the State(s) concerned, whether or not a particular weapon or munition is regarded as a weapon of war or munition of war. In this context, States which may be concerned with granting approvals for the carriage of weapons of war or munitions of war are those of origin, transit, overflight and destination of the consignment and the State of the operator.

(3) Where weapons of war or munitions of war are also dangerous goods by definition (e.g. torpedoes, bombs, etc.), Subpart R will also apply. (See also IEM OPS-1.070.)

IEM OPS-1.070 Carriage of sporting weapons

(See CAR OPS-1.070)

(1) There is no internationally agreed definition of sporting weapons. In general, they may be any weapon which is not a weapon of war or munition of war (See IEM OPS-1.065). Sporting weapons include hunting knives, bows and other similar articles. An antique weapon, which at one time may have been a weapon of war or munition of war, such as a musket, may now be regarded as a sporting weapon.

(2) A firearm is any gun, rifle or pistol which fires a projectile.

(3) In the absence of a specific definition, for the purpose of CAR OPS-1 and in order to provide some guidance to operators, the following firearms are generally regarded as being sporting weapons:

- (a) Those designed for shooting game, birds and other animals;
- (b) Those used for target shooting, clay-pigeon shooting and competition shooting, providing the weapons are not those on standard issue to military forces; (c)Air guns, dart guns, starting pistols, etc.

(4) A firearm, which is not a weapon of war or munition of war, should be treated as a sporting weapon for the purposes of its carriage on an aeroplane.

(5) Other procedures for the carriage of sporting weapons may need to be considered if the aeroplane does not have a separate compartment in which the weapons can be stowed. These procedures should take into account the nature of the flight, its origin and destination, and the possibility of unlawful interference. As far as possible, the weapons should be stowed so they are not immediately accessible to the passengers (e.g. in locked boxes, in checked baggage which is stowed under other baggage or under fixed netting). If procedures other than those in CAR OPS-1.070(b)(1) are applied, the commander should be notified accordingly.

GM OPS-1.085(e)(3) Crew responsibilities

(See CAR OPS-1.085(e)(3))

(a) Information on the effects of medication, drugs, other treatments and alcohol, may be found in CAR FCL-3 Medical.

(b) Further guidance can be found in CAR-99 (Drugs and Alcohol Management Plan) with the associated Drugs and Alcohol Management Plan Guidance Manual.

AMC OPS-1.110 PED

(See CAR-OPS 1.110 Portable electronic devices)

(a) ***Scope***

This AMC provides means to prevent portable electronic devices (PEDs) on board aircraft adversely affect the performance of the aircraft's systems and equipment. It addresses operation of PEDs in the different aircraft zones – passenger compartment, flight compartment, and cargo compartments. Furthermore, it addresses the specific case of PEDs qualified and under configuration control by the operator – controlled PEDs (C-PEDs) - for which the operator gives some credit.

(b) ***Restrictions on the use of PEDs in the passenger compartment.*** If an operator permits passengers to use PEDs on board its aircraft, procedures shall be in place to control their use. The operator shall ensure that all crew members and ground personnel are trained to enforce the restrictions on this equipment in line with these procedures. These procedures shall ensure the following:

- (1) As the general principle all PEDs (including transmitting PEDs (T-PEDs)) are switched-off at the start of the flight when the passengers have boarded and all doors have been closed, until a passenger door has been opened at the end of the flight.
- (2) The following exceptions from the above general principle may be granted under the

responsibility of the operator:

(i) Medical equipment necessary to support physiological functions does not need to be switched-off.

(ii) The use of PEDs, excluding T-PEDs, may be permitted during all phases of flight.

(iii) T-PEDs may be used during non-critical phases of flight, excluding taxiing, if the aircraft is equipped with a system or otherwise certified allowing the operation of such technology during flight. The restrictions coming from the corresponding aircraft certification as documented in the aircraft flight manual (AFM), or equivalent document(s), stay in force.

(iv) Use of cellphone may be permitted after an aircraft has left active runway after landing.

(v) The use of C-PEDs during critical phases of flight, however, may only be permitted if the operator has accounted for this situation in its assessment.

(vi) The commander may permit the use of any kind of PED when the aircraft is stationary during prolonged departure delays, provided that sufficient time is available to check the passenger compartment before the flight proceeds. Similarly, after landing, the commander may authorize the use of any kind of PED in the event of a prolonged delay for a parking/gate position (even though doors are closed and the engines are running).

(3) Announcements shall be made during boarding of the aircraft to inform passengers of the restrictions applicable to PEDs (in particular to T-PEDs) before fastening their seat belts.

(4) Where in-seat electrical power supplies are available for passenger use of the following shall apply:

(i) Information cards giving safety instructions are provided to the passengers;

(ii) PEDs should be disconnected from any in-seat electrical power supply, during taxiing, take-off, approach, landing, and during abnormal or emergency conditions; and

(iii) Flight crew and cabin crew should be aware of the proper means to switch-off in-seat power supplies used for PEDs.

(5) During boarding and any phase of flight:

(i) Appropriate coordination between flight crew and cabin crew is defined to deal with interference or other safety problems associated with PEDs;

(ii) passenger use of equipment during the flight is monitored;

(iii) suspect equipment is switched off; and

(iv) particular attention is given to passenger misuse of equipment that could include a built-in transmitting function.

(6) Thermal runaways of batteries, in particular lithium batteries, and potential resulting fire can be handled properly.

(7) Appropriate coordination between flight crew and cabin crew shall be defined to deal with interference or other safety problems associated with PEDs.

(8) The commander may for any reason and during any phase of flight require deactivation and stowage of PEDs.

(9) Occurrences of suspected or confirmed interference that have potential safety implications shall be reported to the Authority. Where possible, to assist follow-up and technical investigation, reports should describe the offending device, identify the brand name and model number, its location in the aircraft at the time of the occurrence, interference symptoms and the results of actions taken by the crew. The cooperation of the device owner shall be sought by obtaining contact details.

(10) Special requests to operate a PED or T-PED during any phase of the flight for specific reasons (e.g. for security measures) shall be handled properly.

(c) ***Restrictions on the use of PEDs in the flight compartment.*** Due to the higher risk of interference and potential for distracting crew from their duties, PEDs should not be used in the flight compartment. However, the operator may allow the use of PEDs, e.g. to assist the flight crew in their duties, if procedures are in place to ensure the following:

(1) The conditions for the use of PEDs in-flight are specified in the operations manual, otherwise they shall be switched off and stowed during all phases of flight.
(2) The PEDs do not pose a loose-item risk or other hazard.
(3) During critical phases of flight only those C-PEDs are operated, for which the operator has demonstrated that the radio frequency (RF) interference levels are below those considered acceptable for the specific aircraft environment. Guidance for such test is provided in (e) below.
(4) During pre-flight procedures, e.g. when loading route information into navigation systems or when monitoring fuel loading, no T-PED shall be operated. In all other cases, flight crew and other persons on board the aircraft involved in dispatching the aircraft shall observe the same restrictions as applicable to passengers.
(5) These restrictions should not preclude use of a T-PED (specifically a mobile phone) by the flight crew to deal with an emergency. However, reliance should not be predicated on a TPED for this purpose.

(d) ***PEDs not accessible during the flight.*** PEDs shall be switched off, when not accessible for deactivation during flight. This shall apply especially to PEDs contained in baggage or transported as part of the cargo. The operator may allow deviation for PEDs for which tests have demonstrated their safe operation. Other precautions, such as transporting in shielded, metal boxes, may also be used to mitigate associated risks. In case an automated function is used to deactivate a T-PED, the unit shall be qualified for safe operation on board the aircraft.

(e) ***Test methods***

The means to demonstrate that the RF radiations (intentional or non-intentional) are tolerated by aircraft systems should be as follows:

(1) The radio frequency (RF) emissions of PEDs should meet the levels as defined by EUROCAE ED-14E/RTCA DO 160E Section 21 Category M for operation in the passenger compartment and EUROCAE ED-14E/RTCA DO 160E Section 21 Category H for operation in the cargo bay. Later revisions of those documents may be used for testing. The assessment of intentional transmissions of T-PEDs is excluded from those test standards and needs to be addressed separately.
(2) When the operator intends to allow the operation of T-PEDs, its assessment should follow the principles set out in EUROCAE ED-130.
(3) The AUTHORITY reminds operators to consider the applicable telecommunication regulations before allowing the use of transmitting functions on-board aircraft.

GM-1 to AMC OPS-1.110 Definitions of PEDs

DEFINITIONS

(a) ***Definition and categories of PEDs***

PEDs are any kind of electronic device, typically but not limited to consumer electronics, brought on board the aircraft by crew members, passengers, or as part of the cargo and that are not included in the approved aircraft configuration. All equipment that is able to consume electrical energy falls under this definition. The electrical energy can be provided from internal sources as batteries (chargeable or non-rechargeable) or the devices may also be connected to specific aircraft power sources.

PEDs fall into three categories:

(1) ***Non-intentional transmitters*** can non-intentionally radiate RF transmissions. This category includes, but is not limited to, computing equipment, cameras, radio receivers, audio and video reproducers, electronic games and toys. In addition, portable, non-transmitting devices provided to assist crew members in their duties are included in this category. The category is identified as PED.

(2) ***Intentional transmitters*** can radiate RF transmissions on specific frequencies as part of

their intended function. In addition, they may radiate non-intentional transmissions like any PED. The term 'transmitting PED' (T-PED) is used to identify the transmitting capability of the PED. Intentional transmitters are transmitting devices such as RF based remote control equipment, which may include some toys, two-way radios (sometimes referred to as private mobile radio), mobile phones of any type, satellite phones, computer with mobile phone data connection, wireless fidelity (WIFI) or Bluetooth capability. After deactivation of the transmitting capability, e.g. by activating the so called 'flight mode' or 'flight safety mode', the T-PED remains a PED having non-intentional emissions.

(3) ***A controlled PED (C-PED)*** is subject to administrative control by the operator. This will include, inter alia, tracking the location of the devices to specific aircraft or persons and ensuring that no unauthorized changes are made to the hardware, software or databases. A controlled PED will also be subject to procedures to ensure that it is maintained to the latest amendment state. C-PEDs can be assigned to the category of non-intentional transmitters (PEDs) or intentional transmitters (T-PEDs).

(b) ***Definition of the switched-off status***

Many PEDs are not completely disconnected from the internal power source when switched off. The switching function may leave some remaining functionality e.g. data storage, timer, clock, etc. These devices can be considered switched off when in the deactivated status. The same applies for devices having no transmit capability and operated by coin cells without further deactivation capability, e.g. wrist watches.

GM-2 to AMC OPS-1.110 Fire risk from PEDs

FIRE CAUSED BY PEDs

A detailed discussion of fire caused by PEDs can be found in CAA UK CAP 789 edition 2, chapter 31, section 6 Fires in the cabin caused by PEDs and CAA PAPER 2003/4, Dealing with In-Flight Lithium Battery Fires in Portable Electronic Devices, M.J. Lain, D.A. Teagle, J. Cullen, V. Dass.

Appendix 1 to CAR OPS-1.125 Documents to be carried

(See CAR OPS-1.125 Documents to be carried)

In case of loss or theft of documents specified in CAR OPS-1.125, the operation is allowed to continue until the flight reaches the base or a place where a replacement document can be provided.

AMC OPS-1.125(a)(10) Documents to be carried

The Article 83 *bis* Agreement Summary shall be accessible to safety inspectors and shall state the following information as advised in the registration of that agreement with ICAO. (See CAR OPS1.170(b))

5.6 ARTICLE 83 *bis* AGREEMENT SUMMARY TEMPLATE

AGREEMENT SUMMARY		
Title of the Agreement:		
State of Registry:		Focal point:
State of the Operator/State of the principal location of a general aviation operator (PLG):		Focal point:
Date of signature[1]:	By State of Registry:	
	By State of the Operator/PLG:	
Duration[1]:	Start Date:	End Date:
Languages of the Agreement:		
ICAO Registration No.:		
Umbrella Agreement (if any) with ICAO Registration number:		

Chicago Convention	ICAO Annexes affected by the transfer to the State of the Operator/PLG of responsibility in respect of certain functions and duties			
Article 12: Rules of the Air	Annex 2, all chapters	Yes		
		No		
Article 30 a): Aircraft radio equipment	Radio Station Licence	Yes		
		No		
Articles 30 b) and 32 a): Personnel Licensing	Annex 1, Chapters 1, 2, 3 and 6 and Annex 6 Part I, Radio Operator or Part III, Section II, Composition of the flight crew (radio operator) and/or Part II, Qualifications and/or Flight crew member licensing or Part III, Section III, Qualifications	Yes		Annex 6: [Specify Part and paragraph][2]
		No		
Article 31: Certificates of Airworthiness	Annex 6, Part I or Part III, Section II	Yes		[Specify Part and chapters][2]
		No		
	Annex 6, Part II or Part III, Section III	Yes		[Specify Part and chapters][2]
		No		
	Annex 8, Part II, Chapters 3 and 4	Yes		[Specify chapters][2]
		No		

Aircraft affected by the transfer of responsibilities to the State of the Operator/PLG					
Aircraft make, model, series	Nationality and registration marks	Serial No.	AOC # (Commercial Aviation)	Lease/Charter/ Interchange From date[1]	Lease/Charter/ Interchange To date[1]

[1] (dd/mm/yyyy).
[2] Square brackets indicate information that needs to be provided.

AMC OPS-1.130 Manuals to be carried

(See CAR OPS-1.130)

The carriage of an approved electronic version of the Operations Manual is acceptable.

AMC OPS-1.135 (b) Additional Information and Forms carried

The use of an Electronic Flight Bag (EFB) requires an operational approval which will be reflected in the Operations Specifications. The intent and objectives of the requirements to perform an operational evaluation of an EFB system and its commonly used functions are contained in ICAO Document 10020.

Manual on Electronic Flight Bags (EFBs). Guidance material established within ICAO Document 10020 is considered an acceptable means to comply with CAR-OPS 1.135(b).

Appendix 1 to CAR OPS-1.135 Additional information and forms to be carried

(See CAR OPS-1.135 Additional information and forms to be carried)

The Authority may authorize an alleviation against the non-carriage of specific documents for flights within the Oman FIR.

AMC OPS-1.138 Electronic Flight Bag

To enable approving the use of EFBs, the applicant shall ensure that:

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

AC OPS-1.160(a)(1) and (2) Preservation of Recordings

(See CAR OPS-1.060(a)(1) and (2))

In CAR OPS-1.160(a)(1) and (2), the phrase 'to the extent possible' means that either:

(1) There may be technical reasons why all of the data cannot be preserved; or
(2) The aeroplane may have been dispatched with unserviceable recording equipment as permitted by the MEL Policy.

AC OPS-1.165(c)(2) Leasing of aeroplanes between an Omani operator and any entity

(See CAR-OPS 1.165 (c)(2))

(1) The Authority may approve individually Omani operators provided that:
  (a) The lessor is an operator holding an AOC issued by a State which is a signatory to the Convention on International Civil Aviation; and
  (b) Unless otherwise agreed by the Authority of the lessee, the lessee audits the operation of the lessor to confirm compliance with operating and aircrew training standards equivalent to CAR OPS-1, maintenance standards equivalent to CAR-145, and aircraft certification standards as prescribed; and
  (c) The routes intended to be flown are contained within the authorised areas of operations specified in the AOC of the lessor; and
  (d) For the duration of the lease, the flight and duty time limitations and rest requirements used by the lessor are not more permissive than apply in CAR OPS-1.
(2) Lessors, when first approved by the Authority, and any revalidations, remain valid for a period not exceeding twelve (12) months.

Note 1: The lessee is responsible for providing information to the Authority to support the initial application and any revalidations.

AMC OPS-1.165(e) Transfer Agreement as State of Registry under Article 83bis

Transfer of functions and duties as State of Registry under Article 83bis of the Chicago Convention (see CAR OPS-1.165 (e)). The Authority shall carry out the following evaluation before entering into agreement to transfer its responsibilities:

(a) Ensure that the foreign State is a party to Article 83bis;
(b) Carry out an assessment of the capability of the foreign State accepting the transfer, including the recognition of duties and functions under Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention issued/renewed by the foreign State;
(c) Ensure that the commercial agreement (for example, the lease) includes terms that give rise to the transfer agreement. The aircraft concerned shall be clearly identified in the agreement by including reference to the aircraft type, registration and serial number.

Note 1: The duration of the transfer agreement shall not exceed the period covered by the *corresponding commercial agreement. Accordingly, the period of validity of the transfer should be mentioned in the transfer agreement taking into consideration that the registration of the aircraft concerned will not be changed.*

Note 2: The duties and functions to be transferred must be specifically mentioned in the transfer agreement as, in absence of such mention, they are deemed to remain with the Authority.

AMC OPS-1.165(f) Transfer Agreement as State of Operator under Article 83bis

Acceptance of transfer of functions and duties as State of Operator under article 83bis of the Chicago Convention (see CAR-OPS 1.165 (f)), Oman, as a State of the operator, shall carry out the following evaluation before accepting the transfer of responsibilities from the State of Registry:

(a) ensure that the foreign State(s) is/are a party to the Article 83bis agreement;

(b) ensure that the commercial agreement (for example, the lease) includes terms that give rise to the transfer agreement including the recognition, by the Authority, of issuing/renewing licenses/certificates under Article 12 (Rules of Air), Article 30 (Aircraft Radio Equipment), Article 31 (Certificate of Airworthiness) and Article 32(a) (Licenses of Personnel) of the Chicago Convention which were issued/renewed by the State of Registry. The aircraft concerned shall be clearly identified in the agreement by including reference to the aircraft type, registration and serial number;

Note: The duration of the transfer agreement shall not exceed the period covered by the corresponding commercial agreement. Accordingly, the period of validity of the transfer should be mentioned in the transfer agreement taking into consideration that the registration of the aircraft concerned will not be changed.

(c) ensure that the Omani operator continuously carries a certified true copy of the transfer agreement and AOC under which the aircraft is operated at all times, while the transfer agreement is in force.

Note: The duties and functions to be accepted by the Authority under Article 12 (Rules of Air), Article30 (Aircraft Radio Equipment), Article31 (Certificate of Airworthiness) and Article32(a) (Licenses of Personnel) of the Chicago Convention must be mentioned specifically in the transfer agreement as, in absence of such mention, they are deemed to remain with the State of Registry.

SUB PART C – OPERATOR CERTIFICATION AND SUPERVISION

CAR OPS-1.175 General rules for Air Operator Certification/Authorisation

(See GM-1 OPS-1.175, GM-2 OPS-1.175(d)(2), & AMC-1 OPS-1.175(j), AMC-1 & 2 OPS-1.175(k) & (l) and AMC-4 OPS-1.175(t))

Note 1: Appendix 1 to this regulation specifies the contents and conditions of the AOC.

Note 2: Appendix 2 to this regulation specifies the management and organisation requirements.

Note 3: Unless otherwise specified by the Authority, all private aircraft shall meet these requirements for the issuance of an authorization to operate.

Note 4: The air operator certificate shall contain at least the following:

(1) the State of the Operator and the issuing Authority;

(2) the air operator certificate number and its expiration date;

(3) the operator's name, trading name (if different) and address of the principal place of business;

(4) the date of issue and the name, signature and title of the Authority representative; and

(5) in the Operational Points of Contact reference, where the contact details of operational management may be found.

(a) An operator shall not operate an aeroplane for the purpose of commercial/private air transportation otherwise than under, and in accordance with, the terms and conditions of a valid Air Operator Certificate (AOC)/Authorization issued by the CAA of the operator.

(b) The air operators' certificate shall authorise the operator to conduct air transport operations in accordance with the operations specifications.

(c) An applicant for an AOC/Authorization, or variation of an AOC/Authorization, shall allow the Authority to examine all safety aspects of the proposed operation.

(d) An applicant for an AOC/Authorization must:

(1) Not hold an AOC/Authorization issued by another Authority unless specifically approved by the Authorities concerned;

(2) Have his principal place of business and, if any, his registered office located in the Oman; (See GM-2 OPS-1.175(d)(2).

(3) Have registered the aeroplanes which are to be operated under the AOC/Authorization in the Sultanate of Oman; and

(4) Satisfy the Authority that he is able to conduct safe operations.

(e) Notwithstanding sub-paragraph (d)(3) above, an operator may operate, with the mutual agreement of the Authority issuing the AOC/Authorization and another Authority, aeroplanes registered on the national register of the second-named Authority.

(f) An operator shall grant the Authority access to his organisation and aeroplanes and shall ensure that, with respect to maintenance, access is granted to any associated CAR-145 maintenance organisation, to determine continued compliance with CAR OPS-1.

(g) An AOC/Authorization will be varied, suspended or revoked if the Authority is no longer satisfied that the operator can maintain safe operations.

(h) The operator must satisfy the Authority that;

(1) Its organisation and management are suitable and properly matched to the scale and scope of the operation; and

(2) Procedures for the supervision of operations have been defined.

(i) The operator shall have nominated an Accountable Manager acceptable to the Authority, who has corporate Authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority. (See AMC OPS- 1.035)

(j) The operator shall have nominated post-holders, acceptable to the Authority, who are responsible for the management and supervision of the following areas,
   (1) Flight operations;
   (2) The maintenance system;
   (3) Crew training;
   (4) Ground operations;
   (5) Aviation Security;
   (6) Nomination of accountable managers responsible for:
      A. Quality Assurance.
      B. SMS

   Note 1: See AMC-1 OPS 1.175(j) Nominated Post-holders – Competence

   Note 2: Para (6) may be one or two persons who will have direct access to the Accountable Manage

(k) A person may hold more than one of the nominated posts if acceptable to the Authority but, for operators who employ twenty-one (21) or more full-time staff, a minimum of two persons are required to cover all the areas of responsibility with the exception to the Quality Assurance. (See AMC-3 OPS-1.175(k) & (l) Employment of staff).

(l) For operators who employ twenty (20) or less full-time staff, one or more of the nominated posts may be filled by the Accountable Manager, if acceptable to the Authority. (See AMC-1 OPS-1.175 (j))

(m) The operator shall ensure that every flight is conducted in accordance with the provisions of the Operations Manual.

(n) The operator shall arrange appropriate ground handling facilities to ensure the safe handling of its flights. Operator shall ensure that any inadequacy of facilities observed in the course of operations is reported to the Authority responsible for them without undue delay.

(o) The operator shall ensure that its aeroplanes are equipped and its crews are qualified, as required for the area and type of operation.

(p) The operator must comply with the maintenance requirements, in accordance with CAR-M Subpart G, for all aeroplanes operated under the terms of its AOC/Authorization.

(q) The operator shall provide the Authority with a copy of the Operations Manual, as specified in Subpart P and all amendments or revisions to it.

(r) The operator shall maintain operational support facilities at the main operating base, appropriate for the area and type of operation.

(s) The operator shall be subjected to a continued surveillance conducted by the Authority and shall ensure that the required standards of operations established are maintained.

(t) Operators required to employ cabin crew shall appoint a person or group of persons, as part of their operational management personnel as per the CAA approved organisational structure, to manage theoverall supervision of Cabin Crew under their Authority. (See AMC-4 OPS-1.175(t))

CAR OPS-1.180 Issue, variation and continued validity of an AOC/ Authorisation

(a) An operator will not be granted an AOC/Authorisation, or a variation to an AOC/Authorisation, and that AOC/Authorisation will not remain valid unless:
   (1) Aeroplanes operated have a valid Certificate of Airworthiness;
   (2) The maintenance system has been approved by the Authority in accordance with CARM, Subpart G; and
   (3) He has satisfied the Authority that he has the ability to:
      i. Establish and maintain an adequate organisation;
      ii. Establish and maintain a quality system in accordance with CAR OPS-1.035
      iii. Comply with required training programmes;

iv. Comply with maintenance requirements, consistent with the nature and extent of the operations specified, including the relevant items prescribed in CAR OPS-1.175(g) to (o); and
v. Comply with CAR OPS-1.175.
vi. Comply with Safety Management System requirements as prescribed in CAR OPS-1.037.

(b) Notwithstanding the provisions of CAR OPS-1.185(f), the operator shall notify the Authority as soon as practicable of any changes to the information submitted in accordance with CAR OPS1.185 (a) below.

(c) If the Authority is not satisfied that the requirements of subparagraph (a) above have been met, the Authority may require the conducting of one or more demonstration flights, operated as if they were commercial air transport flights.

CAR OPS-1.185 Administrative requirements

(See GM to OPS-1.185(b))

(a) An operator shall ensure that the following information is included in the initial application for an AOC/Authorisation and, when applicable, any variation or renewal applied for:
(1) The official name and business name, address and mailing address of the applicant;
(2) A description of the proposed operation;
(3) A description of the management organisation;
(4) The name of the accountable manager;
(5) The names of nominated post-holders, including those responsible for flight operations, the maintenance system, crew training, aviation security, quality assurance and ground operations together with their qualifications and experience; and
(6) The Operations Manual.

(b) In respect of the operator's maintenance system only, the following information must be included in the initial application for an AOC/authorisation and, when applicable, any variation or renewal applied for, and for each aeroplane type to be operated):
(1) The operator's CAME;
(2) The operator's aeroplane maintenance programme(s);
(3) The aeroplane technical log;
(4) Where appropriate, the technical specification(s) of the maintenance contract(s) between the operator and any approved maintenance organisation;
(5) The number of aeroplanes.

(c) The application for an initial issue of an AOC/authorisation must be submitted at least ninety (90) days before the date of intended operation except that the Operations Manual may be submitted later but not less than sixty (60) days before the date of intended operation.

(d) The application for the variation of an AOC/authorisation must be submitted at least thirty (30) days, or as otherwise agreed, before the date of intended operation.

(e) The application for the renewal of an AOC must be submitted at least thirty (30) days, or as otherwise agreed, before the end of the existing period of validity.

(f) Other than in exceptional circumstances, the Authority must be given at least ten (10) days prior notice of a proposed change of a nominated post-holder.

(g) The operator shall ensure that pilots are knowledgeable with the descriptions and the authorisations that it contained in its AOC and Operations Specifications and to add AOC and Operations specifications specimen and its descriptions in the administration and control of the operations manual part A.

(h) The operator shall develop policies and procedures for third parties that perform work on its behalf.

SECTION 2 – SUBPART C – AC/AMC/GM – OPERATOR CERTIFICATION & SUPERVISION

GM-1 OPS-1.175 The management organisation of an AOC/Authorisation holder

See CAR OPS-1.175(h) to (l) and (t)

(1) Function and Purpose
  (a) The safe conduct of air operations is achieved by an operator and an Authority working in harmony towards a common aim. The functions of the two bodies are different, well defined, but complementary. In essence, the operator complies with the standards set through putting in place a sound and competent management structure. The Authority working within a framework of law (statutes), sets and monitors the standards expected from operators.

(2) Responsibilities of Management
  (a) The responsibilities of management related to CAR OPS-1 should include at least the following five main functions:
    i. Determination of the operator's flight safety policy;
    ii. Allocation of responsibilities and duties and issuing instructions to individuals, sufficient for implementation of company policy and the maintenance of safety standards;
    iii. Monitoring of flight safety standards;
    iv. Recording and analysis of any deviations from company standards and ensuring corrective action;
    v. Evaluating the safety record of the company in order to avoid the development of undesirable trends.

GM-2 OPS-1.175(d)(2) Principal place of business

See CAR OPS-1.175(d)(2)

(1) CAR OPS-1.175(d)(2) requires an operator to have his principal place of business located in Oman.

(2) In order to ensure proper jurisdiction over the operator, the term 'principal place of business' is interpreted as meaning the State in which the administrative headquarters and the operator's financial, operational and maintenance management are based.

AMC-1 OPS-1.175(j) Nominated Post-holders – Competence

See CAR OPS-1.175(j)

(1) ***General.*** Nominated Post-holders are expected to satisfy the Authority that they possess the appropriate experience and licensing requirements which are listed in paragraphs (2) to (6) below. In particular cases, and exceptionally, the Authority may accept a nomination which does not meet the requirements in full but, in this circumstance, the nominee should be able to demonstrate experience which the Authority will accept as being comparable and also the ability to perform effectively the functions associated with the post and with the scale of the operation.

(2) ***Nominated post-holders*** should have:
  (a) Practical experience and expertise in the application of aviation safety standards and safe operating practices;
  (b) Comprehensive knowledge of:
    i. OPS and any associated requirements and procedures;
    ii. The AOC holder's Operations Specifications;

iii. The need for, and content of, the relevant parts of the AOC holder's Operations Manual;

(c) Familiarity with Quality and Safety Management Systems;

(d) Appropriate management experience in a comparable organisation; and

(e) Five years relevant work experience of which at least two years should be from the aviation industry in an appropriate position.

(3) ***Flight Operations.*** The nominated post-holder or his deputy should hold a valid Flight Crew License appropriate to the type of operation conducted under the AOC in accordance with the following:

(a) If the AOC/Authorisation includes aeroplanes certificated for a minimum crew of 2 pilots - An Airline Transport Pilot's License (ATPL) issued or validated by the Authority:

(b) If the AOC/Authorisation is limited to aeroplanes certificated for a minimum crew of 1 pilot - A Commercial Pilot's License (CPL), and if appropriate to the operation, an Instrument Rating issued or validated by the Authority.

(4) ***Maintenance System.*** The nominated post-holder should possess the following:

(a) Relevant engineering degree, or aircraft maintenance technician with additional education acceptable to the Authority. 'Relevant engineering degree' means an engineering degree from Aeronautical, Mechanical, Electrical, Electronic, Avionic or other studies relevant to the maintenance of aircraft/aircraft components.

(b) Thorough familiarity with the organisation's Maintenance Management Exposition.

(c) Knowledge of the relevant type(s) of aircraft.

(d) Knowledge of maintenance methods.

(5) ***Crew Training*.** The nominated post-holder or his deputy should be a current Type Rating Instructor on a type/class operated under the AOC/Authorisation.

(a) The nominated post-holder should have a thorough knowledge of the AOC/Authorisation holder's crew training concept for Flight Crew and for Cabin Crew when relevant.

(6) ***Ground Operations*.** The nominated post-holder should have a thorough knowledge of the AOC/Authorisation holder's ground operations concept.

(7) ***Security.*** The nominated post-holder should have a thorough knowledge of the National Civil Aviation Security Programme, the operator's security programme, security training requirements and threat assessment.

AMC-2 OPS-1.175(k) & (l) Combination of nominated post-holder's responsibilities

See CAR OPS 1.175(k) & (l)

(1) The acceptability of a single person holding several posts, possibly in combination with being the accountable manager as well, will depend upon the nature and scale of the operation. The two main areas of concern are competence and an individual's capacity to meet his responsibilities.

(a) In accordance with CAR-OPS 1.175 (k), the Accountable Manager can hold one or more nominated posts only in operators who employ 20 or less full-time staff. If the Accountable Manager is accepted also as QA Post Holder, the quality audits should be conducted by independent personnel.

(b) The Authority may accept, depending on the complexity and size of operations, the QA Post Holder to hold the SMS position as well subject to compliance audits of the SMS being performed by independent personnel.

(c) The area of responsibility of a Post Holder that is also accepted as SMS Post Holder should be subject to SMS audits performed by independent personnel.

(2) As regards competence in the different areas of responsibility, there should not be any difference from the requirements applicable to persons holding only one post.

(3) The capacity of an individual to meet his responsibilities will primarily be dependent upon the scale of the operation. However, the complexity of the organisation or of the operation may prevent, or limit, combinations of posts which may be acceptable in other circumstances.
(4) In most circumstances, the responsibilities of a nominated post-holder will rest with a single individual. However, in the area of ground operations, it may be acceptable for these responsibilities to be split, provided that the responsibilities of each individual concerned are clearly defined and accepted by the CAA.
(5) The intent of CAR OPS 1.175 is neither to prescribe any specific organisational hierarchy within the operator's organisation nor to prevent an Authority from requiring a certain hierarchy before it is satisfied that the management organisation is suitable.

AMC-3 OPS-1.175(k) & (l) Employment of staff

See CAR OPS-1.175(k) & (l)

In the context of CAR OPS-1.175(k) & (l), the expression "full-time staff" means members of staff who are employed for not less than 35 hours per week excluding vacation periods. For the purpose of establishing the scale of operation, administrative staff, not directly involved in operations or maintenance, should be excluded.

AMC-4 OPS-1.175(t) Responsibilities of appointed person or group of persons

(1) Ensure a current and approved Cabin Safety Procedures Manual is in place;
(2) Ensure current and approved Cabin Crew training programs are in place;
(3) Plan, schedule, and facilitate Cabin Crew training in accordance with the approved training programs;
(4) Assist in the development and facilitation of joint flight operations-cabin safety training programs (i.e., security, crew resource management, interference with crew members, etc.);
(5) Maintain Cabin Crew training records;
(6) Analyse the operator's cabin safety standards, make the necessary recommendations and advise the Authority if necessary;
(7) Write, distribute, and track acknowledgement of Operational Memos and Safety & Procedures Bulletins to the Cabin Crew;
(8) Participate in the Company's Safety Management System through the reporting, investigation and distribution of cabin safety related occurrence reports; and following up on implementing the recommendations;
(9) Receive, process, and respond to Cabin Crew trip reports relative to operational issues in a timely manner;
(10) Develop, maintain and approve operator's Safety Briefing Cards for all company aircraft;
(11) Develop, maintain and approve operator's pre-departure safety briefing either (personally or through a video);
(12) Develop, document, and maintain cabin safety policies, processes, and procedures;
(13) Ensure the allocation of a pre-flight briefing area with privacy;
(14) Ensure the Cabin Crew rosters are:
    a) designed in a manner to reduce the hazards caused by Human Factor and Human Performance; or
    b) in compliance with CAROPS 1 Subpart Q as applicable;
(15) Prepare a Pre-flight briefing checklist that contains all documents required by the CAA;

Appendix 1 to CAR OPS-1.175 Contents and conditions of the Air Operator Certificate

(a) An AOC specifies the:
- (1) For use of the State of the Operator.
- (2) Name of the State of the Operator.
- (3) Identification of the issuing Authority of the State of the Operator.
- (4) AOC number, AC: Air Carrier, AT: Air Transport, PO: Private Operator.
- (5) Date after which the AOC ceases to be valid (dd-mm-yyyy).
- (6) Operator’s registered name.
- (7) Operator’s trading name, if different. “dba” (for “doing business as”).
- (8) Operator’s principal place of business address.
- (9) Operator’s principal place of telephone, fax and E-mail.
- (10) The contact details include the telephone and fax numbers, including the country code, and the e-mail address (if available) at which operational management can be contacted without undue delay for issues related to flight operations, airworthiness, flight and cabin crew competency, dangerous goods and other matters as appropriate will be in the operations specifications.
- (11) Insert the controlled document, carried on board, in which the contact details are listed, with the appropriate paragraph or page reference, e.g.: “Contact details as listed in the operations manual, Gen/Basic, Chapter 1, 1.1 “or “... are listed in the operations specifications, page 1” or are listed in an attachment to this document “.
- (12) Operator ‘s registered name.
- (13) Insertion of reference to the appropriate civil aviation regulations.
- (14) Issuance date of the AOC (dd-mm-yyyy).
- (15) Title, name and signature of the Authority representative. In addition, an official stamp may be applied on the AOC.

(b) Content and format of Operations Specifications - See remarks for any item not filled or for specific approval / authorisation
- (1) Telephone, fax and E-mail contact details of the Authority.
- (2) Associated AOC number.
- (3) Operator’s registered name and the operator’s trading name, if different. “dba” (for “doing business as”).
- (4) Issuance date of the operations specifications (dd-mm-yyyy) and signature of the Authority representative.
- (5) Commercial Aviation Safety Team (CAST)/ICAO designation of the aircraft make, model and series, or master series.
- (6) Other type of transportation to be specified (e.g. emergency medical service).
- (7) Geographical area(s) of authorized operation (by geographical coordinates or specific routes, flight information region or national or regional boundaries).
- (8) List the applicable special limitations (e.g. VFR only, day only).
- (9) List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria). e.g. Dangerous Goods, LVO
- (10) Precision approach category (CAT II, IIIA, IIIB or IIIC). Only the minimum RVR in metres and decision height in feet will be displayed. One line is used per listed approach category.
- (11) Minimum take-off RVR in metres. One line per approval may be used if different approvals are granted).
- (12) List the airborne capabilities (i.e. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.

(13) "Not applicable (N/A)" box may be checked only if the aircraft maximum ceiling is below FL 290.
(14) Extended range operations (ETOPS) currently apply only to twin-engine aircraft.
(15) The threshold distance may also be listed (in NM), as well as the engine type.
(16) Performance-based navigation (PBN): one line is used for each PBN AR navigation specification approval (e.g. RNP AR APCH), with appropriate limitations listed in the "Description" column.
(17) List the EFB functions with any applicable limitations
(18) Limitations, conditions and regulatory basis for operational approval associated with the performance-based navigation specifications (e.g. GNSS, DME/DME/IRU). See Performance Based Navigation Manual (Doc 9613).
(19) Insert the name of the person/organisation responsible for ensuring that the continuing airworthiness of the aircraft is maintained and the regulation that requires the work, i.e. within the AOC regulation or a specific approval (e.g. Part M, Subpart G).
(20) Other authorizations or data can be entered here, using one line (or one multi-line block) per authorization (e.g. special approach authorization, MNPS, approved navigation performance).

Note 1: An Authorisation issued to a Private Operator may contain similar content and conditions.

Note 2: Refer to ICAO Annex 6 Air Operator Certifications for detail operations specifications.

Appendix 2 to CAR OPS-1.175 Management & organisation of an AOC/ Authority holder

(a) ***General:*** an operator must have a sound and effective management structure in order to ensure the safe conduct of air operations. Nominated post-holders must have managerial competency together with appropriate technical/operational qualifications in aviation.

(b) ***Nominated post-holders:***

(1) A description of the functions and the responsibilities of the nominated post-holders, including their names, must be contained in the Operations Manual and the Authority must be given notice in writing of any intended or actual change in appointments or functions.
(2) The operator must make arrangements to ensure continuity of supervision in the absence of nominated post-holders.
(3) A person nominated as a post-holder by the holder of an AOC/Authority must not be nominated as a post-holder by the holder of any AOC/Authority, unless acceptable to the Authorities concerned.
(4) Persons nominated as post-holders must be contracted to work sufficient hours to fulfil the management functions associated with the scale and scope of the operation.

(c) ***Adequacy and supervision of staff:***

(1) ***Crew members.*** The operator must employ sufficient flight and cabin crew for the planned operation, trained and checked in accordance with Subpart N and Subpart O as appropriate.
(2) ***Ground Staff:***

i. The number of ground staff is dependent upon the nature and the scale of operations. Operations and ground handling departments, in particular, must be staffed by trained personnel who have a thorough understanding of their responsibilities within the organisation.

ii. An operator contracting other organisations to provide certain services, retains responsibility for the maintenance of proper standards. In such circumstances, a nominated post-holder must be given the task of ensuring that any contractor employed meets the required standards.

iii. All ground handling operations must be described in a relevant section of Operations Manual or in a separate volume (Ground Handling Manual).

(3) ***Supervision:***

i. The number of supervisors to be appointed is dependent upon the structure of the operator and the number of staff employed.

ii. The duties and responsibilities of these supervisors must be defined, and any other commitments arranged so that they can discharge their supervisory responsibilities.

iii. The supervision of crew members and ground staff must be exercised by individuals possessing experience and personal qualities sufficient to ensure the attainment of the standards specified in the operations manual.

(d) ***Accommodation facilities:***

(1) An operator must ensure that working space available at each operating base is sufficient for personnel pertaining to the safety of flight operations. Consideration must be given to the needs of ground staff, those concerned with operational control, the storage and display of essential records, and flight planning by crews.

(2) Office services must be capable, without delay, of distributing operational instructions and other information to all concerned.

(e) ***Documentation:***

(1) The operator must make arrangement for the production of manuals, amendments and other documentation.

AMC to Appendix 2(b)(4) to OPS-1.175 Nominated Post Holders/Managers – Flight & Duty Time requirements

(1) Occupying a managerial post induces fatigue, consequently Flight & Duty Time requirements (subpart Q) also apply to those staff combining office work and flying duty.

(2) It is responsibility of the operator and post-holder/ concerned manager to evaluate the risk and ensure that an acceptable level of safety is ensured considering that Subpart Q applies to them in totality.

(3) The Operator may decide and implement a mechanism (acceptable to the CAA and endorsed in the OM-A) that would allow a balanced combination of both type of duties with due consideration to office working patterns, flexible allocation of flight duties, and time off.

(4) The proposed mechanism should be based on block time off from managerial and flight duties, quantified as per the amount of time off entitled by office staff (weekends and holidays), considering disrupted flight patterns (24 hour per 7 days week) and overtime.

GM OPS-1.185(b) Maintenance Management Exposition details

(See CAR OPS-1.185(b))

(1) The organisation's Maintenance Management Exposition should reflect the details of any sub-contract(s).

(2) A change of aeroplane type or of the approved maintenance organisation may require the submission of an acceptable amendment to the Maintenance Management Exposition.

SUB PART D – OPERATIONAL PROCEDURES

CAR OPS-1.192 Terminology

The terms which are listed below are for use within the context of this regulation.

(a) ***Adequate Aerodrome.*** An aerodrome which the operator considers to be satisfactory, taking account of the applicable performance requirements and runway characteristics; at the expected time of use, the aerodrome will be available and equipped with necessary ancillary services such as ATS, sufficient lighting, communications, weather reporting, navaids and emergency services.

(b) ***ETOPS (Extended range operations for two engine aeroplanes).*** ETOPS operations are those with two engine aeroplanes approved by the Authority (ETOPS approval), to operate beyond the threshold distance determined in accordance with CAR OPS-1.245 (a) from an Adequate Aerodrome.

(c) ***Adequate ETOPS en-route alternate aerodrome.*** An adequate aerodrome, which additionally, at the expected time of use, has an ATS facility and at least one instrument approach procedure.

(d) ***En-route alternate (ERA) aerodrome.*** An adequate aerodrome along the route, which may be required at the planning stage.

(e) ***3 % ERA.*** An en-route alternate aerodrome selected for the purposes of reducing contingency fuel to 3 %.

(f) ***Isolated aerodrome.*** If acceptable to the Authority, the destination aerodrome can be considered as an isolated aerodrome, if the fuel required (diversion plus final) to the nearest adequate destination alternate aerodrome is more than:

   (1) For aeroplanes with reciprocating engines, fuel to fly for forty-five (45) minutes plus 15 % of the flight time planned to be spent at cruising level or two hours, whichever is less; or

   (2) For aeroplanes with turbine engines, fuel to fly for two hours at normal cruise consumption above the destination aerodrome, including final reserve fuel.

(g) ***Equivalent position.*** A position that can be established by means of a DME distance, a suitably located NDB or VOR, SRE or PAR fix or any other suitable fix between three and five miles from threshold that independently establishes the position of the aeroplane.

(h) ***Critical phases of flight.*** Critical phases of flight are the take-off run, the take-off flight path, the final approach, the landing, including the landing roll, and any other phases of flight at the discretion of the commander.

(i) ***Contingency fuel.*** The fuel required to compensate for unforeseen factors which could have an influence on the fuel consumption to the destination aerodrome such as deviations of an individual aeroplane from the expected fuel consumption data, deviations from forecast meteorological conditions and deviations from planned routings and/or cruising levels/altitudes.

(j) ***Separate runways.*** Runways at the same aerodrome that are separate landing surfaces. These runways may overlay or cross in such a way that if one of the runways is blocked, it will not prevent the planned type of operations on the other runway. Each runway shall have a separate approach procedure based on a separate navigation aid.

(k) ***Approved one-engine-inoperative cruise speed.*** For ETOPS, the approved one-engine-inoperative cruise speed for the intended area of operation shall be a speed, within the certified limits of the aeroplane, selected by the operator and approved by the regulatory Authority.

(l) ***ETOPS area.*** An ETOPS area is an area containing airspace within which an ETOPS approved aeroplane remains in excess of the specified flying time in still air (in standard conditions) at the approved one-engine-inoperative cruise speed from an adequate ETOPS route alternate aerodrome.

(m) ***Dispatch.*** ETOPS planning minima applies until dispatch. Dispatch is when the aircraft first moves under its own power for the purpose of taking off.

CAR OPS-1.195 Operational Control

(See AMC-1, 2, 3 & 4 to CAR OPS-1.195 Operational Control) An
operator shall establish:

(a) Establish and maintain a method of exercising operational control approved by the Authority; and
(b) Exercise operational control over any flight operated under the terms of his AOC/Authorization.
(c) Employ a Flight Operations Officer/ Flight Dispatcher, in accordance with the approved method of flight supervision requiring the services of qualified flight operations officer/flight dispatcher who shall be certified.
(d) Establish and maintain a recognised and approved training programme for the certification process of Flight Operations Officer/ Flight Dispatcher, staffed by qualified and approved training personnel to deliver such training requirements.

CAR OPS-1.196 Aircraft Tracking System - Aeroplanes

(See AMC-1, AMC-2 & AMC-3 OPS1.196)

The operator shall establish an aircraft tracking capability to track aeroplanes throughout its area of operations.

Aircraft tracking system — Aeroplanes

(a) The operator shall establish and maintain, as part of the system for exercising operational control over the flights, an aircraft tracking system, when performed with the following aeroplanes:
    (1) aeroplanes with an MCTOM of more than 27 000 kg, with an MAPSC of more than nineteen (19), and first issued with an individual CoA before 16 December 2018, which are equipped with a capability to provide a position additional to the secondary surveillance radar transponder;
    (2) all aeroplanes with an MCTOM of more than 27 000 kg, with an MAPSC of more than 19, and first issued with an individual CoA on or after 16 December 2018; and
    (3) all aeroplanes with an MCTOM of more than 45 500 kg and first issued with an individual CoA on or after 16 December 2018.
(b) Flights shall be tracked by the operator from take-off to landing, except when the planned route and the planned diversion routes are fully included in airspace blocks where:
    (1) ATS surveillance service is normally provided which is supported by ATC surveillance systems locating the aircraft at time intervals with adequate duration; and
    (2) the operator has provided to competent air navigation service providers necessary contact information.
(c) As of 1 January 2025, all aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2024, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress (see Annex 6, Appendix 9 for further guidance).
    (1) The operator shall make position information of a flight in distress available to the appropriate organizations.
(d) As of 1 January 2025, all aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2024,

    shall autonomously transmit information from which a position can be determined at least once every minute, when in distress, (see ICAO Annex 6, Appendix 9.)
    (1) The operator shall make position information of a flight in distress available to the appropriate SAR/ATC organizations, as established by the CAA.

Note. -Operational procedures for monitoring and making position information of aflight in distress available to the appropriate organizations in a timely manner are contained in PANS-OPS, Volume III, Section 10.

CAR OPS-1.197 Retention of Aircraft Tracking Data

(See GM OPS-1.197)

The operator shall establish procedures, approved by the Authority, for the retention of aircraft tracking data to assist the Search and Rescue agency in determining the last known position of the aircraft.

CAR OPS-1.200 Operations manual

An operator shall provide an Operations Manual in accordance with Subpart P for the use and guidance of operations personnel, and it shall be reviewed, amended or revised as necessary to ensure that the information contained therein is kept up to date. The reviews shall be documented and the maximum interval between the reviews, amendments or revisions shall be conducted on a yearly basis or as required due to compliance changes, whichever comes first.

CAR OPS-1.205 Competence of operations personnel

(See AC OPS-1.205 Competence of Operations personnel)

An operator shall ensure that all personnel assigned to, or directly involved in, ground and flight operations are properly instructed, have demonstrated their abilities in their particular duties and are aware of their responsibilities and the relationship of such duties to the operation as a whole.

CAR OPS-1.210 Establishment of procedures

(See AMC OPS-1.210 (a), & IEM OPS-1.210. (b))

(a) An operator shall establish procedures and instructions, for each aeroplane type, containing ground staff and crew members' duties for all types of operation on the ground and in flight. (See AMC OPS-1.210(a) Establishment of procedures).

(b) An operator shall establish checklists to be provided in accordance with CAR OPS-1.1045(a), which shall be used by flight crews prior to, during and after all phases of operations, and in emergency, to ensure compliance with the operating procedures contained in the aircraft operating manual and the aeroplane flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual. (See IEM OPS-1.210(b) Establishment of procedures).

(c) An operator shall establish a check-list system in accordance with CAR OPS-1.1045 to be used by crew members for all phases of operation of the aeroplane under normal, abnormal and emergency conditions as applicable, to ensure that the operating procedures in the Operations Manual are followed.

(d) An operator shall not require a crew member to perform any activities during critical phases of the flight other than those required for the safe operation of the aeroplane. (See CAR OPS1.192(h) Critical phases of flight).

(e) An operator shall issue operating instructions and provide information on aeroplane climb performance with all engines operating to enable the pilot-in-command to determine the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique. This information should be included in the operations manual.

CAR OPS-1.215 Use of Air Traffic Services

An operator shall ensure that Air Traffic Services are used for all flights whenever available.

CAR OPS-1.216 In-flight Operational Instructions

(See AC OPS-1.216)

An operator shall ensure that his in-flight operational instructions involving a change to the air traffic flight plan shall, when practicable, be coordinated with the appropriate Air Traffic Service unit before transmission to an aeroplane.

CAR OPS-1.220 Authorisation of Aerodromes by the Operator

(See IEM OPS-1.220 Authorisation of aerodromes)

An operator shall only authorise use of aerodromes that are adequate for the type(s) of aeroplane and operation(s) concerned.

CAR OPS-1.225 Aerodrome Operating Minima

(a) An operator shall specify aerodrome operating minima, established in accordance with CAR OPS-1.430 for each departure, destination or alternate aerodrome authorised to be used in accordance with CAR OPS-1.220.

(b) Any increment imposed by the Authority must be added to the minima specified in accordance with sub-paragraph (a) above.

(c) The minima for a specific type of approach and landing procedure are considered applicable if:

  (1) The ground equipment shown on the respective chart required for the intended procedure is operative;

  (2) The aeroplane systems required for the type of approach are operative;

  (3) The required aeroplane performance criteria are met; and

  (4) The crew is qualified accordingly.

(d) The CAA may approve operational variations to alternate aerodrome selection criteria based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approved operational variations to alternate aerodrome selection criteria. The specific safety risk assessment shall include at least the:

  (1) capabilities of the operator;

  (2) overall capability of the aeroplane and its systems;

  (3) available aerodrome technologies, capabilities and infrastructure;

  (4) quality and reliability of meteorological information;

  (5) identified hazards and safety risks associated with each alternate aerodrome variation; and

  (6) specific mitigation measures.

Note: Guidance on performing a safety risk assessment and on determining variations, including examples of variations, is contained in the Flight Planning and Fuel Management Manual (Doc 9976) and the Safety Management Manual (SMM) (Doc 9859).

(e) To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate aerodrome, the operator shall specify appropriate incremental values for height of cloud base and visibility, acceptable to the CAA, to be added to the operator's established aerodrome operating minima.

(f) The margin of time established by the operator for the estimated time of use of an aerodrome shall be approved by the CAA.

Note: Guidance on establishing an appropriate margin of time for the estimated time of use of an aerodrome is contained in the Flight Planning and Fuel Management Manual (Doc 9976).

CAR OPS-1.230 Instrument departure and approach 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 aerodrome is located to serve each instrument runway or aerodrome utilized for instrument flight operations.

(b) All aeroplanes operated in accordance with instrument flight rules shall comply with the instrument flight procedures approved by the State in which the aerodrome is located. An operator shall ensure that instrument departure and approach procedures established by the State in which the aerodrome is located are used.

(c) Notwithstanding sub-paragraphs (a) and (b) above, a commander may accept an ATC clearance to deviate from a published departure or arrival route, provided obstacle clearance criteria are observed and full account is taken of the operating conditions. The final approach must be flown visually or in accordance with the established instrument approach procedure.

CAR OPS-1.235 Noise abatement procedures

(a) An operator shall establish operating procedures for noise abatement during instrument flight operations in compliance with ICAO PANS OPS Volume 1 (Doc 8168–OPS/611).
(b) Take-off climb procedures for noise abatement specified by an operator for any one aeroplane type should be the same for all aerodromes.

CAR OPS-1.240 Routes and areas of operation

(a) An operator shall ensure that operations are only conducted along such routes or within such areas, for which:
  (1) Ground facilities and services, including meteorological services, are provided which are adequate for the planned operation;
  (2) The performance of the aeroplane intended to be used is adequate to comply with minimum flight altitude requirements;
  (3) The equipment of the aeroplane intended to be used meets the minimum requirements for the planned operation;
  (4) Appropriate maps and charts are available (CAR OPS-1.135(a)(9) refers);
  (5) If two-engine aeroplanes are used, adequate aerodromes are available within the time/distance limitations of CAR OPS-1.245.
  (6) If single-engine aeroplanes are used, surfaces are available which permit a safe forced landing to be executed.
(b) An operator shall ensure that operations are conducted in accordance with any restriction on the routes or the areas of operation, imposed by the Authority.

CAR OPS-1.241 Operation in defined airspace with RVSM

(See GM OPS-1.241, Appendix 1 to CAR OPS-1.241, CAR OPS-1.872)

(a) An operator shall not operate an aeroplane in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300m (1000ft) applies between FL 290 and FL 410 inclusive, an aeroplane shall be provided with equipment capable of:
  (1) Indicating to the flight crew the flight level being flown;
  (2) Automatically maintaining a selected flight level;
  (3) Providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ± 90 m (300 ft); and
  (4) Automatically reporting pressure-altitude;
(b) The Authority shall issue a specific approval for RVSM operations;
(c) Prior to granting the RVSM approval required in accordance with paragraph (a), the Authority shall be satisfied that:

(1) the vertical navigation performance capability of the aeroplane satisfies the requirements specified in Annex 6, Appendix 4;

(2) the operator has instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and

(3) the operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

Note: An RVSM approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.

(d) The Operator, in consultation with the Authority (or State of Registry if appropriate), shall ensure that, in respect of those aeroplanes mentioned in paragraphs (a) to (c), adequate provisions exist for:

(1) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with ICAO Annex 11, para 3.3.5.1; and

(2) taking immediate corrective action for individual aircraft, or aircraft type groups, identified in such reports as not complying with the height-keeping requirements for operation in airspace where RVSM is applied. (See Appendix 1 to CAR OPS-1.241)

(e) The RVSM approval by the Authority to the operator shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1,000 flight hours per aeroplane, whichever period is longer. If the operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

Note: Monitoring data from any regional monitoring programme established in accordance with Annex 11, 3.3.5.2, may be used to satisfy the requirement.

(f) All States that are responsible for airspace where RVSM has been implemented, or that have issued RVSM approvals to operators within their State, the Authority shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM approval.

Note 1: These provisions and procedures need to address both the situation where the aircraft in question is operating without approval in the airspace of the State, and the situation where the operator for which the State has regulatory oversight responsibility is found to be operating without the required approval in the airspace of another State.

Note 2: Guidance material relating to the approval for operation and aircraft equipment necessary for flight in RVSM airspace is contained in the Manual on a 300 m (1,000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).

CAR OPS-1.243 Operations in areas with specified navigation performance requirements

(See AMC-1 OPS-1.243(1) AMC-2 OPS-1.243(4), GM-1 OPS-1.243, & GM-2 OPS-1.243(a)(3))

(1) An operator shall ensure that an aeroplane before operating in areas, or through portions of airspace, or on routes where performance-based navigation (PBN) requirements have been prescribed, in addition to the requirements specified in AMC-1 OPS-1.243(a);

(a) The aeroplane be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification;

(b) An operator of an aeroplane operating in areas referred to in (a) shall ensure that all contingency procedures, specified by the authority responsible for the airspace concerned, have been included in the Operations Manual or AFM;

(c) Have information relevant to the aeroplane navigation specification capabilities included in the MEL;

(d) normal and abnormal procedures including contingency procedures;

(2) The Authority shall, for operations where a navigation specification for PBN has been

prescribed, ensure that the operator has established and documented:

(a) normal and abnormal procedures including contingency procedures;

(b) flight crew qualification and proficiency requirements in accordance with the appropriate navigation specifications;

(c) a training programme for relevant personnel consistent with the intended operations; and

(d) appropriate maintenance procedures to ensure continued airworthiness in accordance with the appropriate navigation specifications.

(3) the Operator shall ensure that the specific approval for operations based on PBN authorisation required (AR) navigation specifications has been granted by the Authority.

Note: Guidance on specific approvals for PBN authorization required (AR) navigation specifications is contained in the Performance-based Navigation (PBN) Operational Approval Manual (Doc 9997).

(4) An operator shall obtain operational approval for using RNAV equipment for operations based on conventional navigation methods; (See AMC-2 OPS-1.243(4))

(5) The aeroplane 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 aeroplane to navigate in accordance with AMC-1 OPS-1.243(a) and (b) and, where applicable, CAR OPS-1.243 paras (1) to (3). (*See Note above)*

CAR OPS-1.244 Electronic Navigation Date Management

(a) The operator shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the Authority 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 existing equipment.

(b) The operator shall continue to monitor both the process and products. (See AMC OPS-1.035(5)).

Note: Guidance relating to the processes that data suppliers may follow is contained in RTCA DO-200A/EUROCAE ED-76 and RTCA DO-201A/EUROCAE ED-77. 7.5.2

(c) The operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all necessary aircraft.

CAR OPS-1.245 Two-engine aeroplanes without ETOPS Approval

The maximum distance from an adequate aerodrome for two-engine aeroplanes without an ETOPS Approval is as follows:

(a) Unless specifically approved by the Authority in accordance with CAR OPS-1.246(a) (ETOPS Approval), an operator shall not operate a two-engine aeroplane over a route which contains a point further from an adequate aerodrome than, in the case of:

(1) Performance Class A aeroplanes with either:

i. A maximum approved passenger seating configuration of twenty (20) or more; or

ii. A maximum take-off mass of 45,360kg or more, the distance flown in sixty (60) minutes at the one-engine-inoperative cruise speed determined in accordance with subparagraph (b) below;

(2) Performance Class A aeroplanes with:

i. A maximum approved passenger seating configuration of nineteen (19) or less; and

ii. A maximum take-off mass less than 45,360 kg, the distance flown in 120 minutes or, if approved by the Authority, up to 180 minutes for turbo-jet aeroplanes, at the one-engine-inoperative cruise speed determined in accordance with subparagraph (b) below (See AMC OPS 1.245(a)(2) Operation of non-ETOPS compliant twin turbojet aeroplanes);

(3) Performance Class B or C aeroplanes:
   i. The distance flown in 120 minutes at the one-engine-inoperative cruise speed determined in accordance with subparagraph (b) below; or
   ii. 300 nautical miles, whichever is less. (See IEM OPS 1.245(a) Two-engine aeroplanes without ETOPS Approval).)

(b) An operator shall determine a speed for the calculation of the maximum distance to an adequate aerodrome for each two-engine aeroplane type or variant operated, not exceeding VMO, based upon the true airspeed that the aeroplane can maintain with one- engine inoperative under the following conditions:
   (1) International Standard Atmosphere (ISA);
   (2) Level flight:
      i. For turbojet aeroplanes at:
         A. FL 170; or
         B. At the maximum flight level to which the aeroplane, with one engine inoperative, can climb, and maintain, using the gross rate of climb specified in the AFM, whichever is less.
      ii. For propeller driven aeroplanes at:
         A. FL 80; or
         B. At the maximum flight level to which the aeroplane, with one engine inoperative, can climb, and maintain, using the gross rate of climb specified in the AFM, whichever is less.
   (3) Maximum continuous thrust or power on the remaining operating engine;
   (4) An aeroplane mass not less than that resulting from:
      i. Take-off at sea-level at maximum take-off mass; and
      ii. All engines climb to the optimum long-range cruise altitude; and
      iii. All engines cruise at the long-range cruise speed at this altitude, until the time elapsed since take-off is equal to the applicable threshold prescribed in subparagraph (a) above.

(c) An operator must ensure that the following data, specific to each type or variant, is included in the Operations Manual:
   (1) The one-engine-inoperative cruise speed determined in accordance with subparagraph (b) above; and
   (2) The maximum distance from an adequate aerodrome determined in accordance with subparagraphs (a) and (b) above.

Note: The speeds and altitudes (flight levels) specified above are only intended to be used for establishing the maximum distance from an adequate aerodrome.

CAR OPS-1.246 Extended range operations with two-engine aeroplanes (ETOPS)

(See CAR OPS-1.192) (See CAR OPS-1.295 & CAN 3-37 EDTO)

(a) An operator shall not conduct operations beyond the threshold distance determined in accordance with CAR OPS-1.245 unless approved to do so by the Authority (ETOPS approval) (See CAR OPS-1.192), (For additional information refer to ICAO Doc 9976 and 10085)

(b) Prior to conducting an ETOPS flight, an operator shall ensure that a suitable ETOPS en-route alternate is available, within either the approved diversion time or a diversion time based on the MEL generated serviceability status of the aeroplane, whichever is shorter. (See also CAR OPS-1.297 (d)).

(c) An Operator shall ensure that ETOPS training is provided to Flight Crew member in order to qualify for ETOPS approval. (See also CAR OPS-1.975 (g))

(d) On issuing the specific approval for ETOPS, the Authority shall specify the maximum diversion time granted to the operator for each particular aeroplane and engine combination.

(e) For all aeroplanes the operator shall havein place procedures to prevent the aeroplane being dispatched on a route with diversion times beyond the capability of ETOPS/EDTO significant system time limitations, indicated in the aeroplane flight manual (directly or by reference)

Note. -Guidance for compliance requirements for ETOPS/EDTO significant system time limitations refer to ICAO Doc 10085)

CAR OPS-1.250 Establishment of minimum flight altitudes

(See IEM OPS-1.250 - Establishment of Minimum Flight Altitudes)

(a) An operator shall establish minimum flight altitudes and the methods to determine those altitudes for all route segments to be flown which provide the required terrain clearance considering the requirements of Subparts F to I.
(b) Every method for establishing minimum flight altitudes must be approved by the Authority.
(c) Where minimum flight altitudes established by States over-flown are higher than those established by the operator, the higher values shall apply.
(d) An operator shall consider the following factors when establishing minimum flight altitudes:
  (1) The accuracy with which the position of the aeroplane can be determined;
  (2) The probable inaccuracies in the indications of the altimeters used;
  (3) The characteristics of the terrain (e.g. sudden changes in the elevation) along the routes or in the areas where operations are to be conducted.
  (4) The probability of encountering unfavorable meteorological conditions (e.g. severe turbulence and descending air currents); and
  (5) Possible inaccuracies in aeronautical charts.
  (6) Airspace restriction / Special use airspace
(e) In fulfilling the requirements prescribed in sub-paragraph (d) above due consideration shall be given to:
  (1) Corrections for temperature and pressure variations from standard values;
  (2) The ATC requirements; and
  (3) Any foreseeable contingencies along the planned route.

CAR OPS-1.255 Fuel policy

(See Appendix 1 & 2 to CAR OPS-1.255 Fuel)

(See IEM OPS-1.255(c)(3)(i))

(a) An operator must establish a fuel policy for the purpose of flight planning and in-flight replanning to ensure that every flight carries sufficient fuel for the planned operation and reserves to cover deviations from the planned operation.
(b) An operator shall ensure that the planning of flights is at least based upon (1) and (2) below:
  (1) Procedures contained in the Operations Manual and data derived from:
    i. Current aeroplane specific data derived from a fuel consumption monitoring system, if available or
    ii. if the current aeroplane specific data is not available, Data provided by the aeroplane manufacturer;
  (2) The operating conditions under which the flight is to be conducted including:
    i. Realistic aeroplane fuel consumption data;
    ii. Anticipated masses;
    iii. Current or current and forecasted meteorological conditions;
    iv. Notices to Airmen
    v. Air Navigation Services Provider(s) restrictions or anticipated delay and
    vi. The effect of deferred maintenance action and or configurations deviations.
(c) An operator shall ensure that the pre-flight calculation of usable fuel required for a flight includes:
  (1) Taxi fuel; and
  (2) Trip fuel; and
  (3) Reserve fuel consisting of:

i. Contingency fuel (See IEM OPS 1.255(c)(3)(i) Contingency Fuel);
ii. Alternate fuel, if a destination alternate aerodrome is required. (This does not preclude selection of the departure aerodrome as the destination alternate aerodrome);
iii. Final reserve fuel; and
iv. Additional fuel, if required by the type of operation (e.g. ETOPS); and

(4) Extra fuel if required by the commander.

(d) An operator shall ensure that in-flight re-planning procedures for calculating usable fuel required when a flight has to proceed along a route or to a destination other than originally planned includes:

(1) Trip fuel for the remainder of the flight;
(2) Reserve fuel consisting of:
i. Contingency fuel; and
ii. Alternate fuel, if a destination alternate aerodrome is required. (This does not preclude selection of the departure aerodrome as the destination alternate aerodrome); and
iii. Final reserve fuel; and
iv. Additional fuel, if required by the type of operation (e.g. ETOPS); and
(3) Extra fuel if required by the commander.

(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.

Guidance on compliance with requirements for ETOPS/EDTO critical fuel scenarios is contained in ICAO Doc10085 and for Flight planning and Fuel Management (FPFM) Manual in (ICAO Doc 9976)

CAR OPS-1.260 Carriage of Persons with Reduced Mobility

(See IEM OPS 1.260 - Carriage of persons with Reduced Mobility)

(a) An operator shall establish procedures for the carriage of Persons with Reduced Mobility (PRMs).
(b) An operator shall ensure that PRMs are not allocated, nor occupy, seats where their presence could:
(1) Impede the crew in their duties;
(2) Obstruct access to emergency equipment; or
(3) Impede the emergency evacuation of the aeroplane.
(c) The commander must be notified when PRMs are to be carried on board.

CAR OPS-1.265 Carriage of inadmissible passengers, deportees or persons in custody

An operator shall establish procedures for the transportation of inadmissible passengers, deportees or persons in custody to ensure the safety of the aeroplane and its occupants. The commander must be notified when the above-mentioned persons are to be carried on board.

CAR OPS-1.270 Stowage of baggage and cargo

(See AMC OPS-1.270 & CAR OPS-1.1310 – Loading Restrictions)

(a) The operator shall ensure that all baggage carried onto an aeroplane and taken into the passenger cabin is adequately and securely stowed.
(b) An operator shall establish procedures to ensure that all baggage and cargo on board, which might cause injury or damage, or obstruct aisles and exits if displaced, is placed in stowage areas designed to prevent movement.

CAR OPS-1.275 Transport of items in the cargo compartment

(a) Air operators shall establish a safety risk assessment to transport items including dangerous goods in the cargo compartment. The risk assessment shall cover the following: (1) Hazards associated with the properties of the items to be transported;
   (2) Capabilities of the operator;
   (3) Operational considerations (e.g. area of operations, diversion time);
   (4) Capabilities of the aeroplane and its systems (e.g. cargo compartment fire suppression capabilities);
   (5) Containment characteristics of unit load devices;
   (6) Packing and packaging;
   (7) Safety of the supply chain for items to be transported; and
   (8) Quantity and distribution of dangerous goods items to be transported.
   (9) Carriage of lithium batteries

CAR OPS-1.280 Passenger Seating

(See IEM OPS 1.280 Passenger Seating & AC OPS 1.280 Passenger Seating)

An operator shall establish procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aeroplane.

CAR OPS-1.285 Passenger briefing

An operator shall ensure that:

(a) *General.*
   (1) Passengers are given a verbal briefing about safety matters. Parts or all of the briefing may be provided by an audio-visual presentation.
   (2) Passengers are provided with a safety briefing card on which picture type instructions indicate the operation of emergency equipment and location of exits likely to be used by passengers.

(b) Before take-off:
   (1) Passengers are briefed on the following items if applicable:
      (i) Smoking regulations;
      (ii) Back of the seat to be in the upright position and tray table stowed;
      (iii) Location of emergency exits;
      (iv) Location and use of floor proximity escape path markings;
      (v) Stowage of hand baggage;
      (vi) Restrictions on the use of portable electronic devices; and
      (vii) The location and the contents of the safety briefing card, and,
   (2) Passengers receive a demonstration of the following:
      (i) The use of safety belts and/or safety harnesses, including how to fasten and unfasten the safety belts and/or safety harnesses;
      (ii) The location and use of oxygen equipment if required (CAR OPS-1.770 and CAR OPS1.775 refer). Passengers must also be briefed to extinguish all smoking materials when oxygen is being used; and
      (iii) The location and use of life jackets or equivalent individual flotation devices where their carriage is required (CAR-OPS 1.825 refers).

(c) After take-off
   (1) Passengers are reminded of the following if applicable:
      (i) Smoking regulations; and
      (ii) Use of safety belts and/or safety harnesses including the safety benefits of having safety belts fastened when seated irrespective of seat belt sign illumination.

(d) Before landing
   (1) Passengers are reminded of the following if applicable:
      (i) Smoking regulations;

(ii) Use of safety belts and/or safety harnesses;
(iii) Back of the seat to be in the upright position and tray table stowed;
(iv) Re-stowage of hand baggage; and
(v) Restrictions on the use of portable electronic devices.

(e) After landing
(1) Passengers are reminded of the following:
(i) Smoking regulations; and
(ii) Use of safety belts and/or safety harnesses.

(f) In an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

CAR OPS-1.290 Flight preparation

(a) An operator shall ensure that an operational flight plan is completed for each intended flight. The operational flight plan shall be approved and signed by the commander and, where applicable, signed by the flight dispatcher.

(b) The commander shall not commence a flight unless he is satisfied that:
(1) The aeroplane is airworthy;
(2) The aeroplane is not operated contrary to the provisions of the Configuration Deviation List (CDL);
(3) The instruments and equipment required for the flight to be conducted, in accordance with Subparts K and L, are available;
(4) The instruments and equipment are in operable condition except as provided in the MEL;
(5) Those parts of the operations manual which are required for the conduct of the flight are available;
(6) The documents, additional information and forms required to be available by CAR OPS-1.125 and CAR OPS-1.135 are on board;
(7) Current maps, charts and associated documentation or equivalent data are available to cover the intended operation of the aeroplane including any diversion which may reasonably be expected. This shall include any conversion tables necessary to support operations where metric heights, altitudes and flight levels must be used;
(8) Ground facilities and services required for the planned flight are available and adequate;
(9) The provisions specified in the operations manual in respect of fuel, oil and oxygen requirements, minimum safe altitudes, aerodrome operating minima and availability of alternate aerodromes, where required, can be complied with for the planned flight;
(10) The load is properly distributed and safely secured;
(11) The mass of the aeroplane, at the commencement of take-off roll, will be such that the flight can be conducted in compliance with Subparts F to I as applicable; and
(12) Any operational limitation in addition to those covered by sub-paragraphs (9) and (11) above can be complied with.

CAR OPS-1.295 Selection of aerodromes

(See IEM OPS-1.295(c)(1)(ii))

(a) An operator shall establish procedures for the selection of destination and/or alternate aerodromes in accordance with CAR OPS-1.220 when planning a flight.

(b) An operator must select and specify in the operational flight plan a take-off alternate aerodrome if it would not be possible to return to the aerodrome of departure for meteorological or performance reasons. The take-off alternate aerodrome in relation to the departure aerodrome shall be located within:
(1) For two-engine aeroplanes, either:
i. One-hour flight time at a one-engine-inoperative cruising speed according to the AFM in still air standard conditions based on the actual take-off mass; or

ii. The operator's approved ETOPS diversion time, subject to any MEL restriction, up to a maximum of two hours, at the one-engine-inoperative cruising speed according to the AFM in still air standard conditions based on the actual takeoff mass for aeroplanes and crews authorised for ETOPS; or

(2) Two hours flight time at a one-engine-inoperative cruising speed according to the AFM in still air standard conditions based on the actual take-off mass for three and four engine aeroplanes; and

(3) If the AFM does not contain a one-engine-inoperative cruising speed, the speed to be used for calculation must be that which is achieved with the remaining engine(s) set at maximum continuous power.

(c) An operator must select at least one destination alternate for each IFR flight unless:

(1) Both:

i. The duration of the planned flight from take-off to landing or in the event of inflight re-planning in accordance with CAR OPS-1.255(d), the remaining flight time to destination aerodrome does not exceed six (6) hours; and

ii. Two separate runways are available and useable at the destination and the appropriate weather reports or forecasts for the destination aerodrome, or any combination thereof, indicate that for the period from one hour before until one hour after the expected time of arrival at destination aerodrome, the ceiling will be at least 2000 ft or circling height + 500 ft, whichever is greater, and the visibility will be at least 5 km; or

(2) The destination aerodrome is isolated.

(d) An operator must select two destination aerodrome alternates when:

(1) The appropriate weather reports or forecasts for the destination aerodrome, or any combination thereof, indicate that during a period commencing one (1) hour before and ending one (1) hour after the estimated time of arrival, the weather conditions will be below the applicable planning minima; or

(2) No meteorological information is available.

(e) An operator shall specify any required alternate(s) in the operational flight plan.

(f) An operator shall specify any required ETOPS alternate(s) in the operational and ATC flight plan.

CAR OPS-1.297 Planning minima for IFR flights

(See AC OPS-1.297(c)-Table 1)

(a) *Planning minima for a take-off alternates aerodrome.* An operator shall only select an aerodrome as a take-off alternate aerodrome when the appropriate weather reports or forecasts or any combination thereof indicate that, during a period commencing one (1) hour before and ending one (1) hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable landing minima specified in accordance with CAR OPS-1.225. The ceiling must be considered when the only approaches available are non-precision and/or circling approaches. Any limitation related to one engine inoperative operations must be considered.

(b) *Planning minima for a destination aerodrome (except isolated destination aerodromes).* An operator shall only select the destination aerodrome when:

(1) the appropriate weather reports or forecasts, or any combination thereof, indicate that, during a period commencing one (1) hour before and ending one (1) hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the applicable planning minima as follows:

i. RVR/visibility specified in accordance with CAR OPS-1.225; and

ii. For a non-precision approach or a circling approach, the ceiling at or above MDH; or

(2) two destination alternate aerodromes are selected under CAR OPS-1.295(d) (c)*Planning minima for a*:

i. Destination Alternate Aerodrome

ii. Isolated Aerodrome
iii. 3% ERA Aerodrome
iv. En-route alternate aerodrome required at the planning stage.

(c) An operator shall not select an aerodrome as an en-route alternate aerodrome unless the appropriate weather reports or forecasts, or any combination thereof, indicate that, during a period commencing one (1) hour before and ending one (1) hour after the expected time of arrival at the aerodrome, the weather conditions will be at or above the planning minima in accordance with Table 1 below.

Table 1. Planning minima – En-route and destination alternates

Type of Approach	Planning Minima
Cat II and III	Cat I (*Note 1*)
Cat I	Non-precision *(Notes 1 & 2)*
Non-precision	Non-precision *(Notes 1 & 2)* plus 200 ft/1,000 m
Circling	Circling

Note1: RVR.
Note 2: The ceiling must be at or above the MDH.

(d) Planning minima for an ETOPS en-route alternate aerodrome. An operator shall only select an aerodrome as an ETOPS en-route alternate aerodrome when the appropriate weather reports or forecasts, or any combination thereof, indicate that, during a period between the anticipated time of landing until one hour after the latest possible time of landing, conditions calculated by adding the additional limits of Table 2 or 3 below, and in accordance with the operator's ETOPS approval. An operator shall include in his Operations Manual either Table 2 or Table 3, but not a combination of both, for use in determining the operating minima at the planned ETOPS en-route alternate aerodrome.

(e) A flight shall not proceed beyond the threshold time in accordance with CAR OPS-1.246 unless the identified en-route alternate aerodromes have been re-evaluated for availability and the most up-to-date information indicates that, during the estimated time of use, conditions at those aerodromes will be at or above the operator's established aerodrome operating minima for the operation. If any conditions are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action shall be determined.

Table 2. Planning minima – ETOPS

Type of Approach	Planning Minima	
(RVR/visibility required & ceiling if applicable)		
	Aerodrome with	
	at least 2 separate approach procedures based on 2 separate aids serving 2 separate runways (See IEM OPS 1.295 (c)(1)(ii))	at least 2 separate approach procedures based on 2 separate aids serving 1 runway or, at least 1 approach procedure based on 1 aid serving 1 runway
Precision Approach Cat II, III (ILS, MLS)	Precision Approach Cat I Minima	Non-Precision Approach Minima
Precision Approach Cat I (ILS, MLS)	Non-Precision Approach Minima	Circling minima or, if not available, non-precision approach minima plus 200 ft/1000m
Non-Precision Approach	The lower of non-precision approach minima plus 200 ft/1000m or circling minima	The higher of circling minima or non-precision approach minima plus 200 ft/1000m
Circling Approach	Circling minima	

Table 3. Planning minima – ETOPS

Approach Facility Configuration	Alternate Airfield Ceiling	Alternate Airfield Visibility
Precision approach procedure	Authorised DH/DA plus an increment of 200 ft	Authorised visibility plus an increment of 800 metres
Non-precision approach or circling approach	Authorised MDH/MDA plus an increment of 400 ft	Authorised visibility plus an increment of 1500 metres

CAR OPS-1.300 Submission of ATS Flight Plan

(See AMC OPS 1.300)

An operator shall ensure that a flight is not commenced unless an ATS flight plan has been submitted, or adequate information has been deposited in order to permit alerting services to be activated if required.

CAR OPS-1.305 Refuelling/defuelling with passengers embarking, onboard or disembarking

(See Appendix 1 to CAR OPS-1.305, IEM OPS 1.305, CAR OPS-1.990& IEM OPS-1.990)

(a) An operator shall ensure that no aeroplane is refuelled/defuelled with Avgas or wide cut type fuel (e.g. Jet-B or equivalent) or when a mixture of these types of fuel might occur, when passengers are embarking, on-board or disembarking.

(b) In all other cases necessary precautions shall be taken and the aeroplane shall be properly manned (See CAR OPS-1.990, IEM OPS-1.990) by qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available:
   (1) Passengers shall remain seated without seat belts fastened during these periods of operations; and
   (2) Emergency light shall be in the armed position.

   Note: It is recommended that the window blinds are in the up position.

(c) When refueling/defuelling with passengers embarking, on-board or disembarking, two-way communications shall be maintained by the aeroplane's inter-communication system or other suitable means between the ground crew supervising the refueling/defueling and the qualified personnel on-board the aeroplane.

CAR OPS-1.307 Refuelling/Defuelling with wide-cut fuel

(See IEM OPS-1.307)

An operator shall establish procedures for the refuelling/defuelling with wide-cut fuel (e.g. Jet-B or equivalent) if this is required.

CAR OPS-1.308 Push back and Towing

(See AC OPS-1.308)

(a) The operator shall ensure that all push back and towing procedures comply with appropriate aviation standards and procedures.

(b) The operator shall ensure that pre or post-taxi positioning of the aeroplane is not executed by tow-bar-less towing unless
   (1) the aeroplane is protected by its own design from damage to the nose wheel steering system due to tow-bar-less towing operation, or
   (2) a system/procedure is provided to alert the flight crew that such damage may have or has occurred, or

(3) the tow-bar-less towing vehicle is designed to prevent damage to the aeroplane type.

CAR OPS-1.310 Crew Members at stations

(See AC OPS-1.310(a)(3) and IEM OPS-1.310(b))

(a) Flight crew members.

(1) During take-off and landing each flight crew member required to be on flight deck duty shall be at his station.

(2) During all other phases of flight each flight crew member required to be on flight deck duty shall remain at his station unless his absence is necessary for the performance of his duties in connection with the operation, or for physiological needs provided at least one suitably qualified pilot remains at the controls of the aeroplane at all times.

(3) During all phases of flight each flight crew member required to be on flight deck duty shall remain alert. If a lack of alertness is encountered, appropriate countermeasures shall be used. If unexpected fatigue is experienced a controlled rest procedure, organised by the commander, can be used if workload permits (See AC OPS-1.310(a)(3)). Controlled rest taken in this way may never be considered to be part of a rest period for purposes of calculating flight time limitations nor used to justify any duty period.

(b) ***Cabin crew members***. On all decks of the aeroplane that are occupied by passengers, required cabin crew members shall be seated at their assigned emergency stations during take-off, landing, during any critical phases of flight and whenever the pilot-in-command so directs. (See IEM OPS-1.310(b))

(c) An operator shall ensure that any person conducting duties in the passenger compartment other than those required for the intended flight is:

(1) not confused by the passengers with the cabin crew members;

(2) does not impede cabin crew members in their duties; and

(3) does not occupy cabin crew members assigned stations.

CAR OPS-1.313 Use of headset

(a) Each flight crew member required to be on flight deck duty shall wear the headset with boom microphone or equivalent required by CAR OPS-1.650(p) and/or 1.652(s) and use it as the primary device to listen to the voice communications with Air Traffic Services:

(1) on the ground:

i. when receiving the ATC departure clearance via voice communication,

ii. when engines are running,

(2) in flight below transition altitude or 10,000 feet, whichever is higher, and

(3) whenever deemed necessary by the commander.

(b) In the conditions of paragraph (a) above, the boom microphone or equivalent shall be in a position which permits its use for two-way radio communications.

CAR OPS-1.315 Assisting means for emergency evacuation

An operator shall establish procedures to ensure that before taxiing, take-off and landing, and when safe and practicable to do so, an assisting means for emergency evacuation that deploys automatically, is armed.

CAR OPS-1.320 Seats, safety belts and harnesses

(a) Flight crew members

(1) Any flight crew member occupying a pilot’s seat shall keep the safety harness fastened during the take-off and landing phases; all other flight crew members shall keep their safety harnesses fastened during the take-off and landing phases unless the shoulder

straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.

(2) During other phases of the flight each flight crew member on the flight deck shall keep his safety belt fastened while at his station.

(b) Cabin Crew members

Each cabin crew member shall be seated with seat belt or, when provided, safety harness fastened during take-off and landing and whenever the pilot-in-command so directs.

(c) Passengers

(1) Before take-off and landing, and during taxiing, and whenever deemed necessary in the interest of safety, the commander shall ensure that each passenger on board occupies a seat or berth with his safety belt, or harness where provided, properly secured.

(2) An operator shall make provision for, and the In-charge Cabin crew shall ensure that multiple occupancy of aeroplane seats may only be allowed at specified seat locations (due to the availability of additional oxygen masks) and does not occur other than by one adult and one infant who is properly secured by an infant restraint device.

CAR OPS-1.325 Securing of passenger cabin and galley(s)

(a) An operator shall establish procedures to ensure that before taxiing, take-off and landing all exits and escape paths are unobstructed.

(b) The In-charge Cabin crew shall ensure that before take-off and landing, and whenever deemed necessary in the interest of safety, all passengers, galley equipment and hand baggage is properly secured.

CAR OPS-1.327 Safeguarding of cabin crew and passengers

An operator shall make provision and establish procedures for the safeguarding of cabin crew and passengers in pressurized aeroplanes in the event of loss of pressurization.

(a) Cabin crew shall be safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of depressurization and, in addition, cabin crew should have such means of protection as will enable them to administer first aid to passengers during stabilised flight.

(b) Passengers shall be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurization.

CAR OPS-1.330 Accessibility of emergency equipment

The commander shall ensure that relevant emergency equipment remains easily accessible for immediate use.

CAR OPS-1.335 Smoking on board Oman registered aircraft

(a) Smoking is prohibited on all aircraft registered within the Sultanate of Oman.

(b) When fitted, all “No Smoking” signs shall be illuminated prior to the boarding of passengers and shall remain illuminated until the aircraft shuts down operations for the day.

CAR OPS-1.340 Meteorological Conditions

(a) On an IFR flight a commander shall not:

(1) Commence take-off; or

(2) Continue beyond the point from which a revised flight plan applies in the event of inflight re-planning, when information is available indicating that the expected weather conditions at the time of arrival at the destination and/or required alternate

aerodrome(s) prescribed in CAR OPS-1.295 are at or below the planning minima, prescribed in CAR OPS-1.297.

(b) On an IFR flight a commander shall only continue towards the planned destination or towards the aerodrome of intended landing when the latest information available indicates that, at the expected time of arrival, the weather conditions at the destination, or at least one destination alternate aerodrome, are at or above the applicable aerodrome operating minima.

(c) On an IFR flight, a commander shall only continue beyond:

(1) The decision point when using reduced contingency fuel procedure (See appendix 1 to CAR OPS-1.255 par (b)); or

(2) The pre-determined point when using the pre-determined point procedure (See Appendix 1 to CAR OPS-1.255 Fuel Policy) when information is available indicating that the expected weather conditions at the time of arrival at the destination and/or required alternate aerodrome(s) prescribed in CAR OPS-1.295 are at or above the applicable aerodrome operating minima prescribed in CAR OPS-1.225.

(d) A flight to be conducted in accordance with VFR shall not be commenced unless current meteorological information or a combination of current reports and forecasts indicate that the meteorological conditions along the route or that part of the route to be flown under VFR will, at the appropriate time, be such as to enable compliance with these rules.

(e) The pilot in command should make a Meteorological observation report inflight.

Note: The procedures for making meteorological observations on board aircraft in flight and for recording and reporting them are contained in Annex 3, the PANS-ATM (Doc 4444) and the appropriate Regional Supplementary Procedures (Doc 7030).

CAR OPS-1.345 Ice and other contaminants – ground procedures

(See AC OPS-1.345)

(a) An operator shall establish procedures to be followed when ground de-icing and anti-icing and related inspections of the aeroplane(s) are necessary.

(b) A commander shall not commence take-off unless the external surfaces are clear of any deposit which might adversely affect the performance and/or controllability of the aeroplane except as permitted in the Aeroplane Flight Manual.

CAR OPS-1.346 Ice and other contaminants – flight procedures

(a) An operator shall establish procedures for flights in expected or actual icing conditions. *Note: See AC OPS 1.346 and CAR OPS-1.675*

(b) A commander shall not commence a flight nor intentionally fly into expected or actual icing conditions unless the aeroplane is certificated and equipped to cope with such conditions.

CAR OPS-1.350 Fuel and oil supply

A commander shall not commence a flight or continue in the event of inflight re-planning unless the usable fuel on board meets the requirements of CAR OPS-1.255 paragraph (d) as applicable.

CAR OPS-1.355 Take-off conditions

Before commencing take-off, a commander must satisfy himself that, according to the information available to him, the weather at the aerodrome and the condition of the runway intended to be used should not prevent a safe take-off and departure.

CAR OPS-1.360 Application of take-off minima

Before commencing take-off, a commander must satisfy himself that the RVR or visibility in the takeoff direction of the aeroplane is equal to or better than the applicable minimum.

CAR OPS-1.365 Minimum flight altitudes

(See IEM OPS 1.250)

The commander or the pilot to whom conduct of the flight has been delegated shall not fly below specified minimum altitudes except when necessary for take-off or landing.

CAR OPS-1.370 Simulated abnormal situations in flight

An operator shall establish procedures to ensure that abnormal or emergency situations requiring the application of part or all of abnormal or emergency procedures and simulation of IMC by artificial means, are not simulated during commercial air transportation flights.

CAR OPS-1.375 In-flight fuel management

An operator shall establish policies and procedures approved by the Authority to ensure that in- flight fuel checks and fuel management are performed and carried out according to the following criteria:

(a) Inflight Fuel Check
- (1) A commander must ensure that fuel checks are carried out inflight at regular intervals. The usable remaining fuel must be recorded and evaluated to:
  - i. compare actual consumption with planned consumption;
  - ii. check that the usable remaining fuel is sufficient to complete the flight, in accordance with paragraph (b) 'Inflight fuel management' below; and
  - iii. determine the expected usable fuel remaining on arrival at the destination aerodrome.
- (2) The relevant fuel data must be recorded.

(b) Inflight fuel management.
- (1) The flight must be conducted so that the expected usable fuel remaining on arrival at the destination aerodrome is not less than:
  - i. the required alternate fuel plus final reserve fuel, or
  - ii. the final reserve fuel if no alternate aerodrome is required
- (2) However, if, as a result of an inflight fuel check, the expected usable fuel remaining on arrival at the destination aerodrome is less than:
  - i. the required alternate fuel plus final reserve fuel, the commander must consider the traffic and the operational conditions prevailing at the destination aerodrome, at the destination alternate aerodrome and at any other adequate aerodrome, in deciding whether to proceed to the destination aerodrome or to divert so as to perform a safe landing with not less than final reserve fuel, or
  - ii. the final reserve fuel if no alternate aerodrome is required, the commander must take appropriate action and proceed to an adequate aerodrome so as to perform a safe landing with not less than final reserve fuel.
- (3) The pilot-in-commend shall declare a situation of fuel emergency by broadcasting "MAYDAY. MAYDAY. MAYDAY. FUEL" when calculated usable fuel predicted to be available upon landing, at the nearest adequate aerodrome where a safe landing can be performed, is less than final reserve fuel.
- (4) Additional conditions for specific procedures.
  - i. On a flight using the RCF procedure, in order to proceed to the Destination 1 aerodrome, the commander must ensure that the usable fuel remaining at the decision point is at least the total of:
    - A. Trip fuel from the decision point to the Destination 1 aerodrome; and
    - B. Contingency fuel equal to 5% of trip fuel from the decision point to the Destination 1 aerodrome; and

C. Destination 1 aerodrome alternate fuel, if a Destination 1 alternate aerodrome is required; and
D. Final reserve fuel

ii. On a flight using the PDP procedure in order to proceed to the destination aerodrome, the commander must ensure that the usable fuel remaining at the PDP is at least the total of:
A. Trip fuel from the PDP to the destination aerodrome; and
B. Contingency fuel from the PDP to the destination aerodrome calculated in accordance with Appendix 1 to CAR OPS-1.255 paragraph (a)(3); and
C. Fuel required according to Appendix 1 to CAR OPS-1.255 paragraph (c)(1)(iv)

(c) The pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.

(d) The pilot-in-command shall advise ATC of a minimum fuel state by declaring MINIMUM FUEL when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel.

Note 1: The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance 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: Guidance on declaring minimum fuel is contained in the Flight Planning and Fuel Management Manual (Doc 9976).

CAR OPS-1.385 Use of supplemental oxygen

A commander shall ensure that flight crew members engaged in performing duties essential to the safe operation of an aeroplane in flight use supplemental oxygen continuously whenever cabin altitude exceeds 10,000 ft for a period in excess of thirty (30) minutes, whenever the cabin altitude exceeds 13,000 ft or when other circumstances may dictate the use of oxygen for breathing purposes (e.g. smoke in the cockpit, pilot incapacitation).

CAR OPS-1.390 Cosmic radiation

(See AC OPS-1.390(a)(1), AC OPS-1.390(a)(2) AND AC OPS-1.390(a)(3))

(a) An operator shall take account of the in-flight exposure to cosmic radiation of all crew members while on duty (including positioning) and shall take the following measures for those crew liable to be subject to exposure of more than 1 mSv per year (See AC OPS-1.390(a)(1));
(1) Assess their exposure;
(2) Consider the assessed exposure when organizing working schedules with a view to reduce the doses of highly exposed crew members (See AC OPS-1.390(a)(2));
(3) Inform the crew members concerned of the health risks their work involves (See AC OPS-1.390(a)(3));
(4) Ensure that the working schedules for female crew members, once they have notified the operator that they are pregnant, keep the equivalent dose to the fetus as low as can reasonably be achieved and in any case ensure that the dose does not exceed 1 mSv for the remainder of the pregnancy; and
(5) Ensure that individual records are kept for those crew members who are liable to high exposure. These exposures are to be notified to the individual on an annual basis, and

also upon leaving the operator.

(b) An operator shall not operate an aeroplane above 15,000m (49,000 ft) unless the equipment specified in CAR OPS-1.680(a)(1) is serviceable, or the procedure prescribed in CAR OPS1.680(a)(2) is complied with.

(c) The commander or the pilot to whom conduct of the flight has been delegated shall initiate a descent as soon as practicable when the limit values of cosmic radiation dose rate specified in the Operations Manual are exceeded.

Note: See CAR OPS-1.680(a)(1)

CAR OPS-1.395 Ground proximity detection

When undue proximity to the ground is detected by any flight crew member or by a ground proximity warning system, the commander or the pilot to whom conduct of the flight has been delegated shall ensure that corrective action is initiated immediately to establish safe flight conditions.

CAR OPS-1.398 Use of Airborne Collision Avoidance System (ACAS)

(See AC OPS 1.398)

An operator shall establish procedures to ensure that:

(a) When ACAS is installed and serviceable, it shall be used in flight in a mode that enables Resolution Advisories (RA) to be produced unless to do so would not be appropriate for conditions existing at the time.

(b) When undue proximity to another aircraft (RA) is detected by ACAS, the commander or the pilot to whom conduct of the flight has been delegated must ensure that any corrective action indicated by RA is initiated immediately, unless doing so would jeopardize the safety of the aeroplane;

The corrective action must:

i. Never be in a sense opposite to that indicated by the RA.

ii. Be in the correct sense indicated by the RA even if this is in conflict with the vertical element of an ATC instruction.

iii. Be the minimum possible to comply with the RA indication.

(c) Prescribed ACAS ATC communications are specified.

(d) When the conflict is resolved, the aeroplane is promptly returned to the terms of the ATC instructions or clearance.

CAR OPS-1.400 Approach and landing conditions

(See IEM OPS-1.400)

Before commencing an approach to land, the commander must ensure, the information available pertaining to the weather at the aerodrome and the condition of the runway intended to be used, should not prevent a safe approach, landing or missed approach, in accordance with the performance information contained within the Operations Manual and the Aircraft Flight Manual.

CAR OPS-1.405 Commencement and continuation of approach

(a) An instrument approach shall not be continued below 300m (1000 ft) above an aerodrome elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the aerodrome operating minima.

(b) Where RVR is not available, RVR values may be derived by converting the reported visibility in accordance with Appendix 1 to CAR OPS-1.430, Table 6.

(c) If, after entering the final approach segment or after descending below 300 m (1 000 ft) above the aerodrome 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, an aeroplane shall not continue its approach-to-land at any aerodrome beyond a point at which the limits of the operating minima specified for that aerodrome would be infringed.

Note: Controlling RVR means the reported values of one or more RVR reporting locations (touchdown, mid-point and stop-end) used to determine whether operating minima are or are not met. Where RVR is used, the controlling RVR is the touchdown RVR, unless otherwise specified by State criteria.

(d) The approach may be continued below DA/H or MDA/H and the landing may be completed provided that the required visual reference is established at the DA/H or MDA/H and is maintained.

(e) The touch-down zone RVR is always controlling. If reported and relevant, the midpoint and stop end RVR are also controlling. The minimum RVR value for the mid-point is 125 m or the RVR required for the touch-down zone if less, and 75 m for the stop-end. For aeroplanes equipped with a roll-out guidance or control system, the minimum RVR value for the mid- point is 75 m.

Note. "Relevant", in this context, means that part of the runway used during the high-speed phase of the landing down to a speed of approximately 60 knots.

CAR OPS-1.410 Operating procedures – Threshold crossing height

An operator shall establish operational procedures designed to ensure that an aeroplane being used to conduct 3D instrument approaches crosses the threshold by a safe margin, with the aeroplane in the landing configuration and attitude.

CAR OPS-1.415 Journey log

The pilot-in-command shall be responsible for the journey log book or the general declaration containing the information listed in CAR OPS-1.1055.

CAR OPS-1.420 Occurrence reporting

Detailed reporting requirements are stipulated in CAR 13.400 and CAR-13 Appendix D.

(a) ***Terminology***

(1) *Incident:* An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

(2) *Serious Incident:* is an incident involving circumstances indicating that there was a high probability of an accident and associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

Note 1: The difference between an accident and a serious incident lies only in the result.

Note 2: Examples of serious incidents can be found in ICAO Annex 13 Attachment C.

(3) *Accident:* An occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

i. a person is fatally or seriously injured as a result of:

A. being in the aircraft; or

B. direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or,

C. direct exposure to jet blast except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew: or

ii. the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft; and would normally require major repair or replacement of the affected component; except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes), or for minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike (including holes in the radome); or

iii. the aircraft is missing or is completely inaccessible.

Note 1: For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified, by ICAO, as a fatal injury.

Note 2: An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Note 3: The type of unmanned aircraft system to be investigated is addressed in 5.1 of ICAO Annex 13.

Note 4: Guidance for the determination of aircraft damage can be found in Attachment E of ICAO Annex 13.

(b) ***Incident Reporting:*** An operator shall establish procedures for reporting incidents considering responsibilities described below and circumstances described in sub-paragraph (d) below.

(1) CAR OPS-1.085(b) specifies the responsibilities of crew members for reporting incidents that endanger, or could endanger, the safety of operation.

(2) The commander or the operator of an aeroplane shall submit a report to the Authority of any incident that endangers or could endanger the safety of operation.

(3) Reports must be dispatched within seventy-two (72) hours of the time when the incident was identified unless exceptional circumstances prevent this.

(4) A commander shall ensure that all known or suspected technical defects and all exceedances of technical limitations occurring while he was responsible for the flight are recorded in the aircraft technical log. If the deficiency or exceedance of technical limitations endangers or could endanger the safety of operation, the commander must in addition initiate the submission of a report to the Authority in accordance with paragraph (b)(2) above.

(5) In the case of incidents reported in accordance with sub- paragraphs (b)(1), (b)(2) and (b)(3) above, arising from, or relating to, any failure, malfunction or defect in the aeroplane, its equipment or any item of ground support equipment, or which cause or might cause adverse effects on the continuing airworthiness of the aeroplane, the operator must also inform the organisation responsible for the design or the supplier or, if applicable, the organisation responsible for continued airworthiness, at the same time as a report is submitted to the Authority.

(c) ***Accident and Serious Incident Reporting:*** An operator shall establish procedures for reporting accidents and serious incidents considering responsibilities described below and circumstances described in sub-paragraph (d) below.

(1) The pilot-in-command shall be responsible for notifying the nearest appropriate authority by the quickest available means of any accident involving the aeroplane, resulting in serious injury or death of any person or substantial damage to the aeroplane or property.

(2) A commander shall notify the operator of any accident or serious incident occurring while he was responsible for the flight. In the event that the commander is incapable of providing such notification, this task shall be undertaken by any other member of the crew if they are able to do so, note being taken of the succession of command specified by the operator.

(3) An operator shall ensure that the Authority in the State of the operator, the nearest appropriate Authority (if not the Authority in the State of the operator), and any other

organisation required by the State of the operator to be informed, are notified by the quickest means available of any accident or serious incident and - in the case of accidents only - at least before the aeroplane is moved unless exceptional circumstances prevent this.

(4) The commander or the operator of an aeroplane shall submit a report to the Authority in the State of the operator within seventy-two (72) hours of the time when the accident or serious incident occurred.

(5) In the event of an emergency situation which endangers the safety of the aeroplane or person necessitates the taking of action that involves a violation of local regulations or procedures, the commander shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the commander shall submit a report on any such violation to the appropriate authority of such State; in that event, the commander shall also submit a copy of it to the State of the Operator as soon as possible or within ten (10) days of the occurrence.

(d) ***Specific Reports:*** Occurrences for which specific notification and reporting methods must be used are described below;

(1) ***Air Traffic Incidents:*** A commander shall without delay notify the air traffic service unit concerned of the incident and shall inform them of his intention to submit an air traffic incident report after the flight has ended whenever an aircraft in flight has been endangered by:

i. A near collision with any other flying device;
ii. Faulty air traffic procedures or lack of compliance with applicable procedures by air traffic services or by the flight crew;
iii. Failure of air traffic services facilities.

In addition, the commander shall notify the Authority of the incident.

(2) ***Airborne Collision Avoidance System Resolution Advisory*:** A commander shall notify the air traffic service unit concerned and submit an ACAS report to the Authority whenever an aircraft in flight has manoeuvred in response to an ACAS Resolution Advisory (ACAS RA).

(3) ***Bird Hazards and Strikes:***

i. A commander shall immediately inform the local air traffic service unit whenever a potential bird hazard is observed.
ii. If he is aware that a bird strike has occurred, a commander shall submit a written bird strike report after landing to the Authority whenever an aircraft for which he is responsible suffers a bird strike that results in significant damage to the aircraft or the loss or malfunction of any essential service. If the bird strike is discovered when the commander is not available, the operator is responsible for submitting the report.

(4) ***Dangerous Goods Incidents and Accidents:*** An operator shall report dangerous goods incidents and accidents to the Authority and the appropriate Authority in the State where the accident or incident occurred, as provided for in Appendix 1 to CAR OPS1.1325. The first report shall be dispatched within seventy-two (72) hours of the event unless exceptional circumstances prevent this and include the details that are known at that time. If necessary, a subsequent report must be made as soon as possible giving whatever additional information has been established. (See also CAR OPS-1.1325 & CAR-92.155(1))

(5) ***Unlawful Interference:*** Following an act of unlawful interference on board an aircraft, the commander or, in his absence, the operator shall submit a report as soon as practicable to the local Authority and to the Authority in the State of the operator. (See also CAR OPS-1.1345)

(6) ***Encountering Potentially Hazardous Conditions:*** A commander shall notify the appropriate air traffic services unit as soon as practicable whenever a potentially hazardous condition such as, but not limited to, an irregularity in a ground or

navigational facility, a meteorological phenomenon or a volcanic ash cloud is encountered during flight.

(7) ***Health related incidents requiring immediate action:*** the commander shall notify the appropriate air traffic services unit to relay information to destination aerodrome, as soon as he becomes aware or suspects that there is a traveler onboard suffering from communicable disease. The operator shall ensure that the operations manual contain information to handle health related information, particularly communicable disease. (See AMC OPS-1.420(d)(7))

(8) ***Runway Braking Report:*** As of 4 November 2021, the pilot-in-command shall report the runway braking action special air-report (AIREP) when the runway braking action encountered is not as good as reported.

Note: The procedures for making special air-reports regarding runway braking action are contained in the PANS-ATM (Doc 4444), Chapter 4 and Appendix 1.

CAR OPS-1.425 Deficiencies reported by an Inspecting Authority

(See AC OPS-1.425 & IEM OPS 1.425)

An operator shall:

(a) Notify, immediately but no later than seventy-two (72) hours from the date of inspection, to the CAA principal inspector (copying Foreign Operators Affairs), the deficiencies/findings reported by an Inspecting Authority during its inspection of the operator's aircraft;

(b) Provide the Inspecting Authority, copying the CAA, with the corrective/preventative action plan no later than thirty (30) days from receiving date of the inspection report;

(c) Upon request from the CAA, coordinate with the respective department of the CAA (i.e. Department of Airworthiness, Department of Flight Operations and Department of Licensing) prior to response to the Inspecting Authority on the corrective/ preventive action plan.

(d) Notify the CAA when the Inspecting Authority confirms closure of deficiencies/findings; and (e)Ensure compliance with (a), (b) (c) and (d) for aircraft under a lease agreement (See CAR OPS1.165 and CAR OPS-1.170).

SECTION 2 – SUBPART D – AC/AMC/IEM – OPERATIONAL PROCEDURES

AMC-1 OPS-1.195 Operational Control

(See CAR OPS-1.195)

(1) Operational control means the exercise by the operator or a designated representative, in the interest of safety of the aircraft, the regulatory control, the efficiency of the flight, and the authority over the initiation, continuation, termination or diversion of a flight. There is a requirement for certified flight dispatchers, to provide a full flight watch system for all ETOPS operations.

(2) The organisation and methods established to exercise operational control shall be included in the operations manual and shall cover at least a description of responsibilities concerning the initiation, continuation, termination or diversion of each flight.

(3) Responsibility for operational control shall be delegated only to the pilot-in-command or a suitably qualified flight operations officer/flight dispatcher personnel.

AMC-2 OPS-1.195 Certification Requirements for Commercial Air Transport (CAT) Flight operations officer/Flight dispatcher

(a) A person certified by the operator may operate as flight operations officer/flight dispatcher on the condition they meet these requirements:

(1) ***Age***

The applicant shall be not less than 21 years of age.

(2) ***Knowledge***

The applicant shall have demonstrated a level of knowledge appropriate to the privileges granted to an operations officer, in at least the following subjects:

i. Air law; rules and regulations relevant to the performance of duties as a flight operations officer license; appropriate air traffic services practices and procedures;

ii. Aircraft general knowledge

A. principles of operation of aeroplane power-plants, systems and instruments;

B. operating limitations of aeroplanes and power-plants;

C. minimum equipment list;

iii. Flight performance calculation and planning procedures

A. effects of loading and mass distribution on aircraft performance and flight characteristics; mass and balance calculations;

B. operational flight planning; fuel consumption and endurance calculations; alternate airport selection procedures; en-route cruise control; extended range operation;

C. preparation and filing of air traffic services flight plans;

D. basic principles of computer-assisted planning systems;

iv. Meteorology

A. aeronautical meteorology; the movement of pressure systems; the structure of fronts, and the origin and characteristics of significant weather phenomena which affect take-off, en-route and landing conditions;

B. interpretation and application of aeronautical meteorological reports, charts and forecasts; codes and abbreviations; use of, and procedures for obtaining, meteorological information;

v. Navigation

A. principles of air navigation with particular reference to instrument flight;

vi. Operational procedures

A. use of aeronautical documentation;
B. operational procedures for the carriage of freight and dangerous goods;
C. procedures relating to aircraft accidents and incidents; emergency flight procedures;
D. procedures relating to unlawful interference and sabotage of aircraft;

vii. Principles of flight

A. principles of flight relating to the appropriate category of aircraft; and

viii. Radio communication

A. procedures for communicating with aircraft and relevant ground stations.

(3) ***Experience***

i. The applicant shall have gained the following experience:

A. a total of two years' service in any one or in any combination of the capacities specified in (i) to (iii) inclusive, provided that in any combination of experience the period of service in any capacity shall be at least one year:
B. a flight crew member in air transportation; or
C. a meteorologist in an organisation dispatching aircraft in air transportation; or
D. an air traffic controller; or a technical supervisor of flight operations officers or air transportation flight operations systems; or

ii. at least one year as an assistant in the dispatching of air transport; or iii. have satisfactorily completed a course of approved training. iv. the trainee shall have served under the supervision of a flight operations officer for at least ninety (90) working days within the six months immediately preceding the certification as an FOO/FD.

(4) ***Skills***

i. The applicant shall have demonstrated the ability to:

A. make an accurate and operationally acceptable weather analysis from a series of daily weather maps and weather reports; provide an operationally valid briefing on weather conditions prevailing in the general neighborhood of a specific air route; forecast weather trends pertinent to air transportation with particular reference to destination and alternates;
B. determine the optimum flight path for a given segment, and create accurate manual and/or computer-generated flight plans; and
C. provide operating supervision and all other assistance to a flight in actual or simulated adverse weather conditions, as appropriate to the duties of the holder of a flight operations officer certification.

(5) **Recurrent training requirements**

i. The Flight operations Officer/Flight dispatcher shall within the preceding twelve (12) months, completed at least a one familiarization flight sector in the flight deck of an aeroplane over any area for which that individual is authorised to exercise flight supervision. This flight should include landings at as many aerodromes as practicable.
ii. The Flight Operations Officer/Flight dispatcher shall complete each twenty-four (24) months a written examination as part of recurrent training which covers all aspects of the training required for certification.
iii. In the event that a flight operations officer/flight dispatcher is absent from those assigned duties for more than twelve (12) months they shall be re-certified after completing an approved recurrent training course.

AMC-3 OPS-1.195 Flight Dispatching for aircraft below 5,700Kg MTOW

For the purpose of controlling the weight and balance of an aircraft the air operator certificate holder shall ensure the following:

Goods, passenger, and baggage weights

(a) Subject to paragraphs (b), (c), and (d), a holder of an air operator certificate shall ensure that for every air operation conducted under the authority of the certificate the weights of the following items that are carried on the aircraft are established:
   (1) the total weight of passengers:
   (2) the total weight of crew members:
   (3) the total weight of goods and baggage.

(b) The total weight of passengers (excluding their carry-on baggage (if any) shall be determined by using only one of the following:
   (1) the actual weight of every passenger:
   (2) a standard weight for every passenger that is established by the certificate holder and detailed in the certificate holder's exposition:
   (3) a weight that is declared by the passenger plus an additional four (4) kg for every passenger.

(c) The total weight of crew members (excluding their carry-on baggage (if any)) must be established by using—
   (1) the actual weight of every crew member; or
   (2) a standard weight for every crew member that is established by the certificate holder and detailed in the certificate holder's exposition.

(d) The total weight of goods and baggage must be determined by using— (1) the actual weight of the goods and baggage; or
   (2) for commercial transport operations operating from a remote aerodrome where it is not practicable to establish the actual weight of the goods and baggage, the certificate holder must establish procedures to enable the pilot-in-command to assess the weight of the goods and baggage.

(e) A certificate holder who intends to establish a standard weight to be detailed in the certificate holder's exposition for use under paragraphs (b)(2) or (c)(2) must establish the respective standard weight in accordance with a survey programme that is acceptable to the Authority.

(f) A certificate holder who intends to use declared weights for passengers under paragraph (b)(3), or standard weights for passengers under paragraph (b)(2) or for crew members under paragraph (c)(2) must establish procedures that are acceptable to the Authority to ensure that, if the weight of a passenger or crew member is clearly greater than the declared weight or standard weight being used, a weight that is more representative of the actual weight of the person is used.

(g) A certificate holder who uses a passenger declared weight under paragraph (b)(3) must ensure that the passenger is not encouraged to declare weight that is less than the passenger's actual weight.

AMC-4 OPS-1.195 Operational Control – Flight Operations Officer/ Flight Dispatcher Instructor

(a) The following pre-requisite qualifications are required prior to the approved authorisation being granted by the Authority to perform the duties of Flight Operations Officer/ Flight Dispatcher instructor:
   (1) Applicable Flight Operations Officer/ Flight Dispatcher operational experience:
      i. a minimum of five (5) years in the capacity of a Flight Operations Officer/ Flight Dispatcher; or
      ii. a minimum of continuous three (3) years in the capacity of a Flight Operations Officer/ Flight Dispatcher combined with a minimum of three (3) years'

experience in a training role within the aviation industry.

(2) Recognized relevant qualification in Training (Train the Trainer), or preferably holds an instructor qualification in Human Factors.

(3) Have achieved and maintained a favorable record as a Flight Operations Officer/ Flight Dispatcher.

(4) Proven training background experience in course development, delivery and assessment.

(5) Proficient in computer skills and the ability to use multimedia as a training tool including experience in course design.

(6) High standard of written and spoken English and a high level of interpersonal skills.

(7) Having good knowledge and skills in line with aviation industry standards and Civil Aviation Regulations.

(b) Flight Operations Officer/ Flight Dispatcher Instructor Responsibilities:

(1) Conducts initial, aircraft type training, differences training and recurrent training.

(2) Responsible to impart effective and efficient Flight Operations Officer/ Flight Dispatcher training to Flight Operations Officer/ Flight Dispatcher staff.

(3) Responsible for the instructional design of training courses, including their delivery, development, regulatory compliances, standards, remedial, devices and training material.

(4) Conducting a training needs analysis on the effectiveness of the course material and passed to the Training Manager.

(5) Ensure completion of required documentation and maintaining accurate records of all trainees.

(c) Continuation of Flight Operations Officer/ Flight Dispatcher Instructor Authorisation

(1) This training should consist of a minimum of thirty-five (35) hours of training classes within the twenty-four (24) month period;

(2) Training personnel shall remain conversant within the latest revision of the CAR's, AMC's, and Guidance Material.

(3) They shall also be conversant with the relevant parts of the Operations Manual and associated training procedures.

(4) The operator shall ensure that personnel training records, including records of qualifications, training update and experience is retained for each Instructor.

(5) When a new aircraft type is added to the operator's AOC use of special resources for introduction may be required, such as:

(i) Flight Operations Officer/ Flight Dispatcher Instructors rated on the aircraft from the manufacturer

(ii) Flight Operations Officer/ Flight Dispatcher Instructor from another operator using the same type of aircraft;

(iii) Flight Operations Officer/ Flight Dispatcher Instructor may extend the function to the new aircraft type after having undergone training according to an established Conversion and Differences Course.

(d) A Flight Operations Officer/ Flight Dispatcher Instructor shall complete within the preceding twelve (12) months, at least a one-way qualification flight in the flight crew department of an aeroplane over any area for which that individual is authorised to exercise flight supervision. This flight should include landings at as many aerodromes as practicable.

(e) When a Flight Operations Officer/ Flight Dispatcher Instructor changes operator whilst maintaining aeroplane type:

(1) A Flight Operations Officer/ Flight Dispatcher Instructor who is changing operator with the same aeroplane type with the intention to continue the Flight Operations Officer/ Flight Dispatcher Instructor activity must undergo a conversion training course designed accordingly to CAR OPS-1.945 for changing operator.

(f) Flight Operations Officer/ Flight Dispatcher Instructor changing operator and aeroplane type**:**

(1) A Flight Operations Officer/ Flight Dispatcher Instructor who is changing operator and

aircraft type with the intention to continue the Flight Operations Officer/ Flight Dispatcher Instructor activity must undergo the regular training for changing operator and aircraft type.

AMC-1 OPS-1.196 Aircraft Tracking System – Aeroplanes

(See CAR OPS-1.196)

Equipment, Performance And Procedures When Aircraft Tracking Is Required

(a) ***Automatic tracking of aeroplane position***
The aircraft tracking system shall rely on equipment capable of automatically detecting and transmitting a position report to the aircraft operator, except if (d)(2) applies.

(b) ***Position reporting period***
The tracking of an individual flight shall provide a position report at time intervals which do not exceed 15 minutes.

(c) ***Content of position reports***
Each position report shall contain at least the latitude, the longitude and the time of position determination and whenever available, an indication of the aeroplane altitude, except that for each flight:
(1) One of the position reports may contain only time-stamped data indicating that the aeroplane has left the gate;
(2) One of the position reports may contain only time-stamped data indicating that the aeroplane has become airborne;
(3) One of the position reports may contain only time-stamped data indicating that the aeroplane has landed; and
(4) One of the position reports may contain only time-stamped data indicating that the aeroplane has reached the gate.

(d) ***Source of position data***
The data contained in a position report may come from:
(1) ATC surveillance systems, if the ATC surveillance data source is capable of providing this data with a delay equal to or less than 10 minutes;
(2) the flight crew, if the planned flight duration is less than two position reporting periods;
(3) aeroplane systems. In that case:
   i. the source of time, latitude and longitude data shall be the navigation system of the aeroplane or an approved GNSS receiver;
   ii. the source of altitude data should be:
      - the same source as for time, latitude and longitude data, or
      - an approved source of pressure altitude; and
   iii. the delivery time of position reports from the aeroplane to the operational control over the flight shall, to the extent possible, not exceed 10 minutes; or
(4) any data source when the position report is of a type designated by (c)(1), (c)(2), (c)(3) or (c)(4). In that case, the delivery time of position reports from the data source to the operational control over the flight shall, to the extent possible, not exceed 10 minutes.

(e) ***Temporary lack of aircraft tracking data***
Aircraft tracking data may be incomplete due to a temporary or unexpected issue prior to or during the flight. However, the operator should:
(1) identify any loss of aircraft tracking data which is not due to a temporary issue, and
(2) address any systematic lack of aircraft tracking data affecting a given aeroplane or a given route in a timely manner.

(f) ***Operational control over the flights***
When abnormal flight behaviour is suspected, this should be checked and acted upon without delay.

(g) ***Recording of aircraft tracking data during normal operation***
When the tracking of a flight is required, all related aircraft tracking data shall be recorded on the ground, including position data from ATC surveillance systems when they are used.

The aircraft tracking data of a given flight shall be retained until confirmation that the flight is completed and no accident or serious incident occurred.

(h) ***Preserving aircraft tracking data after an accident or a serious incident***

Following an accident or a serious incident, the operator shall retain the aircraft tracking data of the involved flight for at least 30 days. In addition, the operator shall be capable of providing a copy of this data without delay and in an electronic format that is computer readable using a common text file editor.

(i) ***Procedures***

The operator shall establish procedures describing its aircraft tracking system, including the identification of abnormal flight behaviour and the notification of the competent ATS unit, when appropriate. These procedures shall be integrated with the emergency response plan of the operator.

Note1.- Oceanic area, for the purpose of aircraft tracking, is the airspace which overlies waters outside the territory of a State.

Note2.-See ICAO Annex 11, Chapter 2 for coordination between the operator and air traffic services providers regarding the territory of a State.

Note3.- Operational procedures for monitoring the aircraft tracking information are contained in PANS-OPS, Volume III Section 10

AMC-2 OPS-1.196 Aircraft tracking system — Aeroplanes

Routes Included In Airspace Covered By Ats Surveillance

(a) Trajectory points located at a distance of less than 50 NM from the departure airfield and trajectory points located at a distance of less than 50 NM from the destination airfield may be considered as not part of the 'planned route'.

(b) Trajectory points located at a distance of less than 50 NM from any diversion airfield may be considered as not part of the 'planned diversion routes'.

(c) An ATS surveillance service may be considered 'supported by ATC surveillance systems locating the aircraft at time intervals with adequate duration' if those ATC surveillance systems are capable of locating aircraft at time intervals not exceeding 15 minutes when operated normally. Information on FIRs able to support 15-minute position reports is available on https://www4.icao.int/opsctrl.

(d) When applicable, the operator should check that the conditions required for using the exception defined by CAR-OPS 1.196 (b) are fulfilled before operating into new airspace blocks.

(e) When applicable, the operator should check at time intervals not exceeding 180 calendar days that the conditions required for using the exception defined by CAR-OPS 1.197 (b) are maintained.

AMC-3 OPS-1.196 Aircraft Tracking

(a) When an aircraft operator or an air traffic service (ATS) unit has reason to believe that an aircraft is in distress, coordination shall be established between the ATS unit and the aircraft operator.

(b) The CAA shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

(1) air traffic service (ATS) unit(s); and

(2) SAR rescue coordination centre(s) (RCC) and sub-centres.

Note 1: Refer to Annex 11 for emergency phase criteria.

Note 2: Refer to Annex 12 for required notifications in the event of an emergency phase. Annex 6 — Operation of Aircraft Part I 8/11/18 APP 9-2

Note 3: Operational procedures for monitoring the aircraft tracking information are contained in PANS-OPS, Volume III, Section 10

(c) When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.

(d) The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.

GM OPS-1.197 Retention of Aircraft Tracking Data

Guidance on aircraft tracking capabilities is contained in the Aircraft Tracking Implementation Guidelines is available from ICAO Circular – 347

AC OPS-1.205 Competence of Operations personnel

(See CAR OPS-1.205)

If an operator employs Flight Operations Officers in conjunction with a method of Operational Control as defined in CAR OPS-1.195, training for these personnel should be based on relevant parts of ICAO Doc 7192 D3. This training should be described in Subpart D of the Operations Manual.

AMC OPS-1.210(a) Establishment of procedures

(See CAR OPS-1.210(a))

(1) An operator should specify the contents of safety briefings for all cabin crew members prior to the commencement of a flight or series of flights.

(2) An operator should specify procedures to be followed by cabin crew with respect to:
  - (a) Arming and disarming of slides;
  - (b) The operation of cabin lights, including emergency lighting;
  - (c) The prevention and detection of cabin, oven and toilet fires;
  - (d) Action to be taken when turbulence is encountered; and
  - (e) Actions to be taken in the event of an emergency and/or an evacuation.

IEM OPS-1.210(b) Establishment of procedures

(See CAR OPS-1.210(b))

When an operator establishes procedures and a checklist system for use by cabin crew with respect to the aeroplane cabin, at least the following items should be taken into account:

	ITEM	Pre-Take-Off	In-Flight	Pre-Landing	Post Landing
1.	Brief of cabin crew by the in-charge cabin crew member prior to commencement of a flight or series of flights.	X			
2.	Check of safety equipment in accordance with operator's policies and procedures.	X			
3.	Security checks as required by Subpart S (CAR OPS 1.1250).	X			X
4.	Supervision of passenger embarkation and disembarkation (CAR OPS-1.075; CAR OPS-1.105; CAR OPS-1.270; CAR OPS-1.280; CAR OPS-1.305).	X			X
5.	Securing of passenger cabin (e.g. seat belts, cabin cargo/baggage etc.(CAR OPS 1.280; CAR OPS 1.285; CAR OPS 1.310).	X	if required	X	
6.	Securing of galleys and stowage of equipment and during turbulence (CAR OPS-1.325).	X	X	X	
7.	Arming of door slides.	X			
8.	Safety information to passengers (CAR OPS 1.285).	X	X	if required	X

9. ’Cabin secure’ report to flight crew.	X	if required	X	
10. Operation of cabin lights.	X	if required	X	X
11. Cabin crew at crew stations for turbulence, take-off and landing. (CAR OPS-1.310,	X	if required	X	X
12. Surveillance of passenger cabin.	X	X	X	X
13. Prevention and detection of fire in the cabin (including the combi-cargo area), crew rest areas, galleys and toilets and instructions for actions to be taken.	X	X	X	X
14. Action to be taken when turbulence is encountered or inflight incidents (pressurisation failure, medical emergency etc.). (See also CAR OPS-1.320 and CAR OPS-1.325).		X		
15. Disarming of door slides.				X
16. Reporting of any deficiency and/or unserviceability of equipment and/or any incident (See also CAR OPS 1.420).	X	X	X	X

IEM OPS 1.220 Authorisation of aerodromes

(See CAR-OPS 1.220)

(1) When defining aerodromes for the type of aeroplane(s) and operation(s) concerned, an operator should take account of the following:

(2) An adequate aerodrome is an aerodrome which the operator considers to be satisfactory, taking account of the applicable performance requirements and runway characteristics. In addition, it should be anticipated that, at the expected time of use, the aerodrome will be available and equipped with necessary ancillary services, such as ATS, sufficient lighting, communications, weather reporting, navaids and emergency services / Rescue and Fire Fighting Services.

   (a) For an ETOPS en-route alternate aerodrome, the following additional points should be considered:

      i. The availability of an ATC facility; and

      ii. The availability of at least one letdown aid (ground radar would so qualify) for an instrument approach.

AC OPS-1.216 In-flight Operational Instructions

(See CAR OPS-1.216)

When co-ordination with an appropriate Air Traffic Service unit has not been possible, in-flight operational instructions do not relieve a commander of responsibility for obtaining an appropriate clearance from an Air Traffic Service unit, if applicable, before making a change in flight plan.

GM OPS-1.241 RVSM approval requirements

(a) An operator applying for RVSM operation approval shall submit documents to demonstrate compliance with the requirements as set out in CAR-OPS. These documents may include:

   (1) relevant pages of Airplane Flight Manual;

   (2) Type Certificate, supplemental Type Certificate or Type Certificate Data Sheet;

   (3) Relevant pages of the operations manual stating its operating policy/procedures as well as crew training requirements; and

   (4) Relevant pages of the aircraft and component maintenance manuals, structural repair manual, standard practices manuals, illustrated parts catalogue, maintenance schedule, MMEL/MEL.

(b) To process the application, CAA adopts the standard 5-step approach, namely: pre-application meeting, formal submission of application, evaluation and/or assessment of documents, flight proving/validation and final approval or rejection of application.

(c) Subject to completeness and timeliness of documents submission the processing of RVSM operational approval would require thirty (30) working days.

(d) RVSM operational approval is aircraft and operator specific; CAA must be notified without delay if there are any changes to the identity of the aircraft or operator. The changes will be subject to CAA's approval for continued validity of the RVSM operational approval.

(e) The RVSM operational approval is subject to the operator's compliance with ICAO Document 7030, Regional Supplementary Procedures, and State AIPs.

(f) The maintenance and inspection programme required in CAA regulatory requirement is to ensure that the altimetry system continue to meet RVSM standards. The integrity of the altimetry design features should be verified by scheduled tests and inspections. The programme should include all aspects of continuing airworthiness which may be affected by RVSM requirements.

(g) The programme should contain the maintenance practices outlined in the applicable aircraft and component manufacturer's maintenance manuals for each aircraft type. The operator should include the following if not already addressed by an approved maintenance programme:

  (1) All RVSM equipment should be maintained in accordance with the component manufacturer's maintenance requirements outlined in the approved data package.

  (2) Any modification, repair, or design change which in any way alters the initial RVSM approval, should be subject to a design review by persons approved by the approving authority.

  (3) Any maintenance practices which may affect the continuing RVSM approval integrity, e.g. the alignment of pitot/static probes,

  (4) Built-in Test Equipment (BITE) testing is not an acceptable basis for calibrations, (unless it is shown to be acceptable by the airframe manufacturer with the approval of CAA) and should only be used for fault isolation and troubleshooting purposes.

  (5) Some aircraft manufacturers have determined that the removal and replacement of components utilising quick disconnects and associated fittings, when properly connected, will not require a leak check. While this approach may allow the aircraft to meet static system certification standards when properly connected, it does not always ensure the integrity of the fittings and connectors, nor does it confirm system integrity during component replacement and reconnections. Therefore, a system leak check or visual inspection should be accomplished any time a quick disconnect static line is broken.

(h) Airframe and static systems should be maintained in accordance with the airframe manufacturer's inspection standards and procedures.

(i) The height-keeping performance monitoring programme is mandatory and shall be conducted to get a RVSM approval from CAA.

(j) The Omani operator /owner of Oman registered aircraft holding an RVSM approval shall establish a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the owner/operator have their height keeping performance monitored, at least once every two years or within intervals of one thousand (1,000) flight hours per aeroplane, whichever period is longer. If an owner/operator aircraft type grouping consists of a single aeroplane, monitoring of that airplane shall be accomplished within the specified period.

(k) As part of the programme, the operator should take immediate action to rectify any report of height-keeping error. Additionally, CAA should be informed within seven-two (72) hours with initial analysis of causal factors, as well as measures taken to prevent further occurrence of the following events:

  (1) TVE equal to or greater than ±300 ft (±90 m);

  (2) ASE equal to or greater than ±245 ft (±75 m); and

  (3) Assigned Altitude Deviation (AAD) or Large Height Deviation (LHD) equal to or greater than ±300 ft (±90 m).

(l) Following resolution of the cause(s), the operator will be expected to demonstrate compliance with the RVSM Minimum Aviation System Performance Specification (MASPS) which includes height-keeping performance monitoring of the subject aircraft.

Appendix 1 to CAR OPS-1.241 Altimetry System Performance Requirements for Operations in RVSM Airspace

(a) Details that could influence the accuracy of height-keeping performance, the height-keeping performance capability shall be such that the total vertical error (TVE) for the group of aeroplanes shall have a mean no greater than 25 m (80 ft) in magnitude and shall have a standard deviation no greater than $28 – 0.013z^2$ for $0 \le z \le 25$ when z is the magnitude of the mean TVE in metres, or $92 – 0.004z^2$ for $0 \le z \le 80$ where z is in feet. In addition, the components of TVE shall have the following characteristics:
  - (1) the mean altimetry system error (ASE) of the group shall not exceed 25 m (80 ft) in magnitude;
  - (2) the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 m (245 ft); and
  - (3) the differences between cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

(b) In respect of aeroplanes for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belonging to a group of aeroplanes encompassed by paragraph 1, the height-keeping performance capability shall be such that the components of the TVE of the aeroplane have the following characteristics:
  - (1) the ASE of the aeroplane shall not exceed 60 m (200 ft) in magnitude under all flight conditions; and
  - (2) the differences between the cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

AMC-1 OPS-1.243(1) Operations in areas with specified navigation performance requirements

An aeroplane shall be provided with navigation equipment which will enable it to proceed:

(a) in accordance with its operational flight plan; and

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

(c) The aeroplane is provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specifications;

(d) The Authority has granted the relevant operational approval (See CAR OPS-1.653 GNSS, 1.865 COM and NAV equipment, 1.870 Nav equipment required for MNPS, and 1.872 Equipment required for RVSM); and

(e) The Authority has granted the relevant operational approval for each of the PBN specifications to be used, as listed in ICAO Doc 9613 Performance-Based Navigation (PBN) Manual.

AMC-2 OPS 1.243 (4) RNAV Visual Flight Procedures (RVFP)

(See CAR-OPS 1.243 (4))

1. **General**

(a) Reports indicate flight crew sometimes descend at excessive rates on approach, resulting in un-stabilized approaches. Many of these reports come from flight crew conducting visual approaches to runways not served by vertically guided approach procedures. However, the events can also occur at airports with vertically guided approach procedures when visual approach operations impose altitude restrictions that interfere with the flight crew's ability to establish a stabilized approach. Many of the aircraft involved in these events are equipped with RNAV systems capable of providing lateral, vertical, and airspeed guidance/reference. Procedures such as RVFP, which capitalize on the capabilities of these RNAV systems, are beneficial because they promote flight path repeatability, may reduce air traffic communications and enhance safety.

(b) The design and implementation of RVFP differ from that of charted visual flight procedures in a number of regards;
   (1) RVFP developed under this guidance are for use only by pilots of aircraft equipped with instrument flight rules approved RNAV systems.
   (2) the procedures must be published in the States AIP.

2. **Weather Requirements**
   (a) The ceiling and visibility values required to conduct these procedures should equal or exceed the requirements for visual approach operations.

3. **Operational Approval**
   (a) The operator should ensure that the aircraft is equipped in accordance with the functional requirements of the RVFP.
   (b) The operator should ensure the appropriate operating procedures.
   (c) The operator should ensure that an RVFP training program is in place and that the appropriate training has been conducted.
   (d) The operator should also validate fly ability of the procedure in a simulator approved for each make, model and series of aircraft intended for use of the RVFP.
   (e) Once the Authority is satisfied with the operator's aircraft equipage, procedures and training program, the operator may be approved to fly RVFP commensurate with their PBN Operational Approval.

4. **Roles and Responsibilities.**
   (a) Operators shall train their pilots on RVFP which will include RVFP phraseology and procedures.
   (b) The RVFP should be coded in the aircraft RNAV system database and retrievable by name (i.e., line selectable). ***Pilots are not authorized to build these procedures manually***.
   (c) Pilots should request the RVFP on initial contact with the controlling agency, unless previously coordinated.
   (d) Pilots should report the airport or preceding traffic in sight to receive clearance for an RVFP.
   (e) Pilots should fly the published RVFP route and, unless otherwise cleared by ATC, comply with charted mandatory altitudes and speeds.
   (f) By accepting an RVFP clearance, pilots also accept the requirements and responsibilities associated with a visual approach clearance, e.g. visibility minimums and cloud clearances.
   (g) Controllers should receive training on these procedures, including RVFP phraseology, Intervention policies and procedures, and actions to be taken if a pilot has not reported the airport or preceding traffic in sight by the beginning of the procedure.
   (h) Controllers may allow an aircraft to join the procedure at other than the initial fix. However, ATC may not vector an aircraft to the initial fix of an RF leg, nor to any intermediate location on the RF leg.
   (i) The controlling facility should monitor aircraft operating on any portion of an RVFP by radar or an alternative ATS surveillance system.

GM-1 OPS-1.243 Operations in areas with specified navigation performance requirements

See CAR OPS-1.243

The requirements and procedures relating to areas in which navigation performance specifications are prescribed, based on Regional Air Navigation Agreements, are covered (as indicated for the type of navigation performance specification) in the following documentation:

(a) ICAO Doc 7030 Regional Supplementary Procedures;
(b) ICAO NAT Doc 007 North Atlantic Operations and Airspace Manual; and
(c) ICAODoc 9613 Performance Based Navigation (PBN) Manual.

GM-2 OPS 1.243 (a)(3) Operations in areas with specific navigation performance requirements

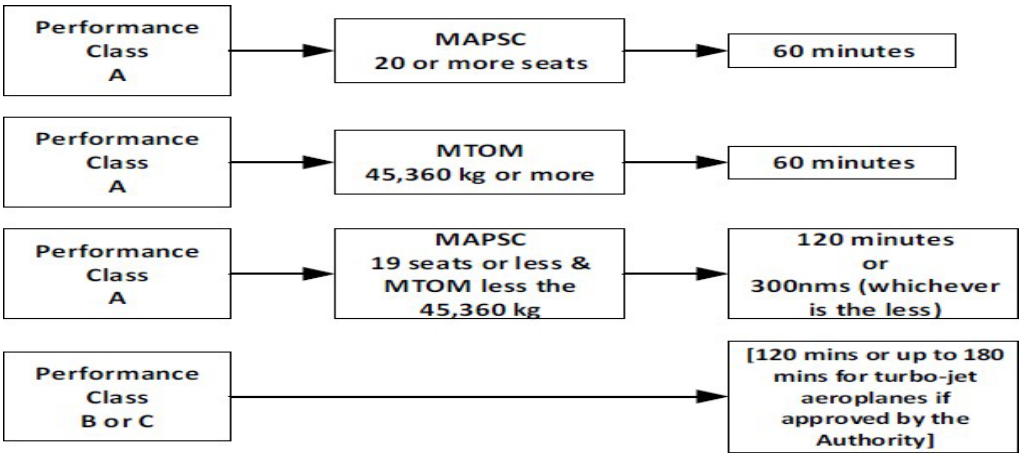
See CAR-OPS 1.234 (a)(3)

Guidance material for the operational approval of PBN operations can be found in ICAO Doc 9997 Performance-Based Navigation (PBN) Operational Approval Manual.

IEM OPS-1.245(a) Maximum distance from an adequate aerodrome for twin engine aeroplanes without ETOPS Approval

(See CAR OPS-1.245)

Notes: (1) MAPSC – Maximum Approved Passenger Seating Configuration;
(2) MTOM – Maximum Take-off Mass



AMC OPS-1.245(a)(2) Operation of non-ETOPS compliant twin turbojet aeroplanes

(See CAR OPS-1.245(a)(2))

Operation of non-ETOPS compliant twin turbojet aeroplanes between 120 and 180 minutes from an adequate aerodrome

(1) As prescribed in CAR OPS-1.245(a)(2), an operator may not operate a twin turbo-jet powered aeroplane having a maximum approved passenger seating configuration of nineteen (19) or less and a MTOM less than 45,360Kg beyond 120 minutes from an adequate aerodrome at the one engine inoperative cruise speed calculated in accordance with CAR OPS-1.245(b) unless approved by the Authority. This 120-minute threshold may be exceeded by no more than 60 minutes. In order for operations between 120 and 180 minutes to be approved, due account should be taken of the aeroplane's design and capabilities (as outlined below) and an operator's experience related to such operations. An operator should ensure that the following items are addressed. Where necessary, information should be included in the Operations Manual and the Operator's Maintenance Management Exposition.

Note: Mention of "the aeroplane's design" in paragraph (1) above does not imply any *additional Type Design Approval requirements (beyond the applicable original Type Certification requirements) before the Authority will permit operations beyond the 120-minute threshold.*

(2) **Systems capability-** Aeroplanes should be certificated to CS-25 as appropriate (or an equivalent accepted by the CAA). With respect to the capability of the aeroplane systems, the objective is that the aeroplane is capable of a safe diversion from the maximum diversion distance with particular emphasis on operations with one engine inoperative or with degraded system capability. To this end, the operator should give consideration to the capability of the following systems to support such a diversion:

(a) **Propulsion systems-** The aeroplane power plant should meet the applicable requirements prescribed in EASA CS-25 and CS-E or equivalent as accepted by the CAA as accepted by the CAA, concerning engine type certification, installation and system operation. In addition to the performance standards established by the Authority at the time of engine certification, the engines should comply with all subsequent mandatory safety standards specified by the Authority, including those necessary to maintain an acceptable level of reliability. In addition, consideration should be given to the effects of extended duration single engine operation (e.g. the effects of higher power demands such as bleed and electrical).

(b) **Airframe systems-** With respect to electrical power, three or more reliable (as defined by EASA CS-25 or equivalent as accepted by the CAA) and independent electrical power sources should be available, each of which should be capable of providing power for all essential services (See Appendix 1). For single engine operations, the remaining power (electrical, hydraulic, pneumatic) should continue to be available at levels necessary to permit continued safe flight and landing, and to provide those services necessary for the overall safety of the passengers and crew. As a minimum, following the failure of any two of the three electrical power sources, the remaining source should be capable of providing power for all of the items necessary for the duration of any diversion. If one or more of the required electrical power sources are provided by an APU, hydraulic system or Air Driven Generator/Ram Air Turbine (ADG/RAT), the following criteria should apply as appropriate:

i. To ensure hydraulic power (Hydraulic Motor Generator) reliability, it may be necessary to provide two or more independent energy sources.

ii. The ADG/RAT, if fitted, should not require engine dependent power for deployment.

iii. The APU should meet the criteria in sub-paragraph (c) below.

(c) **APU -** The APU, if required for extended range operations, should be Certificated as an essential APU and should meet the applicable EASA CS-25 provisions or equivalent as accepted by the CAA.

(d) **Fuel supply system -** Consideration should include the capability of the fuel supply system to provide sufficient fuel for the entire diversion taking account of aspects such as fuel boost and fuel transfer.

(3) **Power-plant Events** and corrective action.

(a) All power-plant events and operating hours should be reported by the operator to the Airframe and Engine manufacturers as well as to the Authority.

(b) These events should be evaluated by the operator in consultation with the Authority and with the engine and airframe manufacturers. The Authority may consult with the type design Authority to ensure that world wide data is evaluated.

(c) Where statistical assessment alone may not be applicable e.g. where the fleet size or accumulated flight hours are small, individual power-plant events should be reviewed on a case by case basis.

(d) The evaluation or statistical assessment, when available, may result in corrective action or the application of operational restrictions.

Note: Power-plant events could include engine shut downs, both on ground and inflight, (excluding normal training events) including flameout, occurrences where the intended thrust level was not achieved or where crew action was taken to reduce thrust below the normal level for whatever reason, and unscheduled removals.

(4) **Maintenance:** The operator's maintenance requirements should address the following:

(a) **Release to service -** A pre-departure check, additional to the pre-flight inspection required by CAR OPS-1.890(a)(1) should be reflected in the Operator's Maintenance Management Exposition. These checks should be conducted and certified by an organisation appropriately approved/accepted in accordance with CAR-145 or by an appropriately trained flight crew member prior to an extended range flight to ensure that all maintenance actions are complete and all fluid levels are at prescribed levels for the flight duration.

(b) **Engine oil consumption programmes-** Such programmes are intended to support engine condition trend monitoring (see below).

(c) **Engine condition trend monitoring programme -** A programme for each power-plant that monitors engine performance parameters and trends of degradation that provides for maintenance actions to be undertaken prior to significant performance loss or mechanical failure.

(d) Arrangements to ensure that all corrective actions required by the type design Authority are implemented.

(5) **Flight Crew Training:** Flight crew training for this type of operation should include, in addition to the requirements of CAR OPS-1 Subpart N, particular emphasis on the following:

(a) **Fuel management -** Verifying required fuel on board prior to departure and monitoring fuel on board en-route including calculation of fuel remaining. Procedures should provide for an independent cross- check of fuel quantity indicators (e.g. fuel flow used to calculate fuel burned compared to indicated fuel remaining). Confirmation that the fuel remaining is sufficient to satisfy the critical fuel reserves.

(b) **Procedures for single and multiple failures in flight that may give rise to go/no-go and diversion decisions -** Policy and guidelines to aid the flight crew in the diversion decision making process and the need for constant awareness of the closest suitable alternate aerodrome in terms of time.

(c) **One-engine inoperative performance data -** Drift down procedures and one-engine inoperative service ceiling data.

(d) **Weather reports and flight requirements -** METAR and TAF reports and obtaining in flight weather updates on en-route alternate, destination and destination alternate aerodromes. Consideration should also be given to forecast winds (including the accuracy of the forecast compared to actual wind experienced during flight) and meteorological conditions along the expected flight path at the one-engine inoperative cruising altitude and throughout the approach and landing.

(e) **Pre-departure check -** Flight crew members who are responsible for the pre- departure check of an aeroplane (see paragraph (3)(a) above), should be fully trained and competent to do so. The training programme required, which should be approved by the Authority should cover all relevant maintenance actions with particular emphasis on checking required fluid levels.

(6) **MEL** – The MEL should take into account all items specified by the manufacturer relevant to operations in accordance with this AMC.

(7) **Dispatch/Flight Planning Requirements:** The operator's dispatch requirements should address the following:

(a) **Fuel and oil supply –** An aeroplane should not be dispatched on an extended range flight unless it carries sufficient fuel and oil to comply with the applicable operational

requirements and any additional reserves determined in accordance with sub-paragraphs
(a)(i) (ii) and (iii) below.

i. **Critical fuel scenario –** The anticipated mass of the aeroplane in determining the corresponding EDTO/ ETOPS critical fuel shall be considered. The critical point is the furthest point from an alternate aerodrome assuming a simultaneous failure of an engine and the pressurisation system. For those aeroplanes that are type certificated to operate above Flight Level 450, the critical point is the furthest point from an alternate aerodrome assuming an engine failure. The operator should carry additional fuel for the worst-case fuel burn condition (one engine vs two engines operating), if this is greater than the additional fuel calculated in accordance with Appendix 1 to CAR OPS-1.255 1.6 (a) and (b), as follows:

A. Fly from the critical point to an alternate aerodrome:
- At 10,000ft; or
- At 25,000 ft or the single-engine ceiling, whichever is lower, provided that all occupants can be supplied with and use supplemental oxygen for the time required to fly from the critical point to an alternate aerodrome; or
- At the single-engine ceiling, provided that the aeroplane is type certificated to operate above Flight Level 450.

B. Descend and hold at 1,500 feet for 15 minutes in ISA conditions;

C. Descend to the applicable MDA/DH followed by a missed approach (taking into account the complete missed approach procedure); followed by D.A normal approach and landing.

Note: Guidance on EDTO/ETOPS critical fuel panning can be found in the Fligh Planning and Fuel Management Manual (ICAO Doc 9976 and ICAO Doc 10085

ii. **Ice protection -** Additional fuel used when operating in icing conditions (e.g. operation of ice protection systems (engine/airframe as applicable)) and, when manufacturer's data is available, take account of ice accumulation on unprotected surfaces if icing conditions are likely to be encountered during a diversion;

iii. **APU operation -** If an APU has to be used to provide additional electrical power, consideration should be given to the additional fuel required.

(b) **Communication facilities -** The availability of communications facilities in order to allow reliable two-way voice communications between the aeroplane and the appropriate air traffic control unit at one- engine inoperative cruise altitudes.

(c) **Aircraft Technical Log -** review to ensure proper MEL procedures, deferred items, and required maintenance checks completed.

(d) **En-route alternate aerodrome(s) -** Ensuring that en-route alternate aerodromes are available for the intended route, within 180 minutes based upon the one-engine inoperative cruise speed which is a speed within the certificated limits of the aeroplane, selected by the operator and approved by the regulatory Authority, and confirmation that, based on the available meteorological information, the weather conditions at enroute alternate aerodromes are at or above the applicable minima for the period of time during which the aerodrome(s) may be used. (See also CAR OPS- 1.297).

Planning Minima

<table>
<tr><th rowspan="3">Type of Approach</th><th colspan="4">Planning Minima
(RVR visibility required & ceiling if applicable)</th></tr>
<tr><td colspan="4">Aerodrome with</td></tr>
<tr><td>at least 2 separate approach procedures based on 2 separate aids serving 2 separate runways (see IEM OPS 1.295 (c)(1)(ii))</td><td>at least 2 separate approach procedures based on 2 separate aids serving 1 runway</td><td>or</td><td>at least 1 approach procedure based on 1 aid serving 1 runway</td></tr>
<tr><td>Precision Approach Cat II, III (ILS, MLS)</td><td>Precision Approach Cat I Minima</td><td colspan="3">Non-Precision Approach Minima</td></tr>
<tr><td>Precision approach Cat I (ILS, MLS)</td><td>Non-Precision Approach Minima</td><td colspan="3">Circling minima or, if not available, non- precision approach minima plus 200 ft / 1,000 m</td></tr>
<tr><td>Non-Precision Approach</td><td>The lower of non-precision approach minima plus 200 ft /1,000 m or circling minima</td><td colspan="3">The higher of circling minima or non-precision approach minima plus 200 ft / 1,000 m</td></tr>
<tr><td>Circling Approach</td><td colspan="4">Circling minima</td></tr>
</table>

Appendix 1 to AMC OPS-1.245(a)(2) Power supply to essential services

(See CAR OPS-1.241(a)(2))

(1) Any one of the three electrical power sources referred to in sub-paragraph (2)(b) of AMC OPS1.245(a)(2) should be capable of providing power for essential services which should normally include:

- (a) Sufficient instruments for the flight crew providing, as a minimum, attitude, heading, airspeed and altitude information;
- (b) Appropriate pitot heating;
- (c) Adequate navigation capability;
- (d) Adequate radio communication and intercommunication capability;
- (e) Adequate flight deck and instrument lighting and emergency lighting;
- (f) Adequate flight controls;
- (g) Adequate engine controls and restart capability with critical type fuel (from the standpoint of flame-out and restart capability) and with the aeroplane initially at the maximum relight altitude;
- (h) Adequate engine instrumentation;
- (i) Adequate fuel supply system capability including such fuel boost and fuel transfer functions that may be necessary for extended duration single or dual engine operation;
- (j) Such warnings, cautions and indications as are required for continued safe flight and landing;
- (k) Fire protection (engines and APU);
- (l) Adequate ice protection including windshield de-icing; and
- (m) Adequate control of the flight deck and cabin environment including heating and pressurisation.

(2) The equipment (including avionics) necessary for extended diversion times should have the ability to operate acceptably following failures in the cooling system or electrical power systems.

IEM OPS-1.250 Establishment of Minimum Flight Altitudes

(See CAR OPS-1.250)

(1) The following are examples of some of the methods available for calculating minimum flight altitudes.

(2) KSS Formula

(a) Minimum obstacle clearance altitude (MOCA). MOCA is the sum of:

i. The maximum terrain or obstacle elevation whichever is highest; plus

ii. 1,000 ft for elevation up to and including 6,000 ft; or

iii. 2,000 ft for elevation exceeding 6,000 ft rounded up to the next 100 ft. A.The lowest MOCA to be indicated is 2,000 ft.

B. From a VOR station, the corridor width is defined as a borderline starting 5 nm either side of the VOR, diverging 4° from centreline until a width of 20 nm is reached at 70 nm out, thence paralleling the centreline until 140 nm out, thence again diverging 4° until a maximum width of 40 nm is reached at 280 nm out. Thereafter the width remains constant (see figure 1).

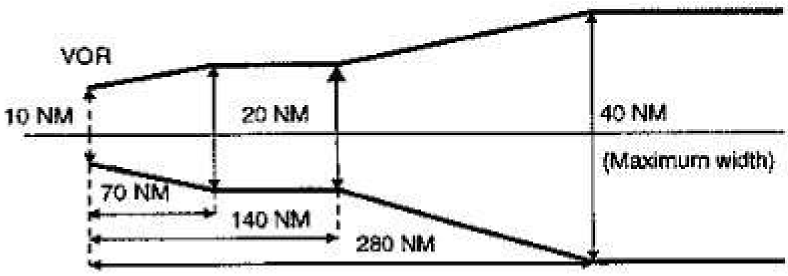


FIGURE 1

C. From an NDB, similarly, the corridor width is defined as a borderline starting 5 nm either side of the NDB diverging 7° until a width of 20 nm is reached 40 nm out, thence paralleling the centreline until 80 nm out, thence again diverging 7° until a maximum width of 60 nm is reached 245 nm out. Thereafter the width remains constant (see figure 2).

D. MOCA does not cover any overlapping of the corridor.

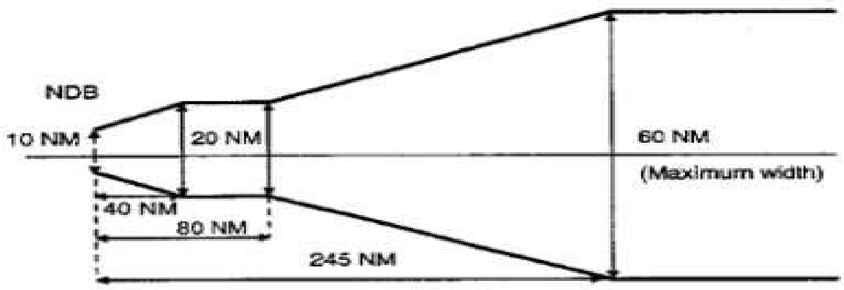


FIGURE 2

(b) Minimum off-route altitude (MORA). MORA is calculated for an area bounded by every or every second LAT/LONG square on the Route Facility Chart (RFC)/Terminal Approach Chart (TAC) and is based on a terrain clearance as follows:

i. Terrain with elevation up to 6,000 ft (2,000 m) – 1,000 ft above the highest terrain and obstructions;

ii. Terrain with elevation above 6,000 ft (2,000 m) – 2,000 ft above the highest terrain and obstructions.

(3) Jeppesen Formula (see figure 3)

(a) MORA is a minimum flight altitude computed by Jeppesen from current ONC or WAC charts. Two types of MORAs are charted which are:

i. Route MORAs e.g. 9800a; and

ii. Grid MORAs e.g. 98.

(b) Route MORA values are computed on the basis of an area extending 10 nm to either side of route centreline and including a 10 nm radius beyond the radio fix/reporting point or mileage break defining the route segment.

(c) MORA values clear all terrain and man-made obstacles by 1,000 ft in areas where the highest terrain elevation or obstacles are up to 5,000 ft. A clearance of 2,000 ft is provided above all terrain or obstacles which are 5,001 ft and above.

(d) A Grid MORA is an altitude computed by Jeppesen and the values are shown within each Grid formed by charted lines of latitude and longitude. Figures are shown in thousands and hundreds of feet (omitting the last two digits so as to avoid chart congestion). Values followed by ± are believed not to exceed the altitudes shown. The same clearance criteria as explained in paragraph 3(c) above apply.

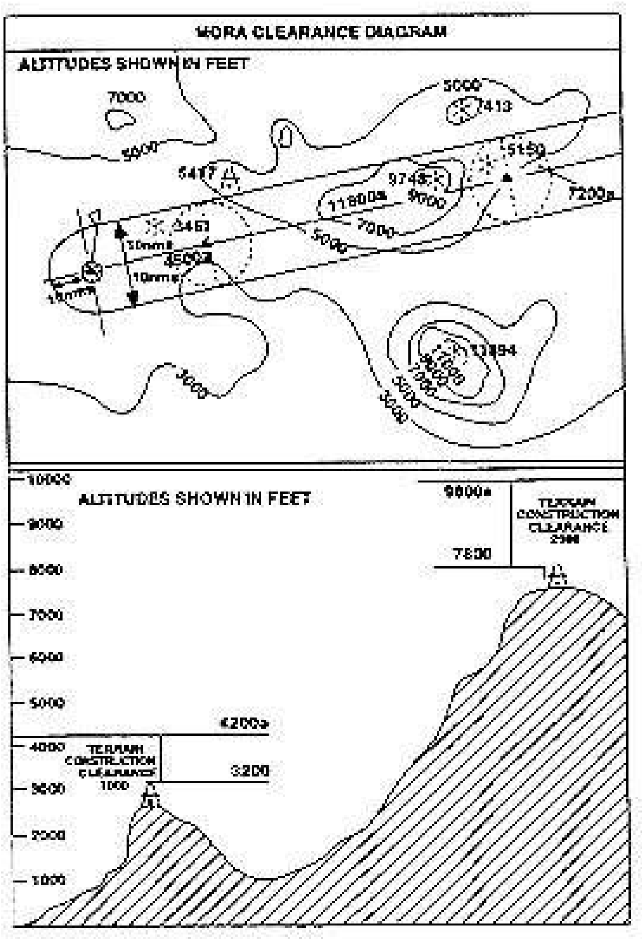


FIGURE 3

(4) ATLAS Formula

(a) Minimum safe En-route Altitude (MEA). Calculation of the MEA is based on the elevation of the highest point along the route segment concerned (extending from navigational aid to navigational aid) within a distance on either side of track as specified below:

i. Segment length up to 100 nm – 10 nm (See Note 1 below).

ii. Segment length more than 100 nm – 10% of the segment length up to a maximum of 60 nm (See Note 2 below).

NOTE 1: This distance may be reduced to 5 nm within TMAs where, due to the number and type of available navigational aids, a high degree of navigational accuracy is warranted.

NOTE 2: In exceptional cases, where this calculation results in an operationally *impracticable value, an additional special MEA may be calculated based on a distance of not less than 10 nm either side of track. Such special MEA will be shown together with an indication of the actual width of protected airspace.*

(b) The MEA is calculated by adding an increment to the elevation specified above as appropriate:

Elevation of highest point	***Increment***
Not above 5,000 ft	1,500 ft
Above 5,000 ft but not above 10,000 ft	2,000 ft
Above 10,000 ft	10% of elevation plus 1,000 ft

NOTE: For the last route segment ending over the initial approach fix, a reduction to 1,000 ft is permissible within TMAs where, due to the number and type of available navigation aids, a high degree of navigational accuracy is warranted.

The resulting value is adjusted to the nearest 100 ft.

(c) Minimum safe Grid Altitude (MGA). Calculation of the MGA is based on the elevation of the highest point within the respective grid area. The MGA is calculated by adding an increment to the elevation specified above as appropriate:

Elevation of highest point	***Increment***
Not above 5, 000 ft	1,500 ft
Above 5,000 ft but not above 10,000 ft	2,000 ft
Above 10,000 ft	10% of elevation plus 1,000 ft

The resulting value is adjusted to the nearest 100 ft.

IEM OPS 1.255(c)(3)(i) Contingency Fuel

(See CAR-OPS 1.255(c)(3)(i))

1. At the planning stage, not all factors which could have an influence on the fuel consumption to the destination aerodrome can be foreseen. Therefore, contingency fuel is carried to compensate for items such as:
   i. Deviations of an individual aeroplane from the expected fuel consumption data;
   ii. Deviations from forecast meteorological conditions; and
   iii. Deviations from planned routings and/or cruising levels/altitudes.

Appendix 1 to CAR OPS-1.255 Fuel Policy

(See CAR OPS-1.255)

An operator must base the company fuel policy, including calculation of the amount of fuel to be on board for departure, on the following planning criteria:

(a) ***Basic Procedure***

The usable fuel to be on board for departure must be the amount of:

(1) Taxi fuel, which shall not be less than the amount, expected to be used prior to takeoff. Local conditions at the departure aerodrome and APU consumption shall be considered.

(2) Trip fuel, which shall include:

i. Fuel for takeoff and climb from aerodrome elevation to initial cruising level/altitude, considering the expected departure routing; and

ii. Fuel from top of climb to top of descent, including any step climb/descent; and

iii. Fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

iv. Fuel for approach and landing at the destination aerodrome.

(3) Contingency fuel, except as provided for in Paragraph (b) 'Reduced Contingency Fuel', which shall be the higher of (3)(i) or (3)(ii) below:
   i. Either:
      A. 5% of the planned trip fuel or, in the event of inflight re-planning, 5% of the trip fuel for the remainder of the flight; or
      B. Not less than 3% of the planned trip fuel or, in the event of inflight replanning, 3% of the trip fuel for the remainder of the flight, provided that an en-route alternate aerodrome is available in accordance with Appendix 2 to CAR OPS-1.255; or
      C. An amount of fuel sufficient for twenty (20) minutes flying time based upon the planned trip fuel consumption provided that the operator has established a fuel consumption monitoring programme for individual aeroplanes and uses valid data determined by means of such a programme for fuel calculation; or
      D. An amount of fuel based on a statistical method approved by the Authority which ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel. This method is used to monitor the fuel consumption on each city pair/aeroplane combination and the operator uses this data for a statistical analysis to calculate contingency fuel for that city pair/aeroplane combination. (See Notes 1 & 2 below).

Note 1: As an example, the following values of statistical coverage of the deviation from the planned to the actual trip fuel have been agreed:

(a) 99% coverage plus 3% of the trip fuel, if the calculated flight time is less than 2 hours, or more than 2 hours and no suitable enroute alternate is available;

(b) 99% coverage if the calculated flight time is more than 2 hours and a suitable en-route alternate is available; (c) 90% coverage if:

i. *the calculated flight time is more than 2 hours; and*

ii. *a suitable en-route alternate is available; and*

iii. *at the destination aerodrome two (2) separate runways are available and useable, one of which is equipped with an ILS/MLS, and the weather conditions are in compliance with CAR-OPS 1.295(c)(1)(ii); or the ILS/MLS is operational to Cat II/III operating minima and the weather conditions are at or above 500ft/2 500m.*

Note 2: The fuel consumption data base used in conjunction with these values is based on fuel consumption monitoring for each route/aeroplane combination over a rolling two-year period.

   ii. An amount to fly for five (5) minutes at holding speed at 1,500 ft (450m), above the destination aerodrome in Standard Conditions.

(4) Alternate fuel which shall:
   i. include:
      A. Fuel for a missed approach from the applicable MDA/DH at the destination aerodrome to missed approach altitude, taking in to account the complete missed approach procedure; and
      B. Fuel for climb from missed approach altitude to cruising level/altitude, considering the expected departure routing; and
      C. Fuel for cruise from top of climb to top of descent, considering the expected routing; and
      D. Fuel for descent from top of descent to the point where the approach is initiated, taking in to account the expected arrival procedure; and
      E. Fuel for executing an approach and landing at the destination alternate aerodrome selected in accordance with CAR OPS-1.295.

ii. where two destination alternate aerodromes are required in accordance with CAR OPS-1.295(d), be sufficient to proceed to the alternate aerodrome which requires the greater amount of alternate fuel.

(5) Final reserve fuel, for each type and variant shall be:

i. For aeroplanes with reciprocating engines, fuel to fly for forty-five (45) minutes; or

ii. For aeroplanes with turbine engines, fuel to fly for thirty (30) minutes at holding speed at 1,500 ft (450m) above aerodrome elevation in standard conditions, calculated with the estimated mass on arrival at the destination alternate aerodrome or the destination aerodrome, when no destination alternate aerodrome is required.

iii. For each type and variant in the above, the figure should be rounded up to an easily recallable figure.

(6) The minimum additional fuel, which shall permit:

i. The aeroplane to descend as necessary and proceed to an adequate alternate aerodrome in the event of engine failure or loss of pressurisation, whichever requires the greater amount of fuel based on the assumption that such a failure occurs at the most critical point along the route, and

A. hold there for fifteen (15) minutes at 1,500 ft (450m) above aerodrome elevation in standard conditions; and

B. make an approach and landing, except that additional fuel is only required, if the minimum amount of fuel calculated in accordance with subparagraphs (a)(2) to (a)(5) above is not sufficient for such an event;

ii. Holding for fifteen (15) minutes at 1,500 ft (450m) above destination aerodrome elevation in standard conditions, when a flight is operated without a destination alternate aerodrome;

(7) Extra fuel, which shall be at the discretion of the commander.

Note 1: Discretionary fuel requested would be due to a known probable event or unforeseen factors (see Note 2) which may cause an imminent arrival at the planned destination without the required fuel reserves.

Note 2: Unforeseen factors are those which could have an influence on the fuel consumption to the destination aerodrome, such as deviations of an individual aeroplane from the expected fuel consumption data, deviations from forecast meteorological conditions, extended delays and deviations from planned routings and/or cruising levels.

(b) Reduced Contingency Fuel (RCF) Procedure:

If an operator's fuel policy includes preflight planning to a Destination 1 aerodrome (commercial destination) with a reduced contingency fuel procedure using a decision point along the route and a Destination 2 aerodrome (optional refuel destination), the amount of usable fuel, on board for departure, shall be the greater of (b)(1) or (b)(2) below:

(1) The sum of:

i. Taxi fuel; and

ii. Trip fuel to the Destination 1 aerodrome, via the decision point; and

iii. Contingency fuel equal to not less than 5% of the estimated fuel consumption from the decision point to the Destination 1 aerodrome; and

iv. Alternate fuel or no alternate fuel if the decision point is at less than six hours from the Destination 1 aerodrome and the requirements of CAR OPS-1.295(c)(1)(ii) are fulfilled; and

v. Final reserve fuel; and

vi. Additional fuel; and

vii. Extra fuel if required by the commander. (See Notes 1 & 2 para (a)(7))

(2) The sum of:

i. Taxi fuel; and

ii. Trip fuel to the Destination 2 aerodrome, via the decision point; and
iii. Contingency fuel equal to not less than the amount calculated in accordance with subparagraph (a)(3) above from departure aerodrome to the Destination 2 aerodrome; and
iv. Alternate fuel, if a Destination 2 alternate aerodrome is required; and
v. Final reserve fuel; and
vi. Additional fuel; and
vii. Extra fuel if required by the commander. (See Notes 1 & 2 para (a)(7))

(c) Predetermined Point (PDP) Procedure

If an operator's fuel policy includes planning to a destination alternate aerodrome where the distance between the destination aerodrome and the destination alternate aerodrome is such that a flight can only be routed via a predetermined point to one of these aerodromes, the amount of usable fuel, on board for departure, shall be the greater of (c)(1) or (c)(2) below:

(1) The sum of:
i. Taxi fuel; and
ii. Trip fuel from the departure aerodrome to the destination aerodrome, via the predetermined point; and
iii. Contingency fuel calculated in accordance with subparagraph (a)(3) above; and
iv. Additional fuel if required, but not less than:
A. For aeroplanes with reciprocating engines, fuel to fly for 45 minutes plus 15% of the flight time planned to be spent at cruising level or two hours, whichever is less; or
B. For aeroplanes with turbine engines, fuel to fly for two hours at normal cruise consumption above the destination aerodrome, this shall not be less than final reserve fuel; and
v. Extra fuel if required by the commander; (See Notes 1 & 2 para (a)(7)) or

(2) The sum of:
i. Taxi fuel; and
ii. Trip fuel from the departure aerodrome to the destination alternate aerodrome, via the predetermined point; and
iii. Contingency fuel calculated in accordance with subparagraph (a)(3) above; and
iv. Additional fuel if required, but not less than:
A. For aeroplanes with reciprocating engines, fuel to fly for forty five (45) minutes; or
B. For aeroplanes with turbine engines, fuel to fly for thirty (30) minutes at holding speed at 1 500 ft (450 m) above the destination alternate aerodrome elevation in standard conditions; this shall not be less than final reserve fuel; and
v. Extra fuel if required by the commander. (See Notes 1 & 2 para (a)(7))

(d) Isolated Aerodrome Procedure

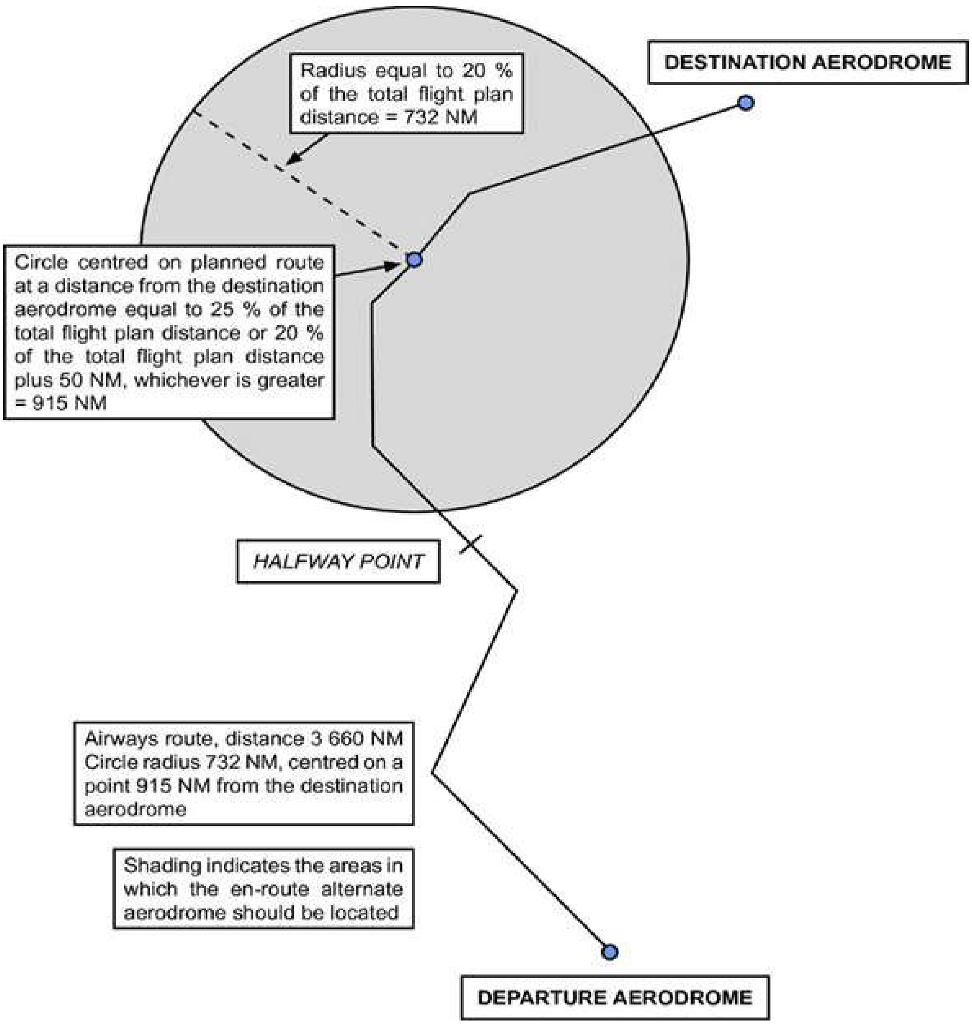
If an operator's fuel policy includes planning to an isolated aerodrome, the last possible point of diversion to any available en-route alternate aerodrome shall be used as the predetermined point. See paragraph (c) above.

Appendix 2 to CAR OPS-1.255 Location of the 3% en-route Alternate (3%ERA) aerodrome for the purpose of reducing contingency fuel to 3%

(See Appendix 1 to CAR OPS-1.255 (a)(3)(i)(B))

The 3% ERA aerodrome shall be located within a circle having a radius equal to 20% of the total flight plan distance, the centre of which lies on the planned route at a distance from the destination aerodrome of 25% of the total flight plan distance, or at least 20% of the total flight plan distance plus 50 nm, whichever is greater, all distances are to be calculated in still air conditions (See Figure 1 above. Location of the 3% en-route Alternate (3% ERA) aerodrome for the purposes of reducing contingency fuel to 3%.).

Figure 1. Location of the 3% En-route Alternate (3% ERA) aerodrome for the purposes of reducing contingency fuel to 3%



IEM OPS-1.260 Carriage of persons with Reduced Mobility

See CAR OPS-1.260

(1) A person with reduced mobility (PRM) is understood to mean a person whose mobility is reduced due to physical incapacity (sensory or locomotory), an intellectual deficiency, age, illness or any other cause of disability when using transport and when the situation needs special attention and the adaptation to a person's need of the service made available to all passengers.

(2) In normal circumstances PRMs should not be seated adjacent to an emergency exit.
(3) In circumstances in which the number of PRMs forms a significant proportion of the total number of passengers carried on board:
   (a) The number of PRMs should not exceed the number of able-bodied persons capable of assisting with an emergency evacuation; and
   (b) The guidance given in paragraph (2) above should be followed to the maximum extent possible.

AMC OPS-1.270 Cargo carriage in the passenger cabin

(See CAR OPS-1.270)

(1) In establishing procedures for the carriage of cargo in the passenger cabin of an aeroplane, an operator should observe the following:
   (a) That dangerous goods are not permitted (See also CAR OPS-1.1310(a));
   (b) That a mix of the passengers and live animals should not be permitted except for pets (weighing not more than 8 kg) and guide dogs;
   (c) That the weight of the cargo does not exceed the structural loading limit(s) of the cabin floor or seat(s);
   (d) That the number/type of restraint devices and their attachment points should be capable of restraining the cargo in accordance with EASA CS-25 or equivalent as accepted by the CAA;
   (e) That the location of the cargo should be such that, in the event of an emergency evacuation, it will not hinder egress nor impair the cabin crew's view.

Appendix 1 to CAR OPS-1.270 Stowage of baggage and cargo

(a) Procedures established by an operator to ensure that hand baggage and cargo is adequately and securely stowed must take account of the following:
   (1) Each item carried in a cabin must be stowed only in a location that is capable of restraining it;
   (2) Mass limitations placarded on or adjacent to stowages must not be exceeded;
   (3) Under seat stowages must not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment;
   (4) Items must not be stowed in toilets or against bulkheads that are incapable of restraining articles against movement forwards, sideways or upwards and unless the bulkheads carry a placard specifying the greatest mass that may be placed there;
   (5) Baggage and cargo placed in lockers must not be of such size that they prevent latched doors from being closed securely;
   (6) Baggage and cargo must not be placed where it can impede access to emergency equipment; and
   (7) Checks must be made before take-off, before landing, and whenever the fasten seat belts signs are illuminated or it is otherwise so ordered to ensure that baggage is stowed where it cannot impede evacuation from the aircraft or cause injury by falling (or other movement) as may be appropriate to the phase of flight.

AC OPS-1.280 Passenger Seating

(See CAR OPS-1.280 & IEM OPS-1.280)

(1) An operator should establish procedures to ensure that:
   (a) The passengers who are allocated seats which permit direct access to emergency exits, shall appear to be reasonably fit, strong and able to assist the rapid evacuation of the aeroplane in an emergency after the appropriate briefing by the crew:
   (b) In all cases, passengers who, because of their condition, may hinder other passengers

during an evacuation or who may impede the crew in carrying out their duties, should not be allocated seats which permit direct access to emergency exits. If the operator is unable to establish procedures which can be implemented at the time of passenger 'check-in', an alternative procedure acceptable to the Authority will be established that allows for correct seat allocation prior to departure.

IEM OPS-1.280 Passenger Seating

(See CAR OPS-1.280)

(1) The following categories of passengers are among those who should not be allocated to, or directed to seats which permit direct access to emergency exits:
   (a) Passengers suffering from obvious physical, mental, or handicapped to the extent that they would have difficulty in moving quickly if asked to do so;
   (b) Passengers who have either impaired vision or impaired hearing to the extent that they might not readily understand printed or verbal instructions given;
   (c) Passengers who may have difficulty in moving quickly due of age, frail or sickness will be allocated a seat where assistance can be organised;
   (d) Obese passengers who would have difficulty in moving quickly or reaching and passing through the adjacent emergency exit;
   (e) Children (whether accompanied or not) and infants;
   (f) Deportees or prisoners in custody; and,
   (g) Passengers with animals.

Note: "Direct access" means a seat from which a passenger can proceed directly to the exit without entering an aisle or passing around an obstruction.

IEM OPS 1.295(c)(1)(ii) Separate runways

(See CAR-OPS 1.295(c)(1)(ii))

(1) Runways on the same aerodrome are considered to be separate runways when:

   i. They are separate landing surfaces which may overlay or cross such that if one of the runways is blocked, it will not prevent the planned type of operations on the other runway; and

   ii. Each of the landing surfaces has a separate approach procedure based on a separate aid.

AMC OPS-1.297 Application of aerodrome forecasts

(See CAR OPS-1.297)

APPLICATION OF AERODROME FORECASTS (TAF & TREND) TO PRE-FLIGHT PLANNING (ICAO Annex 3 refers)

1. APPLICATION OF INITIAL PART OF TAF (For aerodrome planning minima see JAR-OPS 1.297)

Applicable time period : From the start of the TAF validity period up to the time of applicability of the first subsequent 'FM...*' or 'BECMG' or, if no 'FM' or BECMG' is given, up to the end of the validity period of the TAF.

Application of forecast: The prevailing weather conditions forecast in the initial part of the TAF should be fully applied with the exception of the **mean wind** and **gusts (and crosswind)** which should be applied in accordance with the policy in the column ' BECMG AT and FM' in the table below. This may however be overruled temporarily by a 'TEMPO' or 'PROB**' if applicable acc. to the table below.

2. APPLICATION OF FORECAST FOLLOWING CHANGE INDICATORS IN TAF AND TREND

TAF or TREND for AERODROME PLANNED AS:	FM (alone) and BECMG AT: Deterioration and Improvement	BECMG (alone), BECMG FM, BECMG TL, BECMG FM ...* TL, in case of: Deterioration	 Improvement	TEMPO (alone), TEMPO FM, TEMPO TL, TEMPO FM ... TL, PROB30/40 (alone) Deterioration **Transient/Showery Conditions** in connection with short-lived weather phenomena, e.g. thunderstorms, showers	 **Persistent Conditions** in connection with e.g. haze, mist, fog, dust/sandstorm, continuous precipitation	 Improvement **In any case**	PROB TEMPO Deterioration and Improvement
DESTINATION at ETA ±1 HR **TAKE–OFF ALTERNATE** at ETA ± 1 HR **DEST. ALTERNATE** at ETA ± 1 HR **ENROUTE ALTERNATE** at ETA ± 1 HR (See JAR-OPS AMC 1.255)	Applicable from the **start of the change.** **Mean wind:** Should be within required limits; **Gusts:** May be disregarded.	Applicable from the **time of start** of the change. **Mean wind:** Should be within required limits; **Gusts:** May be disregarded.	Applicable from the **time of end** of the change. **Mean wind:** Should be within required limits; **Gusts:** May be disregarded.	Not applicable **Mean wind and gusts** exceeding required limits may be **disregarded.**	Applicable **Mean wind:** Should be within required limits; **Gusts:** May be disregarded	Should be disregarded.	Deterioration may be disregarded; Improvement should be disregarded Including mean wind and gusts.
ETOPS ENRT ALTN at earliest/latest ETA ± 1 HR	Applicable from the **time of start** of change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	Applicable from the **time of start of change;** **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	Applicable from the **time of end** of the change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied;.	**Applicable if below applicable landing minima** **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	**Applicable if below applicable landing minima** **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.		

Note 1: "Required limits" are those contained in the Operations Manual.

Note 2: If promulgated aerodrome forecasts do not comply with the requirements of ICAO Annex 3, operators should ensure that guidance in the application of these reports is provided.

* The space following 'FM' should always include a time group e.g. 'FM1030'.

AC OPS-1.297(c) Planning Minima for Alternate Aerodromes

(See CAR OPS-1.297(c)-Table 1)

‘Non precision minima' in CAR OPS-1.297, Table 1, means the next highest minimum that is available in the prevailing wind and serviceability conditions; “Localiser Only” approaches, if published, are considered to be ‘non precision’ in this context. It is recommended that operators wishing to publish Tables of planning minima choose values that are likely to be appropriate on the majority of occasions (e.g. regardless of wind direction). Unserviceability must, however, be fully taken into account.

AMC OPS-1.300 Submission of ATS Flight plan

(See CAR OPS-1.300)

(1) Flights without ATS flight plan. When unable to submit or to close the ATS flight plan due to lack of ATS facilities or any other means of communications to ATS, an operator should establish procedures, instructions and a list of authorised persons to be responsible for alerting search and rescue services.

(2) To ensure that each flight is located at all times, these instructions should:

- (a) Provide the authorised person with at least the information required to be included in a VFR Flight plan, and the location, date and estimated time for re-establishing communications;
- (b) If an aeroplane is overdue or missing, provide for notification to the appropriate ATS or Search and Rescue facility; and
- (c) Provide that the information will be retained at a designated place until the completion of the flight.

Appendix 1 to CAR-OPS 1.305 Refuelling/Defuelling with passengers embarking, on board or disembarking

(a) An operator must establish operational procedures for re/defuelling with passengers embarking, on board or disembarking to ensure the following precautions are taken:

- (1) One qualified person must remain at a specified location during fuelling operations with passengers on board. This qualified person must be capable of handling emergency procedures concerning fire protection and fire-fighting, handling communications and initiating and directing an evacuation;
- (2) A two-way communication shall be established and shall remain available by the aeroplane’s inter-communication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the aeroplane;
- (3) Crew, staff and passengers must be informed that re/defuelling will take place;
- (4) ‘Fasten Seat Belts’ signs must be off;
- (5) ‘NO SMOKING’ signs **(if available)** must be illuminated, cabin lighting to be switched “ON.”
- (6) Passengers must be instructed to unfasten their seat belts and smoking is not allowed;
- (7) Sufficient qualified personnel must be on board and be prepared for an immediate emergency evacuation;
- (8) If the presence of fuel vapour is detected inside the aeroplane, or any other hazard arises during re/defuelling, fuelling must be stopped immediately;
- (9) The ground area beneath the exits intended for emergency evacuation and slide deployment areas must be kept clear; and
- (10) Provision is made for a safe and rapid evacuation.

IEM OPS-1.305 Refuelling/Defuelling with passengers embarking, on board or disembarking

(See CAR OPS-1.305)

When refuelling/defuelling with passengers on board, ground servicing activities and work inside the aeroplane, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and that the aisles and emergency doors are unobstructed.

IEM OPS-1.307 Refuelling/Defuelling with wide-cut fuel

See CAR OPS 1.307

(1) 'Wide cut fuel' (designated JET B, JP-4 or AVTAG) is an aviation turbine fuel that falls between gasoline and kerosene in the distillation range and consequently, compared to kerosene (JET A or JET A1), it has the properties of higher volatility (vapour pressure), lower flash point and lower freezing point.

(2) Wherever possible, an operator should avoid the use of wide-cut fuel types. If a situation arises such that only wide-cut fuels are available for refuelling/defuelling, operators should be aware that mixtures of wide-cut fuels and kerosene turbine fuels can result in the air/fuel mixture in the tank being in the combustible range at ambient temperatures. The extra precautions set out below are advisable to avoid arcing in the tank due to electrostatic discharge. The risk of this type of arcing can be minimised by the use of a static dissipation additive in the fuel. When this additive is present in the proportions stated in the fuel specification, the normal fuelling precautions set out below are considered adequate.

(3) Wide-cut fuel is considered to be "involved" when it is being supplied or when it is already present in aircraft fuel tanks.

(4) When wide-cut fuel has been used, this should be recorded in the Technical Log. The next two uplifts of fuel should be treated as though they too involved the use of wide-cut fuel.

(5) When refuelling/defuelling with turbine fuels not containing a static dissipator, and where wide-cut fuels are involved, a substantial reduction on fuelling flow rate is advisable. Reduced flow rate, as recommended by fuel suppliers and/or aeroplane manufacturers, has the following benefits:
   - (a) It allows more time for any static charge build-up in the fuelling equipment to dissipate before the fuel enters the tank;
   - (b) It reduces any charge which may build up due to splashing; and
   - (c) Until the fuel inlet point is immersed, it reduces misting in the tank and consequently the extension of the flammable range of the fuel.

(6) The flow rate reduction necessary is dependent upon the fuelling equipment in use and the type of filtration employed on the aeroplane fuelling distribution system. It is difficult, therefore, to quote precise flow rates. Reduction in flow rate is advisable whether pressure fuelling or over-wing fueling is employed.

(7) With over-wing fuelling, splashing should be avoided by making sure that the delivery nozzle extends as far as practicable into the tank. Caution should be exercised to avoid damaging bag tanks with the nozzle.

AC OPS-1.308 Push Back and Towing

(See CAR OPS-1.308)

Tow-bar-less towing should be based on the applicable SAE ARP (Aerospace Recommended Practices), i.e. 4852B/4853B/5283/5284/5285 (as amended).

AC OPS-1.310(a)(3) Controlled rest on flight deck

(See CAR OPS-1.310(a)(3))

Even though crew members should stay alert at all times during flight, unexpected fatigue can occur as a result of sleep disturbance and circadian disruption. To cover for this unexpected fatigue, and to regain a high level of alertness, a controlled rest procedure on the Flight Deck can be used. Moreover, the use of controlled rest has been shown to increase significantly levels of alertness during the later phases of flight, particularly after the top of descent, and is considered a good use of CRM principles. Controlled rest should be used in conjunction with other on-board fatigue management countermeasures such as physical exercise, bright cockpit illumination at appropriate times, balanced eating and drinking, and intellectual activity. The maximum rest time has been chosen to limit deep sleep with consequent long recovery time (sleep inertia).

(1) It is the responsibility of all crew members to be properly rested before flight (see CAR OPS-1.085).

(2) This AC is concerned with controlled rest taken by the minimum certificated flight crew. It is not concerned with resting by members of an augmented crew.

(3) Controlled rest means a period of time 'off task' some of which may include actual sleep.

(4) Controlled rest may be used at the discretion of the commander to manage both sudden unexpected fatigue and fatigue which is expected to become more severe during higher workload periods later in the flight. It cannot be planned before flight.

(5) Controlled rest should only take place during a low workload part of the flight.

(6) Controlled rest periods should be agreed according to individual needs and the accepted principles of CRM; where the involvement of the cabin crew is required, consideration should be given to their workload.

(7) Only one flight crew member at a time should take rest, at his station; the harness should be used and the seat positioned to minimise unintentional interference with the controls.

(8) The commander should ensure that the other flight crew member(s) is (are) adequately briefed to carry out the duties of the resting crew member. One pilot must be fully able to exercise control of the aeroplane at all times. Any system intervention which would normally require a cross check according to multi crew principles should be avoided until the resting crew member resumes his duties.

(9) Controlled rest may be taken according the following conditions:

   (a) The rest period should be no longer than 45 minutes (in order to limit any actual sleep to approximately 30 minutes).

   (b) After this 45-minute period, there should be a recovery period of 20 minutes during which sole control of the aeroplane should not be entrusted to the pilot who has completed his rest.

   (c) In the case of 2-crew operations, means should be established to ensure that the non-resting flight crew member remains alert. This may include:

   - Appropriate alarm systems
   - Onboard systems to monitor crew activity
   - Frequent Cabin Crew checks; In this case, the commander should inform the in-charge cabin crewmember of the intention of the flight crew member to take controlled rest, and of the time of the end of that rest;
   - Frequent contact should be established between the flight deck and the cabin crew by means of the interphone, and cabin crew should check that the resting crew member is again alert at the end of the period. The frequency of the contacts should be specified in the Ops Manual.

(10) A minimum 20-minute period should be allowed between rest periods to overcome the effects of sleep inertia and allow for adequate briefing.

(11) If necessary, a flight crew member may take more than one rest period if time permits on longer sectors, subject to the restrictions above.
(12) Controlled rest periods should terminate at least 30 minutes before top of descent.

IEM OPS-1.310(b) Cabin crew seating positions

(See CAR OPS-1.310(b))

(1) When determining cabin crew seating positions, the operator should ensure that they are:
(a)Close to a floor level exit;
   (b) Provided with a good view of the area(s) of the passenger cabin for which the cabin crew member is responsible; and
   (c) Evenly distributed throughout the cabin, in the above order of priority.
(2) Paragraph (1) above should not be taken as implying that, in the event of there being more such cabin crew stations than required cabin crew, the number of cabin crew members should be increased.

AC OPS-1.345 Ice and other contaminants Procedures

(1) **General**

(a) Any deposit of frost, ice, snow or slush on the external surfaces of an aeroplane may drastically affect its flying qualities because of reduced aerodynamic lift, increased drag, modified stability and control characteristics. Furthermore, freezing deposits may cause moving parts, such as elevators, ailerons, flap actuating mechanism etc., to jam and create a potentially hazardous condition.

Propeller/engine/APU/systems performance may deteriorate due to the presence of frozen contaminants to blades, intakes and components. Also, engine operation may be seriously affected by the ingestion of snow or ice, thereby causing engine stall or compressor damage. In addition, ice/frost may form on certain external surfaces (e.g. wing upper and lower surfaces, etc.) due to the effects of cold fuel/structures, even in ambient temperatures well above 0° C.

(b) The procedures established by the operator for de-icing and/or anti-icing in accordance with CAR OPS-1.345 are intended to ensure that the aeroplane is clear of contamination so that degradation of aerodynamic characteristics or mechanical interference will not occur and, following anti-icing, to maintain the airframe in that condition during the appropriate holdover time. The de-icing and/or anti- icing procedures should therefore include requirements, including type-specific, taking into account manufacturer's recommendations and cover:

i. Contamination checks, including detection of clear ice and under-wing frost.

Note: Limits on the thickness/area of contamination published in the AFM or other manufacturers' documentation should be followed;

ii. De-icing and/or anti-icing procedures including procedures to be followed if deicing and/or anti-icing procedures are interrupted or unsuccessful;
iii. Post treatment checks;
iv. Pre-take-off checks;
v. Pre take-off contamination checks;
vi. The recording of any incidents relating to de-icing and/or anti-icing; and
vii. The responsibilities of all personnel involved in de-icing and/or anti-icing.

(c) Under certain meteorological conditions de-icing and/or anti-icing procedures may be ineffective in providing sufficient protection for continued operations. Examples of these conditions are freezing rain, ice pellets and hail, heavy snow, high wind velocity, fast dropping OAT or any time when freezing precipitation with high water content is present. No Holdover Time Guidelines exist for these conditions.

(d) Material for establishing operational procedures can be found, for example, in:
- ICAO Annex 3, Meteorological Service for International Air Navigation;
- ICAO Doc 9640-AN/940"Manual of aircraft ground de-icing/anti-icing operations";
- ISO 11075 (*) ISO Type I fluid;
- ISO 11076 (*) Aircraft de-icing/anti-icing methods with fluids;
- ISO 11077 (*) Self-propelled de-icing/anti-icing vehicles-functional requirements;
- ISO 11078 (*) ISO Type II fluid;
- EUROCAE ED-104/SAE AS 5116 Minimum operational performance specification for ground ice detection systems;
- SAE ARP 4737 Aircraft de-icing/anti-icing methods;
- SAE AMS 1424 Type I fluids;
- SAE AMS 1428 Type II, III and IV fluids;
- SAE ARP 1971 Aircraft De-icing Vehicle, Self-Propelled, Large and Small Capacity;
- SAE ARD 50102 Forced air or forced air/fluid equipment for removal of frozen contaminants;
- SAE ARP 5149 Training Programme Guidelines for De-icing/Anti-icing of Aircraft on Ground.

(2) **Terminology**

Terms used in the context of this AC have the following meanings. Explanations of other definitions may be found elsewhere in the documents listed in paragraph (1)(d). In particular, meteorological definitions may be found in ICAO Doc. 9640.

(a) ***Anti-icing.*** The procedure that provides protection against the formation of frost or ice and accumulation of snow on treated surfaces of the aeroplane for a limited period of time (holdover time).

(b) ***Anti-icing fluid.*** Anti-icing fluid includes but is not limited to the following:

i. Type I fluid if heated to min 60° C at the nozzle;
ii. Mixture of water and Type I fluid if heated to min 60°C at the nozzle;
iii. Type II fluid;
iv. Mixture of water and Type II fluid;
v. Type III fluid;
vi. Mixture of water and Type III fluid;
vii. Type IV fluid;
viii. Mixture of water and Type IV fluid.

Note: On uncontaminated aeroplane surfaces Type II, III and IV anti-icing fluids are normally applied unheated.

(c) ***Clear ice.*** A coating of ice, generally clear and smooth, but with some air pockets. It forms on exposed objects, the temperature of which are at, below or slightly above the freezing temperature, by the freezing of super-cooled drizzle, droplets or raindrops.

(d) ***Conditions conducive to aeroplane icing on the ground.*** Freezing fog, freezing precipitation, frost, rain or high humidity (on cold soaked wings), mixed rain and snow and snow.

(e) ***Contamination.*** Contamination in this context is understood as all forms of frozen or semi-frozen moisture such as frost, snow, slush, or ice.

(f) ***Contamination check.*** Check of aeroplane for contamination to establish the need for de-icing.

(g) ***De-icing.*** The procedure by which frost, ice, snow or slush is removed from an aeroplane in order to provide non-contaminated surfaces.

(h) ***De-icing fluid.*** Such fluid includes, but is no limited to, the following:

i. Heated water;
ii. Type I fluid;

iii. Mixture of water and Type I fluid;
iv. Type II fluid;
v. Mixture of water and Type II fluid;
vi. Type III fluid;
vii. Mixture of water and Type III fluid;
viii. Type IV fluid;
ix. Mixture of water and Type IV fluid.

Note: De-icing fluid is normally applied heated to ensure maximum efficiency.

(i) ***De-icing/anti-icing***. This is the combination of de-icing and anti-icing performed in either one or two steps.

(j) ***Ground Ice Detection System (GIDS).*** System used during aeroplane ground operations to inform the ground crew and/or the flight crew about the presence of frost, ice, snow or slush on the aeroplane surfaces.

(k) ***Holdover time (HOT).*** The estimated period of time for which an anti-icing fluid is expected to prevent the formation of frost or ice and the accumulation of snow on the treated surfaces of an aeroplane on the ground in the prevailing ambient conditions.

(l) ***Lowest Operational Use Temperature (LOUT).*** The lowest temperature at which a fluid has been tested and certified as acceptable in accordance with the appropriate aerodynamic acceptance test whilst still maintaining a freezing point buffer of not less than:
i. 10° C for a Type I de-icing/anti-icing fluid,
ii. 7° C for Type II, III or IV de-/anti-icing fluids.

(m) ***Post treatment check.*** An external check of the aeroplane after de-icing and/or anti- icing treatment accomplished from suitably elevated observation points (e.g. from the deicing equipment itself or other elevated equipment) to ensure that the aeroplane is free from any frost, ice, snow, or slush.

(n) ***Pre-take-off check.*** An assessment, normally performed from within the flight deck, to validate the applied holdover time.

(o) ***Pre-take-off contamination check.*** A check of the treated surfaces for contamination, performed when the hold-over-time has been exceeded or if any doubt exists regarding the continued effectiveness of the applied anti-icing treatment. It is normally accomplished externally, just before the commencement of the take-off run.

(3) **Fluids**

(a) ***Type I fluid.*** Due to its properties, Type I fluid forms a thin, liquid-wetting film on surfaces to which it is applied which, under certain weather conditions, gives a very limited holdover time. With this type of fluid, increasing the concentration of fluid in the fluid/water mix does not provide any extension in holdover time.

(b) ***Type II and Type IV fluids contain thickener which enable the fluid to form a thicker liquid-wetting film on surfaces to which it is applied.*** Generally, this fluid provides a longer holdover time than Type I fluids in similar conditions. With this type of fluid, the holdover time can be extended by increasing the ratio of fluid in the fluid/water mix.

(c) ***Type III fluid:*** a thickened fluid intended especially for use on aeroplanes with low rotation speeds.

(d) ***Fluids used for de-icing and/or anti-icing should be acceptable to the operator and the aeroplane manufacturer.*** These fluids normally conform to specifications such as SAE AMS 1424, 1428 or equivalent. Use of non-conforming fluids is not recommended due to their characteristics not being known.

Note: The anti-icing and aerodynamic properties of thickened fluids may be seriously degraded by, for example, inappropriate storage, treatment, application, application equipment and age.

(4) **Communications**

(a) Before aeroplane treatment.

When the aeroplane is to be treated with the flight crew on board, the flight and ground crews should confirm the fluid to be used, the extent of treatment required, and any aeroplane type specific procedure(s) to be used. Any other information needed to apply the HOT tables should be exchanged.

(b) Anti-icing code

i. The operator’s procedures should include an anti-icing code, which indicates the treatment the aeroplane has received. This code provides the flight crew with the minimum details necessary to estimate a holdover time (see para 5 below) and confirms that the aeroplane is free of contamination.

ii. The procedures for releasing the aeroplane after the treatment should therefore provide the Commander with the anti-icing code.

(c) Anti-icing Codes to be used (examples):

i. ”Type I“ at (start time) – To be used if anti-icing treatment has been performed with a Type I fluid;

ii. ”Type II/100“ at (start time) – To be used if anti-icing treatment has been performed with undiluted Type II fluid;

iii. ”Type II/75“ at (start time) – To be used if anti-icing treatment has been performed with a mixture of 75% Type II fluid and 25% water;

iv. ”Type IV/50“ at (start time) – To be used if anti-icing treatment has been performed with a mixture of 50% Type IV fluid and 50% water.

Note 1: When a two-step de-icing/anti-icing operation has been carried out, the Anti-Icing Code is determined by the second step fluid. Fluid brand names may be included, if desired.

(d) After Treatment

Before reconfiguring or moving the aeroplane, the flight crew should receive a confirmation from the ground crew that all de-icing and/or anti-icing operations are complete and that all personnel and equipment are clear of the aeroplane.

(5) **Holdover protection**

(a) Holdover protection is achieved by a layer of anti-icing fluid remaining on and protecting aeroplane surfaces for a period of time. With a one-step de-icing/anti-icing procedure, the holdover time (HOT) begins at the commencement of de-icing/anti- icing. With a two step procedure, the holdover time begins at the commencement of the second (anti-icing) step. The holdover protection runs out:

i. At the commencement of take-off roll (due to aerodynamic shedding of fluid); or

ii. When frozen deposits start to form or accumulate on treated aeroplane surfaces, thereby indicating the loss of effectiveness of the fluid.

(b) The duration of holdover protection may vary subject to the influence of factors other than those specified in the holdover time (HOT) tables. Guidance should be provided by the operator to take account of such factors which may include:

i. Atmospheric conditions, e.g. exact type and rate of precipitation, wind direction and velocity, relative humidity and solar radiation; and

ii. The aeroplane and its surroundings, such as aeroplane component inclination angle, contour and surface roughness, surface temperature, operation in close proximity to other aeroplanes (jet or propeller blast) and ground equipment and structures.

(c) Holdover times are not meant to imply that flight is safe in the prevailing conditions if the specified holdover time has not been exceeded. Certain meteorological conditions, such as freezing drizzle or freezing rain, may be beyond the certification envelope of the aeroplane.

(d) The operator should publish in the Operations Manual the holdover times in the form of a table or diagram to account for the various types of ground icing conditions and the different types and concentrations of fluids used. However, the times of protection shown in these tables are to be used as guidelines only and are normally used in conjunction with pre-take-off check.

(e) References to usable HOT tables should be used for de-/anti-icing aircraft on ground'.

(6) **Procedures to be used**. Operator's procedures should ensure that:

(a) When aeroplane surfaces are contaminated by ice, frost, slush or snow, they are de- iced prior to take-off; according to the prevailing conditions. Removal of contaminants may be performed with mechanical tools, fluids (including hot water), infra-red heat or forced air, taking account of aeroplane type specific requirements.

(b) Account is taken of the wing skin temperature versus OAT, as this may affect:

i. The need to carry out aeroplane de-icing and/or anti-icing; and

ii. The performance of the de-icing/anti-icing fluids.

(c) When freezing precipitation occurs or there is a risk of freezing precipitation occurring, which would contaminate the surfaces at the time of take-off, aeroplane surfaces should be anti-iced. If both de-icing and anti-icing are required, the procedure may be performed in a one or two-step process depending upon weather conditions, available equipment, available fluids and the desired holdover time. One-step deicing/ anti-icing means that deicing and anti-icing are carried out at the same time using a mixture of deicing/ anti-icing fluid and water. Two-step de-icing/anti-icing means that de-icing and anti-icing are carried out in two separate steps. The aeroplane is first de-iced using heated water only or a heated mixture of deicing/anti-icing fluid and water. After completion of the de-icing operation a layer of a mixture of deicing/anti-icing fluid and water, or of de-icing/anti-icing fluid only, is to be sprayed over the aeroplane surfaces. The second step will be applied, before the first step fluid freezes, typically within three minutes and, if necessary, area by area.

(d) When an aeroplane is anti-iced and a longer holdover time is needed/desired, the use of a less diluted Type II or Type IV fluid should be considered.

(e) All restrictions relative to Outside Air Temperature (OAT) and fluid application (including, but not necessarily limited to temperature and pressure), published by the fluid manufacturer and/or aeroplane manufacturer, are followed. Procedures, limitations and recommendations to prevent formation of fluid residues are followed.

(f) During conditions conducive to aeroplane icing on the ground or after de-icing and/or anti-icing, an aeroplane is not dispatched for departure unless it has been given a contamination check or a post treatment check by a trained and qualified person. This check should cover all treated surfaces of the aeroplane and be performed from points offering sufficient accessibility to these parts. To ensure that there is no clear ice on suspect areas, it may be necessary to make a physical check (e.g. tactile).

(g) The required entry is made in the Technical Log. (See CAR OPS-1.1055).

(h) The Commander continually monitors the environmental situation after the performed treatment. Prior to take-off he performs a pre-take-off check, which is an assessment whether the applied HOT is still appropriate. This pre-take-off check includes, but is not limited to, factors such as precipitation, wind and OAT.

(i) If any doubt exists as to whether a deposit may adversely affect the aeroplane's performance and/or controllability characteristics, the Commander should require a pre-take-off contamination check to be performed in order to verify that the aeroplane's surfaces are free of contamination. Special methods and/or equipment may be necessary to perform this check, especially at night time or in extremely adverse weather conditions. If this check cannot be performed just prior take-off, re-treatment should be applied.

(j) When re-treatment is necessary, any residue of the previous treatment should be removed and a completely new de-icing/anti-icing treatment applied.

(k) When a Ground Ice Detection System (GIDS) is used to perform an aeroplane surfaces check prior to and/or after a treatment, the use of GIDS by suitably trained personnel should be a part of the procedure.

(7) **Special operational considerations**

(a) When using thickened de-icing/anti-icing fluids, the operator should consider a two- step deicing/anti- icing procedure, the first step preferably with hot water and/or non-thickened fluids.

(b) The use of de-icing/anti-icing fluids has to be in accordance with the aeroplane manufacturer's documentation. This is particular true for thickened fluids to assure sufficient flow-off during take-off.

(c) The operator should comply with any type-specific operational requirement(s) such as an aeroplane mass decrease and/or a take-off speed increase associated with a fluid application.

(d) The operator should take into account any flight handling procedures (stick force, rotation speed and rate, take-off speed, aeroplane attitude etc.) laid down by the aeroplane manufacturer when associated with a fluid application.

(e) The limitations or handling procedures resulting from (c) and/or (d) above should be part of the flight crew pre-take-off briefing.

(8) **Special maintenance considerations**

(a) ***General***

The operator should take proper account of the possible side-effects of fluid use. Such effects may include, but are not necessarily limited to, dried and/or re-hydrated residues, corrosion and the removal of lubricants.

(b) ***Special considerations due to residues of dried fluids***.

The operator should establish procedures to prevent or detect and remove residues of dried fluid. If necessary, the operator should establish appropriate inspection intervals based on the recommendations of the airframe manufacturers and/or own experience:

i. *Dried fluid residues.*

Dried fluid residue could occur when surfaces has been treated but the aircraft has not subsequently been flown and not been subject to precipitation. The fluid may then have dried on the surfaces;

ii. *Re-hydrated fluid residues.*

Repetitive application of thickened de-icing/anti-icing fluids may lead to the subsequent formation/buildup of a dried residue in aerodynamically quiet areas, such as cavities and gaps. This residue may re-hydrate if exposed to high humidity conditions, precipitation, washing, etc., and increase to many times its original size/volume. This residue will freeze if exposed to conditions at or below 0°C. This may cause moving parts such as elevators, ailerons, and flap actuating mechanisms to stiffen or jam in flight. Re-hydrated residues may also form on exterior surfaces, which can reduce lift, increase drag and stall speed. Re-hydrated residues may also collect inside control surface structures and cause clogging of drain holes or imbalances to flight controls. Residues may also collect in hidden areas: around flight control hinges, pulleys, grommets, on cables and in gaps;

iii. Operators are strongly recommended to request information about the fluid dry-out and rehydration characteristics from the fluid manufacturers and to select products with optimised characteristics;

iv. Additional information should be obtained from fluid manufacturers for handling, storage, application and testing of their products.

(9) **Training**

(a) An operator should establish appropriate initial and recurrent de-icing and/or anti-icing training programmes (including communication training) for flight crew and those of his ground crew who are involved in de-icing and/or anti-icing.

(b) These de-icing and/or anti-icing training programmes should include additional training if any of the following will be introduced:

i. A new method, procedure and/or technique;
ii. A new type of fluid and/or equipment; and
iii. A new type(s) of aeroplane.

(10) **Subcontracting (see AMC OPS-1.035 paragraphs (4) and (5))**

The operator should ensure that the subcontractor complies with the operator's quality and training/qualification requirements together with the special requirements in respect of:

(a) De-icing and/or anti-icing methods and procedures
(b) Fluids to be used, including precautions for storage and preparation for use;
(c) Specific aeroplane requirements (e.g. no-spray areas, propeller/engine de-icing, APU operation etc.);
(d) Checking and communications procedures.

AC OPS-1.346 Flight in expected or actual icing conditions

(See CAR OPS-1.346)

(1) The procedures to be established by an operator should take account of the design, the equipment or the configuration of the aeroplane and also of the training which is needed. For these reasons, different aeroplane types operated by the same company may require the development of different procedures. In every case, the relevant limitations are those which are defined in the Aeroplane Flight Manual (AFM) and other documents produced by the manufacturer.

(2) For the required entries in the Operations Manual, the procedural principles which apply to flight in icing conditions are referred to under Appendix 1 to CAR OPS-1.1045, Part A, paragraph 8.3.8 and should be cross- referenced, where necessary, to supplementary, typespecific data under Part B, paragraph 4.1.1.

(3) ***Technical content of the Procedures.***The operator should ensure that the procedures take account of the following:

(a) CAR OPS-1.675;
(b) The equipment and instruments which must be serviceable for flight in icing conditions;
(c) The limitations on flight in icing conditions for each phase of flight. These limitations may be imposed by the aeroplane's de-icing or anti-icing equipment or the necessary performance corrections which have to be made;
(d) The criteria the Flight Crew should use to assess the effect of icing on the performance and/or controllability of the aeroplane;
(e) The means by which the Flight Crew detects, by visual cues or the use of the aeroplane's ice detection system, that the flight is entering icing conditions; and
(f) The action to be taken by the Flight Crew in a deteriorating situation (which may develop rapidly) resulting in an adverse effect on the performance and/or controllability of the aeroplane, due to either:

i. the failure of the aeroplane's anti-icing or de-icing equipment to control a buildup of ice, and/or
ii. ice build-up on unprotected areas.

(4) ***Training for dispatch and flight in expected or actual icing conditions.*** The content of the Operations Manual, Part D, should reflect the training, both conversion and recurrent, which Flight Crew, Cabin Crew and all other relevant operational personnel will require in order to comply with the procedures for dispatch and flight in icing conditions.

(a) For the Flight Crew, the training should include:
   i. Instruction in how to recognise, from weather reports or forecasts which are available before flight commences or during flight, the risks of encountering icing conditions along the planned route and on how to modify, as necessary, the departure and in-flight routes or profiles;
   ii. Instruction in the operational and performance limitations or margins;
   iii. The use of in-flight ice detection, anti-icing and de-icing systems in both normal and abnormal operation; and
   iv. Instruction in the differing intensities and forms of ice accretion and the consequent action which should be taken.

(b) For the Cabin Crew, the training should include;
   i. Awareness of the conditions likely to produce surface contamination; and
   ii. The need to inform the Flight Crew of significant ice accretion.

AC OPS-1.390(a)(1) Assessment of Cosmic Radiation

(See CAR OPS-1.390(a)(1))

(1) In order to show compliance with CAR OPS-1.390(a), an operator should assess the likely exposure for crew members so that he can determine whether or not action to comply with CAR OPS-1.390 paragraphs (a)(2), (3), (4) and (5) will be necessary.

(a) Assessment of exposure level can be made by the method described below, or other method acceptable to the Authority:

Table 1 – Hours of exposure for effective dose of 1 millisievert (mSv)

Altitude (feet)	Kilometre equivalent	Hours at latitude 60N	Hours at equator
27 000	8·23	630	1330
30 000	9·14	440	980
33 000	10·06	320	750
36 000	10·97	250	600
39 000	11·89	200	490
42 000	12·80	160	420
45 000	13·72	140	380
48 000	14·63	120	350

Note: This table, published for illustration purposes, is based on the JARI-3 computer program; and may be superseded by updated versions, as approved by the Authority.

The uncertainty on these estimates is about ± 20%. A conservative conversion factor of 0.8 has been used to convert ambient dose equivalent to effective dose.

(b) Doses from cosmic radiation vary greatly with altitude and also with latitude and with the phase of the solar cycle. Table 1 gives an estimate of the number of flying hours at various altitudes in which a dose of 1 mSv would be accumulated for flights at 60° N and at the equator. Cosmic radiation dose rates change reasonably slowly with time at altitudes used by conventional jet aircraft (i.e. up to about 15 km / 49 000 ft).

(c) Table 1 can be used to identify circumstances in which it is unlikely that an annual dosage level of 1 mSv would be exceeded. If flights are limited to heights of less than 8 km (27 000 ft), it is unlikely that annual doses will exceed 1 mSv. No further controls are necessary for crew members whose annual dose can be shown to be less than 1 mSv.

AC OPS-1.390(a)(2) Working Schedules and Record Keeping

(See CAR OPS 1.390(a)(2))

Where in-flight exposure of crew members to cosmic radiation is likely to exceed 1 mSv per year the operator should arrange working schedules, where practicable, to keep exposure below 6 mSv per year. For the purpose of this regulation crew members who are likely to be exposed to more than 6 mSv per year are considered highly exposed and individual records of exposure to cosmic radiation should be kept for each crew member concerned.

AC OPS-1.390(a)(3) Explanatory Information

(See CAR OPS-1.390(a)(3))

Operators should explain the risks of occupational exposure to cosmic radiation to their crew members. Female crew members should know of the need to control doses during pregnancy, and the operator consequently notified so that the necessary dose control measures can be introduced.

AC OPS-1.398 Use of Airborne Collision Avoidance System (ACAS)

(See CAR OPS-1.398)

(1) The ACAS operational procedures and training programmes established by the operator should take into account AMC-29 (EASA) "Operators on Training Programmes for the Use of ACAS". This AMC incorporates advice contained in:

(a) ICAO Annex 10 Volume 4;

(b) ICAO Doc 8168 PANS OPS Volume 1;

(c) ICAO Doc 4444 PANS RAC Part X paragraph 3.1.2; and

(d) ICAO guidance material “ACAS Performance - Based Training Objectives” (published under Attachment E to State letter AN 7/1.3.7.2-97/77.)

IEM OPS-1.400 Approach and Landing Conditions

(See CAR OPS-1.400)

The in-flight determination of the landing distance should be based on the latest available report, preferably not more than 30 minutes before the expected landing time.

AMC OPS-1.420(d)(7) Notification of Communicable Disease Onboard Aircraft

(See CAR OPS-1.420(d)(7))

When the commander becomes aware of a suspected communicable disease case(s) onboard the aircraft, they shall transmit the following information via air traffic control to the destination for action by the responsible health officials:

(a) Aircraft identification;
(b) Departure aerodrome;
(c) Destination aerodrome;
(d) Estimated time of arrival;
(e) Number of persons on board;
(f) Number of suspected case(s) on board; and (g) Nature of the public health risk, if known?

AC OPS-1.425 Deficiencies reported by an Inspecting Authority

(See CAR-OPS-1.425 Deficiencies reported by an Inspecting Authority)

For deficiencies raised by all member states to the EASA SAFA programme, the corrective/ preventive action plan should be uploaded onto the EASA centralised database by the operator.

Access rights to the database, can be obtained through:
https://safa.easa.europa.eu/user/selfregister (This is limited to two user names per operator).

IEM OPS-1.425 Inspecting Authority

(See CAR-OPS-1.425 - Deficiencies reported by an Inspecting Authority)

Inspecting Authority is the National Aviation Authority which performs inspections on aircraft under the operational control of the Oman registered aircraft while abroad.

For any unresolved/pending issues with the inspecting Authority, the Authority national coordinator shall be contacted.

SUBPART E – ALL WEATHER OPERATIONS

CAR OPS-1.430 Aerodrome Operating Minima – General

(See CAR OPS-1.225, AMC OPS-1.430(b)(4), AMC OPS-1.430(d), GM OPS-1.430 & Appendix 1 to CAR OPS-1.430)

(a) **Aerodrome operating minima:**
   (1) An operator shall establish, for each aerodrome planned to be used, aerodrome operating minima that are not lower than the values given in Appendix 1. The method of determination of such minima must be acceptable to the Authority and be specified in the operations manual. Such minima shall not be lower than any that may be established for such aerodromes by the State in which the aerodrome is located, except when specifically approved by that State.
   (2) The use of HUD, HUDLS or EVS may allow operations with lower visibilities than normally associated with the aerodrome operating minima. States which promulgate aerodrome operating minima may also promulgate regulations for reduced visibility minima associated with the use of HUD or EVS.
   (3) Notwithstanding paragraph (a)(2) above, in-flight calculation of minima for use at unplanned alternate aerodromes and/or for approaches utilising EVS shall be carried out in accordance with a method acceptable to the Authority

(b) In establishing the aerodrome operating minima which will apply to any particular operation, an operator must take full account of:
   (1) the type, performance and handling characteristics of the aeroplane;
   (2) the composition of the flight crew, their competence and experience;
   (3) the dimensions and characteristics of the runways which may be selected for use;
   (4) the adequacy and performance of the available visual and non-visual ground aids (See AMC to CAR OPS-1.430(b)(4) Landing Minima for failed equipment);
   (5) the equipment available on the aeroplane for the purpose of navigation and/or control of the flight path, as appropriate, during the take-off, the approach, the flare, the landing, roll-out and the missed approach;
   (6) the obstacles in the approach, missed approach and the obstacle clearance altitude/height for the instrument approach procedures required for the execution of contingency procedures;
   (7) the obstacles in the climb-out areas and necessary clearance margins;
   (8) the means to determine and report meteorological conditions; and
   (9) the flight technique to be used during the final approach.

(c) The aeroplane categories referred to in this Subpart are defined in ICAO Doc 8168 PAN-OPS (d)Stabilised Approaches (SAp) and Continuous Descent Final Approaches (CDFA):
   (1) All approaches shall be flown as stabilised approaches (SAp) unless otherwise approved by the Authority for a particular approach to a particular runway.
   (2) All non-precision approaches shall be flown using the continuous descent final approaches (CDFA) technique unless otherwise approved by the Authority for a particular approach to a particular runway. When calculating the minima in accordance with Appendix 1 to CAR OPS-1.430), the operator shall ensure that the applicable minimum RVR is increased by 200 metres (m) for Cat A/B aeroplanes and by 400 m for Cat C/D aeroplanes for approaches not flown using the CDFA technique, providing that the resulting RVR/CMV value does not exceed 5 000 m.
   (3) Notwithstanding the requirements in (d)(2) above, an Authority may exempt an operator from the requirement to increase the RVR when not applying the CDFA technique.

(4) Exemptions as described in paragraph (d)(3) must be limited to locations where there is a clear public interest to maintain current operations. The exemptions must be based on the operator's experience, training programme and flight crew qualification. The exemptions must be reviewed at regular intervals and must be terminated as soon as facilities are improved to allow application of the CDFA technique. (See AMC OPS1.430(d)).

(e) **Exemptions:**

(1) An operator must ensure that Appendix 1 to CAR OPS-1.430 is applied.

(2) Notwithstanding the requirements of (e)(1) above, the Authority may exempt an operator from the requirement to increase the RVR above 1500 m (Cat A/B aeroplanes) or above 2400 m (Cat C/D aeroplanes), when approving an operation to a particular runway where it is not practicable to fly an approach using the CDFA technique or where the criteria in paragraph (c) of Appendix 1 to CAR OPS-1.430 cannot be met.

(3) Exemptions as described in paragraph (e)(2) must be limited to locations where there is a clear public interest to maintain current operations. The exemptions must be based on the operator's experience, training programme and flight crew qualification. The exemptions must be reviewed at regular intervals and must be terminated as soon as facilities are improved to allow application of the CDFA technique (See AMC OPS1.430(d)).

CAR OPS-1.435 Terminology

(a) Terms used in this Subpart and not defined in CAR–1 have the following meaning:

(1) ***Circling.*** The visual phase of an instrument approach to bring an aircraft into position for landing on a runway which is not suitably located for a straight-in approach.

(2) ***Low Visibility Procedures (LVP)***. Procedures applied at an aerodrome for the purpose of ensuring safe operations during: Lower than Standard Category I, Other than Standard Category II, Category II and III approaches and Low Visibility Take- offs.

(3) ***Low visibility operations (LVO).*** Approach operations in RVR's less that 550m and/or with a decision (DH) less than 60m (200ft) or take-off operations in RVR's less than 400m.

(4) ***Low Visibility Take-Off (LVTO).*** A take-off where the Runway Visual Range (RVR) is less than 400 m.

(5) ***Flight control system.*** A system which includes an automatic landing system and/or a hybrid landing system.

(6) ***Fail-Passive flight control system.*** A flight control system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude but the landing is not completed automatically. For a fail-passive automatic flight control system the pilot assumes control of the aeroplane after a failure.

(7) ***Fail-Operational flight control system*****.** A flight control system is fail-operational if, in the event of a failure below alert height, the approach, flare and landing, can be completed automatically. In the event of a failure, the automatic landing system will operate as a fail-passive system.

(8) ***Fail-operational hybrid landing system*****.** A system which consists of a primary failpassive automatic landing system and a secondary independent guidance system enabling the pilot to complete a landing manually after failure of the primary system.

(9) ***Visual approach*****.** An approach when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to the terrain.

(10) ***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.

(11) ***Stabilised Approach (SAp).*** An approach which is flown in a controlled and appropriate manner in terms of configuration, energy and control of the flight path from a predetermined point or altitude/height down to a point 50 feet above the threshold or the point where the flare manoeuvre is initiated if higher.

(12) ***Head-Up Display (HUD).*** A display system which presents flight information into the pilot's forward external field of view and which does not significantly restrict the external view.

(13) ***Head-Up Guidance Landing System (HUDLS).*** The total airborne system which provides head-up guidance to the pilot during the approach and landing and/or goaround. It includes all sensors, computers, power supplies, indications and controls. A HUDLS is typically used for primary approach guidance to decision heights of 50 ft.

(14) ***Hybrid Head-Up Display Landing System (Hybrid HUDLS).*** A system which consists of a primary fail-passive automatic landing system and a secondary independent HUD/HUDLS enabling the pilot to complete a landing manually after failure of the primary system.

Note: Typically, the secondary independent HUD/HUDLS provides guidance which normally takes the form of command information, but it may alternatively be situation (or deviation) information.

(15) ***Enhanced Vision System (EVS).*** An electronic means of displaying a real-time image of the external scene through the use of imaging sensors.

(16) ***Converted Meteorological Visibility (CMV).*** A value (equivalent to an RVR) which is derived from the reported meteorological visibility, as converted in accordance with the requirements in this subpart.

(17) ***Lower than Standard Category I Operation.*** A Category I Instrument Approach and Landing Operation using Category I DH, with an RVR lower than would normally be associated with the applicable DH.

(18) ***Other than Standard Category II Operation.***A Category II Instrument Approach and Landing Operation to a runway where some or all of the elements of the ICAO Annex 14 Precision Approach Category II lighting system are not available.

(19) ***GNSS Landing System (GLS).*** An approach operation using augmented GNSS information to provide guidance to the aircraft based on its lateral and vertical GNSS position. (It uses geometric altitude reference for its final approach slope.

(20) ***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".

CAR OPS-1.440 Low visibility operations – General operating rules

(See Appendix 1 to CAR OPS-1.440)

(a) The Authority shall issue a specific approval for the following:
   (1) Instrument approach operations in low visibility which shall only be conducted when RVR information is provided;
   (2) For low visibility take-off, the minimum take-off RVR;

   Note: In general, visibility for take-off is defined in terms of RVR. An equivalent horizontal visibility may also be used.

   (3) These specific approvals will be included within the operations specifications.
(b) An operator shall not conduct Lower than Standard Category I operations unless approved by the Authority.
(c) An operator shall not conduct Category II, Other than Standard Category II or III operations unless:
   (1) Each aeroplane concerned is certificated for operations with decision heights below 200ft, or no decision height and equipped in accordance with CS–AWO, or an equivalent accepted by the Authority;
   (2) A suitable system for recording approach and/or automatic landing success and failure is established and maintained to monitor the overall safety of the operation;
   (3) The operations are approved by the Authority;
   (4) The flight crew consists of at least two (2) pilots;
   (5) Decision Height is determined by means of a radio altimeter.
   (6) RVR information is provided; and
(d) An operator shall not conduct low visibility take-offs in less than 150 m RVR (Category A, B and C aeroplanes) or 200 m RVR (Category D aeroplanes) unless approved by the Authority.

CAR OPS-1.445 Low visibility operations – Aerodrome considerations

(a) An operator shall not use an aerodrome for Category II or III operations unless the aerodrome is approved for such operations by the State in which the aerodrome is located.
(b) An operator shall verify that Low Visibility Procedures (LVP) have been established, and will be enforced, at those aerodromes where low visibility operations are to be conducted.
(c) An operator shall not conduct instrument approach and landing operations in less than 800 m visibility (aerodrome operating minima) unless RVR information is provided.

CAR OPS-1.450 Low visibility operations – Training and Qualifications

(See Appendix 1 to CAR OPS-1.450)

(a) An operator shall ensure that, prior to conducting Low Visibility Take-Off, Lower than Standard Category I, Other than Standard Category II, Category II and III operations or approaches utilising EVS:
   (1) Each flight crew member:
      i. Completes the training and checking requirements prescribed in Appendix 1 including Flight Simulator training in operating to the limiting values of RVR/CMV and Decision Height appropriate to the operator's Category II/III approval; and

ii. Is qualified in accordance with Appendix 1;

(2) The training and checking is conducted in accordance with a detailed syllabus approved by the Authority and included in the Operations Manual. This training is in addition to that prescribed in Subpart N; and

(3) The flight crew qualification is specific to the operation and the aeroplane type.

CAR OPS-1.455 Low visibility operations – Operating Procedures

(See Appendix 1 to CAR OPS-1.455)

(a) An operator must establish procedures and instructions to be used for Low Visibility Take-Off, approaches utilising EVS, Lower than Standard Category I, Other than Standard Category II, and Category II and III operations. These procedures must be included in the Operations Manual and contain the duties of flight crew members during taxiing, take-off, approach, flare, landing, roll-out and missed approach as appropriate.

(b) The commander shall satisfy himself that:

(1) The status of the visual and non-visual facilities is sufficient prior to commencing a Low Visibility Take-Off, an Approach utilising EVS, a Lower than Standard Category I, and other than Standard Category II, or a Category II or III approach;

(2) Appropriate LVPs are in force according to information received from Air Traffic Services, before commencing a Low Visibility Take-off, a Lower than Standard Category I, and other than Standard Category II, or a Category II or III approach; and

(3) The flight crew members are properly qualified prior to commencing a Low Visibility Take-off in an RVR of less than 150 m (Category A, B and C aeroplanes) or 200 m (Cat D aeroplanes), an Approach utilising EVS, a Lower than Standard Category I, and Other than Standard Category II, or a Category II or III approach.

CAR OPS-1.460 Low visibility operations – Minimum equipment

(a) An operator must include in the Operations Manual the minimum equipment that has to be serviceable at the commencement of a Low Visibility Take-off, a Lower than Standard Category I approach, an Other than Standard Category II approach, an approach utilising EVS, or a Category II or III approach in accordance with the AFM or other approved document.

(b) The commander shall satisfy himself that the status of the aeroplane and of the relevant airborne systems is appropriate for the specific operation to be conducted.

CAR OPS-1.465 VFR Operating minima

(See Appendix 1 to CAR OPS-1.465 and CAR-180.101)

(a) An operator shall ensure that:

(1) VFR flights are conducted in accordance with the Visual Flight Rules and in accordance with the Table in Appendix 1 to CAR OPS-1.465.

(2) Special VFR flights are not commenced when the visibility is less than 3 km and not otherwise conducted when the visibility is less than 1·5 km.

SECTION 2 – SUBPART E – AC/AMC IEM – ALL WEATHER OPERATIONS

GM OPS-1.430 Documents containing information related to All Weather Operations

(See CAR OPS-1.430 Subpart E)

(1) The purpose of this IEM is to provide operators with a list of documents related to AWO.

(a) ICAO Annex 2 / Rules of the Air;
(b) ICAO Annex 6 / Operation of Aircraft, Part I;
(c) ICAO Annex 10 / Telecommunications Vol 1;
(d) ICAO Annex 14 / Aerodromes Vol 1;
(e) ICAO Doc 8186 / PANS - OPS Aircraft Operations;
(f) ICAO Doc 9365 / AWO Manual;
(g) ICAO Doc 9476 / SMGCS Manual (Surface Movement Guidance and Control Systems);
(h) ICAO Doc 9157 / Aerodrome Design Manual;
(i) ICAO Doc 9328 / Manual for RVR Assessment;
(j) ECAC Doc 17, Issue 3 (partly incorporated in CAR OPS-1); and
(k) CS-AWO (EASA - Airworthiness Certification).

AMC OPS-1.430(b)(4) Landing Minima for failed equipment

Effect on Landing Minima of temporarily failed or downgraded Ground Equipment (See CAR-OPS 1.430(b)(4)

1. Introduction

1.1 This AMC provides operators with instructions for flight crews on the effects on landing minima of temporary failures or downgrading of ground equipment.

1.2 Aerodrome facilities are expected to be installed and maintained to the standards prescribed in ICAO Annexes 10 and 14. Any deficiencies are expected to be repaired without unnecessary delay.

2. **General.** These instructions are intended for use both pre-flight and in-flight. It is not expected however that the commander would consult such instructions after passing the outer marker or equivalent position. If failures of ground aids are announced at such a late stage, the approach could be continued at the commander’s discretion. If, however, failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in Tables 1A and 1B below, and the approach may have to be abandoned to allow this to happen.

3. **Operations with no Decision Height (DH)**

3.1 An operator should ensure that, for aeroplanes authorised to conduct no DH operations with the lowest RVR limitations, the following applies in addition to the content of Tables 1A and 1B, below:

(a) RVR. At least one RVR value must be available at the aerodrome;
(b) Runway lights
   i. No runway edge lights, or no centre lights – Day – RVR 200 m; Night – Not allowed;
   ii. No TDZ lights – No restrictions;
   iii. No standby power to runway lights – Day – RVR 200 m; Night – not allowed.

4. **Conditions applicable to Tables 1:**

(a) Multiple failures of runway lights other than indicated in Table 1B are not acceptable.

(b) Deficiencies of approach and runway lights are treated separately.

(c) Category II or III operations. A combination of deficiencies in runway lights and RVR assessment equipment is not allowed.

(d) Failures other than ILS affect RVR only and not DH.

Table 1. Failed or downgraded equipment – Effect on landing minima

<table>
<tr><th rowspan="2">Failed or downgraded equipment</th><th colspan="5">Effect on landing minima</th></tr>
<tr><th>CAT IIIB
(Note 1)</th><th>CAT IIIA</th><th>CAT II</th><th>CAT I</th><th>Non precision</th></tr>
<tr><td>ILS stand-by transmitter</td><td colspan="2">Not allowed</td><td colspan="3">No effect</td></tr>
<tr><td>Outer marker</td><td colspan="4">No effect if replaced by published equivalent position</td><td>Not applicable</td></tr>
<tr><td>Middle marker</td><td colspan="4">No effect</td><td>No effect unless used as MAPT</td></tr>
<tr><td>Touchdown zone RVR assessment system</td><td colspan="3">May be temporarily replaced with midpoint RVR if approved by the State of the aerodrome. RVR may be reported by human observation</td><td colspan="2">No effect</td></tr>
<tr><td>Midpoint or stop- end RVR</td><td colspan="5">No effect</td></tr>
<tr><td>Anemometer for runway in use</td><td colspan="5">No effect if other ground source available</td></tr>
<tr><td>Celiometer</td><td colspan="5">No effect</td></tr>
<tr><td>Approach lights</td><td colspan="2">Not allowed for operations with DH > 50ft</td><td>Not allowed</td><td colspan="2">Minima for nil facilities</td></tr>
<tr><td>Approach light except for the last 210 m</td><td colspan="2">No effect</td><td>Not allowed</td><td colspan="2">Minima for nil facilities</td></tr>
<tr><td>Approach light except for the last 420 m</td><td colspan="3">No effect</td><td colspan="2">Minima as for intermediate facilities</td></tr>
<tr><td>Standby power for approach lights</td><td colspan="2">Not allowed</td><td colspan="2">Not Allowed</td><td>No Effect</td></tr>
<tr><td>Whole runway light system</td><td colspan="3">Not allowed</td><td colspan="2">Day – minima as for nil facilities
Night – not allowed</td></tr>
<tr><td>Edge lights</td><td colspan="5">Day only; Night – not allowed</td></tr>
<tr><td>Centreline lights</td><td colspan="2">Day – RVR 300m
Night – not allowed</td><td>Day – RVR 300m
Night – 550m</td><td colspan="2">No Effect</td></tr>
<tr><td>Centreline lights spacing increased to 30m</td><td>RVR 150 m</td><td colspan="4">Not effect</td></tr>
<tr><td>Touchdown zone lights</td><td colspan="2">Day – RVR 200m
Night – 300 m</td><td>Day – RVR 300m
Night – 550m</td><td colspan="2">No Effect</td></tr>
<tr><td>Standby power for runway lights</td><td colspan="2">Not allowed</td><td>No effect</td><td colspan="2">No effect</td></tr>
<tr><td>Taxiway light system</td><td colspan="5">No effect – except delays due to reduced movement rate</td></tr>
</table>

Note 1: For CAT IIIB with no DH, see also paragraph 3 above.

AMC OPS-1.430(d) Continuous Descent Final Approach (CDFA)

(See CAR OPS-1.430(d))

1. Introduction

1.1. Controlled-Flight-Into-Terrain (CFIT) is a major causal category of accident and hull loss in commercial aviation. Most CFIT accidents occur in the final approach segment of non- precision approaches; the use of stabilised-approach criteria on a continuous descent with a constant, predetermined vertical path is seen as a major improvement in safety during the conduct of such approaches. Operators should ensure that the following techniques are adopted as widely as possible, for all approaches.

1.2. The elimination of level flight segments at Minimum Descent Altitude (MDA) close to the ground during approaches, and the avoidance of major changes in attitude and power / thrust close to the runway which can destabilise approaches, are seen as ways to reduce operational risks significantly.

1.3. For completeness this AMC also includes criteria which should be considered to ensure the stability of an approach (in terms of the aeroplane's energy and approach-path control).

1.3. The term Continuous Descent Final Approach (CDFA) has been selected to cover a technique for any type of non-precision approach

1.4. Non-precision approaches operated other than using a constant pre-determined vertical path or when the facility requirements and associated conditions do not meet the conditions specified in Para 2.4 below RVR penalties apply. However, this should not preclude an operator from applying CDFA technique to such approaches. Those operations should be classified as special letdown procedures, since it has been shown that such operations, flown without additional training, may lead to inappropriately steep descent to the MDA(H), with continued descent below the MDA(H) in an attempt to gain (adequate) visual reference.

1.5. The advantages of CDFA are:

(a) The technique enhances safe approach operations by the utilisation of standard operating practices;

(b) The profile reduces the probability of infringement of obstacle-clearance along the final approach segment and allows the use of MDA as DA;

(c) The technique is similar to that used when flying an ILS approach, including when executing the missed approach and the associated go-around manoeuvre;

(d) The aeroplane attitude may enable better acquisition of visual cues;

(e) The technique may reduce pilot workload;

(f) The Approach profile is fuel efficient;

(g) The Approach profile affords reduced noise levels;

(h) The technique affords procedural integration with APV approach operations;

(i) When used and the approach is flown in a stabilised manner is the safest approach technique for all approach operations.

2. CDFA (Continuous Descent Final Approach)

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

2.2. An approach is only suitable for application of CDFA technique when it is flown along a predetermined vertical slope (See sub- paragraph (a) below) which follows a designated or nominal vertical profile (See sub-paragraphs (a)(i) and (ii) below):

(a) Predetermined Approach Slope: Either the designated or nominal vertical profile of an approach.

(i) Designated Vertical Profile: A continuous vertical approach profile which forms part of the approach procedure design. APV is considered to be an approach with a designated vertical profile.

(ii) Nominal Vertical Profile: A vertical profile not forming part of the approach procedure design, but which can be flown as a continuous descent.

Note: The nominal vertical profile information may be published or displayed (on the approach chart) to the pilot by depicting the nominal slope or range / distance vs height.

(b) Approaches with a nominal vertical profile are considered to be:

(i) NDB, NDB/DME;

(ii) VOR, VOR/DME;

(iii) LLZ, LLZ/DME;

(iv) VDF, SRA or

(v) GNSS/LNAV.

2.3. Stabilised Approach (SAp): An approach which is flown in a controlled and appropriate manner in terms of configuration, energy and control of the flight path from a pre-determined point or altitude/height down to a point 50 feet above the threshold or the point where the flare manoeuvre is initiated if higher.

(a) The control of the descent path is not the only consideration when using the CDFA technique. Control of the aeroplane's configuration and energy is also vital to the safe conduct of an approach.

(b) The control of the flight path, described above as one of the requirements for conducting an SAp, should not be confused with the path requirements for using the CDFA technique. The predetermined path requirements for conducting SAp are established by the operator and published in the Operations Manual (OM) Part B; guidance for conducting SAp operations is given in paragraph 5 below.

(c) The predetermined approach slope requirements for applying the CDFA technique are established by:

(i) The instrument-procedure design when the approach has a designated vertical profile;

(ii) The published 'nominal' slope information when the approach has a nominal vertical profile;

(iii) The designated final-approach segment minimum of 3nm, and maximum, when using timing techniques, of 8nm.

(d) A Stabilised Approach will never have any level segment of flight at DA(H) (or MDA(H) as applicable). This enhances safety by mandating a prompt go-around manoeuvre at DA(H) (or MDA(H))

(e) An approach using the CDFA technique will always be flown as an SAp, since this is a requirement for applying CDFA; however, an SAp does not have to be flown using the CDFA technique, for example a visual approach.

2.4. Approach with a designated vertical profile using the CDFA technique:

(a) The optimum angle for the approach slope is 3 degrees, and the gradient should preferably not exceed 6.5 percent which equates to a slope of 3.77 degrees, (400 ft/NM) for procedures intended for conventional aeroplane types/classes and/or operations. In any case, conventional approach slopes should be limited to 4.5 degrees for Category A and B aeroplanes and 3.77 degrees for Category C and D aeroplanes, which are the upper limits for applying the CDFA technique. A 4.5-degree approach slope is the upper limit for certification of conventional aeroplanes

(b) The approach is to be flown utilising operational flight techniques and onboard navigation system(s) and navigation aids to ensure it can be flown on the desired vertical path and track in a stabilised manner, without significant vertical path changes during the finalsegment descent to the runway. APV is included.

(c) The approach is flown to a DA(H).

(d) No MAPt is published for these procedures.

2.5. Approach with a nominal vertical profile using the CDFA technique:

(a) The optimum angle for the approach slope is 3 degrees, and the gradient should preferably not exceed 6.5 percent which equates to a slope of 3.77 degrees, (400 ft/NM) for procedures intended for conventional aeroplane types / class and / or operations. In any case, conventional approaches should be limited to 4.5 degrees for Category A and B aeroplanes and 3.77 degrees for Category C and D aeroplanes, which are the upper limits for applying CDFA technique. A 4.5-degree approach slope is the upper limit for certification of conventional aeroplanes.

(b) The approach should meet at least the following facility requirements and associated conditions. NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA, GNSS(LNAV) with a procedure which fulfils the following criteria:

(i) The final approach track off-set is 5-degrees except for Category A and B aeroplanes, where the approach-track off-set is 15-degrees; and

(ii) A Final Approach Fix (FAF), or another appropriate fix where descent is initiated is available; and

(iii) The distance from the FAF to the THR is less than or equal to 8 NM in the case of timing; or

(iv) The distance to the threshold (THR) is available by FMS/RNAV or DME; or

(v) The minimum final-segment of the designated constant angle approach path should not be less than 3 NM from the THR unless approved by the Authority.

(c) CDFA may also be applied utilising the following:

(i) GNSS/LNAV with altitude/height cross checks against positions or distances from the THR; or

(ii) Height crosscheck compared with DME distance values.

(d) The approach is flown to a DA(H).

(e) The approach is flown as a SAp.

Note: Generally, a MAPt is published for these procedures.

3. Operational Procedures

3.1. A MAPt should be specified to apply CDFA with a nominal vertical profile as for any non-precision approach.

3.2. The flight techniques associated with CDFA employ the use of a predetermined approach slope. The approach, in addition, is flown in a stabilised manner, in terms of configuration, energy and control of the flight path. The approach should be flown to a DA(H) at which the decision to land or go-around is made immediately. This approach technique should be used when conducting:

3.2.1. All non-precision approaches (NPA) meeting the specified CDFA criteria in para 2.4; and

3.2.2. All approaches categorised as APV.

3.3. The flight techniques and operational procedures prescribed above should always be applied; in particular, with regard to control of the descent path and the stability of the aeroplane on the approach prior to reaching MDA(H). Level flight at MDA(H) should be avoided as far as practicable. In addition, appropriate procedures and training should be established and implemented to facilitate the applicable elements of paragraphs (4), (5) and (8). Particular emphasis should be placed on subparagraphs 4.8, 5.1 to 5.7 and 8.4.

3.4. In cases where the CDFA technique is not used with high MDA(H), it may be appropriate to make an early descent to MDA(H) with appropriate safeguards to include the above training requirements, as applicable, and the application of a significantly higher RVR/Visibility.

3.5. For Circling Approaches (Visual Manoeuvring), all the applicable criteria with respect to the stability of the final descent path to the runway should apply. In particular, the control of the desired final nominal descent path to the threshold should be conducted to facilitate the techniques described in paragraphs (4) and (5) of this ACJ.

3.5.1. Stabilisation during the final straight-in segment for a circling approach should ideally be accomplished by 1000 ft above aerodrome elevation for turbo-jet aeroplanes.

3.5.2. For a circling approach where the landing runway threshold and appropriate visual landing aids may be visually acquired from a point on the designated or published procedure (prescribed tracks), stabilisation should be achieved not later than 500 ft above aerodrome elevation. It is however recommended that the aeroplane be stabilised when passing 1000 ft above aerodrome elevation.

3.5.3. When a low-level final turning manoeuvre is required in order to align the aeroplane visually with the landing runway, a height of 300 ft above the runway threshold elevation, or aerodrome elevation as appropriate, should be considered as the lowest height for approach stabilisation with wings level.

3.5.4. Dependent upon aeroplane type/class the operator may specify an appropriately higher minimum stabilisation height for circling approach operations.

3.5.5. The operator should specify in the OM the procedures and instructions for conducting circling approaches to include at least:

(a) The minimum required visual reference; and

(b) The corresponding actions for each segment of the circling manoeuvre; and

(c) The relevant go-around actions if the required visual reference is lost.

(d) The visual reference requirements for any operations with a prescribed track circling manoeuvre to include the MDA(H) and any published MAPt.

3.6. Visual Approach. All the applicable criteria with respect to the stability of the final descent path to the runway should apply to the operation of visual approaches. In particular, the control of the desired final nominal descent path to the threshold should be conducted to facilitate the appropriate techniques and procedures described in paragraphs (6) & (7) of this proposed ACJ.

3.6.1. Stabilisation during the final straight-in segment for a visual approach should ideally be accomplished by 500 ft above runway threshold elevation for turbo-jet aeroplanes.

3.6.2. When a low-level final turning manoeuvre is required in order to align the aeroplane with the landing runway, a minimum height of 300 ft above the runway threshold elevation (or aerodrome elevation as appropriate) should be considered as the lowest height for visual approach stabilisation with wings level.

3.6.3. Dependent upon aeroplane type/class, the operator may specify an appropriately higher minimum stabilisation height for visual approach operations.

3.6.4. The operator should specify in the OM the procedures and instructions for conducting visual approaches to include at least:

(a) The minimum required visual reference; and

(b) The corresponding actions if the required visual reference is lost during a visual approach manoeuvre; and

(c) The appropriate go around actions.

3.7. The control of the descent path using the CDFA technique ensures that the descent path to the runway threshold is flown using either:

(a) A variable descent rate or flight path angle to maintain the desired path, which may be verified by appropriate crosschecks; or

(b) A pre-computed constant rate of descent from the FAF, or other appropriate fix which is able to define a descent point and/or from the final approach segment step-down fix; or

(c) Vertical guidance, including APV.

The above techniques also support a common method for the implementation of flight- director guided or auto-coupled RNAV(VNAV) or GLS approaches.

3.8. Missed Approach - The manoeuvre associated with the vertical profile of the missed approach should be initiated not later than reaching the MAPt or the DA(H) specified for the approach, whichever occurs first. The lateral part of the missed approach procedure must be flown via the MAPt unless otherwise stated on the approach chart.

3.9. In case the CDFA technique is not used the approach should be flown to an altitude/height at or above the MDA(H) where a level flight segment at or above MDA(H) may be flown to MAPt.

3.10. In case the CDFA technique is not used when flying an approach, an operator should implement procedures to ensure that early descent to the MDA(H) will not result in a subsequent flight below MDA(H) without adequate visual reference. These procedures could include:

(a) Awareness of radio altimeter information with reference to the approach profile;

(b) Enhanced Ground Proximity Warning System and/ or Terrain Awareness information;
(c) Limitation of rate of descent;
(d) Limitation of the number of repeated approaches;
(e) Safeguards against too early descents with prolonged flight at MDA(H);
(f) Specification of visual requirements for the descent from the MDA(H).

4. Flight techniques

4.1. The CDFA technique can be used on almost any published non-precision approach when the control of the descent path is aided by either:

4.1.1. A recommended descent rate, based on estimated ground speed, which may be provided on the approach chart; or

4.1.2. The descent path as depicted on the chart.

4.2. In order to facilitate the requirement of paragraph 4.1.2 above, the operator should either provide charts which depict the appropriate cross check altitudes/heights with the corresponding appropriate range information, or such information should be calculated and provided to the flight-crew in an appropriate and useable format.

4.3. For approaches flown coupled to a designated descent path using computed electronic glideslope guidance (normally a 3-degree path), the descent path should be appropriately coded in the flight management system data base and the specified navigational accuracy (RNP) should be determined and maintained throughout the operation of the approach.

4.4. With an actual or estimated ground speed, a nominal vertical profile and required descent rate, the approach should be flown by crossing the FAF configured and on-speed. The tabulated or required descent rate is established and flown to not less than the DA(H), observing any stepdown crossing altitudes if applicable.

4.5. To assure the appropriate descent path is flown, the pilot not-flying should announce crossing altitudes as published fixes and other designated points are crossed, giving the appropriate altitude or height for the appropriate range as depicted on the chart. The pilot flying should promptly adjust the rate of descent as appropriate.

4.6. With the required visual reference requirements established, the aeroplane should be in position to continue descent through the DA(H) or MDA(H) with little or no adjustment to attitude or thrust/power.

4.7. When applying CDFA on an approach with a nominal vertical profile to a DA(H), it may be necessary to apply an add-on to the published minima (vertical profile only) to ensure sufficient obstacle clearance. The add on, if applicable, should be published in the OM – (Aerodrome Operating Minima). However, the resulting procedure minimum will still be referred to as the DA(H) for the approach.

4.8. Operators should establish a procedure to ensure that an appropriate callout (automatic or oral) is made when the aeroplane is approaching DA(H). If the required visual references are not established at DA(H), the missed-approach procedure is to be executed promptly. Visual contact with the ground alone is not sufficient for continuation of the approach. With certain combinations of DA(H), RVR and approach slope, the required visual references may not be achieved at the DA(H) in spite of the RVR being at or above the minimum required for the conduct of the approach. The safety benefits of CDFA are negated if prompt go-around action is not initiated.

4.9. The following bracketing conditions in relation to angle of bank, rate of descent and thrust/power management are considered to be suitable for most aeroplane types/class to ensure the predetermined vertical path approach is conducted in a stabilised manner:

4.9.1. Bank angle: As prescribed in the AOM, should generally be less than 30 degrees;

4.9.2. Rate of descent (ROD): The target ROD should not exceed 1000 fpm. The ROD should deviate by no more than + 300 feet per minute (fpm) from the target ROD. Prolonged rates of descent which differ from the target ROD by more than 300 fpm indicate that the vertical path is not being maintained in a stabilised manner. The ROD should not exceed 1200fpm except under exceptional circumstances, which have been anticipated and briefed prior to commencing the approach; for example, a strong tailwind. Note:

zero rate of descent may be used when the descent path needs to be regained from below the profile. The target ROD may need to be initiated prior to reaching the required descent point (typically 0.3NM before the descent point, dependent upon ground speed, which may vary for each type/class of aeroplane). See (c) below.

4.9.3. Thrust/power management: The limits of thrust/power and the appropriate range should be specified in the OM, Part B or equivalent documents

4.10. Transient corrections/Overshoots: The above-specified range of corrections should normally be used to make occasional momentary adjustments in order to maintain the desired path and energy of the aeroplane. Frequent or sustained overshoots should require the approach to be abandoned and a go around initiated. A correction philosophy should be applied similar to that described in paragraph 5 below.

4.11. The relevant elements of paragraph 4 above should, in addition, be applied to approaches not flown using the CDFA technique; the procedures thus developed, thereby ensure a controlled flight path to MDA(H). Dependent upon the number of step-down fixes and the aeroplane type/class, the aeroplane should be appropriately configured to ensure safe control of the flight path prior to the final descent to MDA(H).

5. Stabilisation of energy/speed and configuration of the aeroplane on the approach

5.1. The control of the descent path is not the only consideration. Control of the aeroplane's configuration and energy is also vital to the safe conduct of an approach.

5.2. The approach should be considered to be fully stabilised when the aeroplane is:

(a) tracking on the required approach path and profile; and

(b) in the required configuration and attitude; and (c) flying with the required rate of descent and speed; and (d) flying with the appropriate thrust/power and trim.

5.3. The following flight path control criteria should be met and maintained when the aeroplane passes the gates described in paragraphs 5.6 and 5.7 below.

5.4. The aeroplane is considered established on the required approach path at the appropriate energy for stable flight using the CDFA technique when:

(a) It is tracking on the required approach path with the correct track set, approach aids tuned and identified as appropriate to the approach type flown and on the required vertical profile; and

(b) It is at the appropriate attitude and speed for the required target ROD with the appropriate thrust/power and trim.

5.5. It is recommended to compensate for strong wind/gusts on approach by speed increments given in the Aeroplane Operations Manual (AOM). To detect wind shear and magnitude of winds aloft, all available aeroplane equipment such as FMS, INS, etc. should be used.

5.6. It is recommended that stabilisation during any straight-in approach without visual reference to the ground should be achieved at the latest when passing 1,000 ft above runway threshold elevation. For approaches with a designated vertical profile applying CDFA, a later stabilisation in speed may be acceptable if higher than normal approach speeds are required by ATC procedures or allowed by the OM. Stabilisation should, however, be achieved not later than 500 ft above runway threshold elevation.

5.7. For approaches where the pilot has visual reference with the ground, stabilisation should be achieved not later than 500 ft above aerodrome elevation. However, it is recommended that the aeroplane should be stabilised when passing 1,000 ft above runway threshold elevation.

5.8. The relevant elements of paragraph 5 above should in addition be applied to approaches not flown using the CDFA technique; the procedures thus developed ensure that a controlled and stable path to MDA(H) is achieved. Dependent upon the number of step-down fixes and the aeroplane type/class, the aeroplane should be appropriately configured to ensure safe and stable flight prior to the final descent to MDA(H).

6. Visual Reference and path-control below MDA(H) when not using the CDFA technique

6.1. In addition to the requirements stated in Appendix 1 to CAR-OPS 1.430, the pilot should have attained a combination of visual cues to safely control the aeroplane in roll and pitch to maintain the final approach path to landing. This must be included in the standard operating procedures and reflected in the OM.

7. Operational Procedures and Instructions for using the CDFA technique or not

7.1. The operator should establish procedures and instructions for flying approaches using the CDFA technique and not. These procedures should be included in the OM and should include the duties of the flight crew during the conduct of such operations.

(a) The operator should publish in the OM the requirements stated in paragraphs (4) and (5) above, as appropriate to the aeroplane type or class to be operated.

(b) The checklists should be completed as early as practicable and preferably before commencing final descent towards the DA(H).

7.2. The operator's manuals should at least specify the maximum ROD for each aeroplane type/class operated and the required visual reference to continue the approach below:

(a) The DA(H) when applying CDFA;

(b) MDA(H) when not applying CDFA.

7.3. The operator should establish procedures which prohibit level flight at MDA(H) without the flight crew having obtained the required visual references.

Note: It is not the intention of this paragraph to prohibit level flight at MDA(H) when conducting a circling approach, which does not come within the definition of the CDFA technique.

7.4. The operator should provide the flight crew with:

(a) Unambiguous details of the technique used (CDFA or not).

(b) The corresponding relevant minima should include:

(i) Type of decision, whether DA(H) or MDA(H);

(ii) MAPt as applicable;

(iii) Appropriate RVR/Visibility for the approach classification and aeroplane category.

7.5. Specific types/class of aeroplane, in particular certain Performance Class B and Class C aeroplanes, may be unable to comply fully with the requirements of this ACJ relating to the operation of CDFA. This problem arises because some aeroplanes must not be configured fully into the landing configuration until required visual references are obtained for landing, because of inadequate missed-approach performance engine out. For such aeroplanes, the operator should either:

(a) Obtain approval from the Authority for an appropriate modification to the stipulated procedures and flight techniques prescribed herein; or

(b) Increase the required minimum RVR to ensure the aeroplane will be operated safely during the configuration change on the final approach path to landing.

8. Training

8.1. The operator should ensure that, prior to using the CDFA technique or not (as appropriate), each flight crew member undertakes:

8.1.1. The appropriate training and checking as required by Subpart N. Such training should cover the techniques and procedures appropriate to the operation which are stipulated in paragraphs (4) and (5) of this ACJ.

8.1.2. The operator's proficiency check should include at least one approach to a landing or go around as appropriate using the CDFA technique or not. The approach should be operated to the lowest appropriate DA(H) or MDA(H) as appropriate; and, if conducted in a Simulator, the approach should be operated to the lowest approved RVR.

Note. The approach required by paragraph 8.1.2 is not in addition to any manoeuvre currently required by either CAR-FCL or CAR-OPS 1. The requirement may be fulfilled by undertaking any currently required approach (engine out or otherwise) other than a precision approach, whilst using the CDFA technique.

8.2. The policy for the establishment of constant predetermined vertical path and approach stability are to be enforced both during initial and recurrent pilot training and checking. The relevant training procedures and instructions should be documented in the OM.

8.3. The training should emphasise the need to establish and facilitate joint crew procedures and CRM to enable accurate descent path control and the requirement to establish the aeroplane in a stable condition as required by the operator's operational procedures. If barometric vertical navigation is used the crews should be trained in the errors associated with these systems.

8.4. During training emphasis should be placed on the flight crew's need to:

(a) Maintain situational awareness at all times, in particular with reference to the required vertical and horizontal profile;

(b) Ensure good communication channels throughout the approach;

(c) Ensure accurate descent-path control particularly during any manually-flown descent phase. The non-operating/non-handling pilot should facilitate good flight path control by:

(i) Communicating any altitude/height crosschecks prior to the actual passing of the range/altitude or height crosscheck;

(ii) Prompting, as appropriate, changes to the target ROD;

(iii) Monitoring flight path control below DA/MDA.

(d) Understand the actions to be taken if the MAPt is reached prior to the MDA(H).

(e) Ensure that the decision to go around must, at the latest, have been taken upon reaching the DA(H) or MDA(H).

(f) Ensure that prompt go around action is taken immediately when reaching DA(H) if the required visual reference has not been obtained as there may be no obstacle protection if the go-around manoeuvre is delayed.

(g) Understand the significance of using the CDFA technique to a DA(H) with an associated MAPt and the implications of early go around manoeuvres.

(h) Understand the possible loss of the required visual reference (due to pitch- change/climb) when not using the CDFA technique for aeroplane types/classes which require a late change of configuration and/or speed to ensure the aeroplane is in the appropriate landing configuration.

8.5. Additional specific training when not using the CDFA technique with level flight at or above MDA(H).

8.5.1. The training should detail:

(a) The need to facilitate good CRM; with good flight-crew communication in particular.

(b) The additional known safety risks associated with the 'dive-and-drive' approach philosophy which may be associated with non-CDFA.

(c) The use of DA(H) during approaches flown using the CDFA technique.

(d) The significance of the MDA(H) and the MAPt where appropriate.

(e) The actions to be taken at the MAPt and the need to ensure the aeroplane remains in a stable condition and on the nominal and appropriate vertical profile until the landing.

(f) The reasons for increased RVR/Visibility minima when compared to application of CDFA.

(g) The possible increased obstacle infringement risk when undertaking level flight at MDA(H) without the required visual references.

(h) The need to accomplish a prompt go around manoeuvre if the required visual reference is lost.

(i) The increased risk of an unstable final approach and an associated unsafe landing if a rushed approach is attempted either from:

(1) Inappropriate and close-in acquisition of the required visual reference;

(2) Unstable aeroplane energy and or flight path control.

(j) The increased risk of CFIT (See introduction).

9. Approvals

9.1. The procedures which are flown with level flight at/or above MDA(H) must be approved by the Authority and listed in the OM.

9.2. Operators should classify aerodromes where there are approaches which require level flight at/or above MDA(H) as being B and C categorised. Such aerodrome categorisation will depend upon the operator's experience, operational exposure, training programme(s) and flight crew qualification(s).

9.3. Exemptions granted in accordance with CAR-OPS 1.430, paragraph (d)(2) should be limited to locations where there is a clear public interest to maintain current operations. The exemptions should be based on the operator's experience, training programme and flight crew qualification. The exemptions should be reviewed at regular intervals and should be terminated as soon as facilities are improved to allow SAp or CDFA.

Appendix 1 to CAR OPS-1.430 Aerodrome Operating Minima

(See CAR-OPS 1.430 Aerodrome Operating Minima – General)
(See AMC to Appendix 1 to CAR-OPS 1.430 (d) AOM: RVR for CAT I, APV, NPA)
(See GM to Appendix 1 to CAR-OPS 1.430 (f)&(g) RVR Category II & III)
(See GM to Appendix 1 to CAR-OPS 1.430 (g)(5) - Table 8 Crew actions in case of autopilot failure)
(See AMC to Appendix 1 to CAR-OPS 1.430 (h) – EVS)
(See AMC to Appendix 1 to CAR-OPS 1.430, paragraph (j) – Circling)

Note: The minima stated in this Appendix are based upon the experience of commonly used approach aids. This is not meant to preclude the use of other guidance systems such as Head Up Display (HUD) and Enhanced Visual Systems (EVS) but the applicable minima for such systems will need to be developed as the need arises.

(a) Take-off Minima

(1) *General*

i. Take-off minima established by the operator must be expressed as visibility or RVR limits, taking into account all relevant factors for each aerodrome planned to be used and the aeroplane characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions (e.g. ceiling) must be specified.

ii. The commander shall not commence take-off unless the weather conditions at the aerodrome of departure are equal to or better than applicable minima for landing at that aerodrome unless a suitable take-off alternate aerodrome is available.

iii. When the reported meteorological visibility is below that required for take-off and RVR is not reported, a take-off may only be commenced if the commander can determine that the RVR/visibility along the take-off runway is equal to or better than the required minimum.

iv. When no reported meteorological visibility or RVR is available, a take-off may only be commenced if the commander can determine that the RVR/visibility along the take-off runway is equal to or better than the required minimum.

(2) *Visual reference.*

The take-off minima must be selected to ensure sufficient guidance to control the aeroplane in the event of both a discontinued take-off in adverse circumstances and a continued take-off after failure of the critical power unit.

(3) *Required RVR/Visibility*

i. For multi-engined aeroplanes, whose performance is such that, in the event of a critical power unit failure at any point during take-off, the aeroplane can either stop or continue the take-off to a height of 1500 ft above the aerodrome while clearing obstacles by the required margins, the take-off minima established by an operator must be expressed as RVR/Visibility values not lower than those given in Table 1 below except as provided in paragraph (4).

Table 1. – RVR/Visibility for take-off.

Take-off RVR/Visibility	
Facilities	**RVR/Visibility** ***(Note 3)***
Nil (Day only)	500 m
Runway edge lighting and/or centreline marking	250/300 m *(Notes 1 & 2)*
Runway edge and centreline lighting	200/250 m *(Note 1)*
Runway edge and centreline lighting and multiple RVR information	150/200 m *(Notes 1 & 4)*

Note 1: The higher values apply to Category D aeroplanes.
Note 2: For night operations at least runway edge and runway end lights are required.
Note 3: The reported RVR/Visibility value representative of the initial part of the take-off run can be replaced by pilot assessment.
Note 4: The required RVR value must be achieved for all of the relevant RVR reporting points with the exception given in Note 3 above.

ii. For multi-engined aeroplanes whose performance is such that they cannot comply with the performance conditions in sub-paragraph (a)(3)(i) above in the event of a critical power unit failure, there may be a need to re-land immediately and to see and avoid obstacles in the take-off area. Such aeroplanes may be operated to the following take-off minima provided they are able to comply with the applicable obstacle clearance criteria, assuming engine failure at the height specified. The take-off minima established by an operator must be based upon the height from which the one engine inoperative net take-off flight path can be constructed. The RVR minima used may not be lower than either of the values given in Table 1 above or Table 2 below.

Table 2. – Assumed engine failure height above the runway versus RVR/Visibility

Take-off RVR/Visibility – flight path	
Assumed engine failure height above the take-off runway	**RVR/Visibility** *(Note 2)*
< 50 ft	200 m
51 – 100 ft	300 m
101 – 150 ft	400 m
151 – 200 ft	500 m
201 – 300 ft	1 000 m
> 300 ft	1 500 m *(Note 1)*

Note 1: 1500 m is also applicable if no positive take-off flight path can be constructed.
Note 2: The reported RVR/Visibility value representative of the initial part of the take-off run can be replaced by pilot assessment.

iii. When reported RVR, or meteorological visibility is not available, the commander shall not commence take-off unless he can determine that the actual conditions satisfy the applicable take-off minima.

(4) Exceptions to sub-paragraph (a)(3)(i) above:

i. Subject to the approval of the Authority, and provided the requirements in paragraphs (A) to (E) below have been satisfied, an operator may reduce the takeoff minima to 125 m RVR (Category A, B and C aeroplanes) or 150 m RVR (Category D aeroplanes) when:
   A. Low Visibility Procedures are in force;
   B. High intensity runway centreline lights spaced 15 m or less and high intensity edge lights spaced 60m or less are in operation;
   C. Flight crew members have satisfactorily completed training in a Flight Simulator;
   D. A 90 m visual segment is available from the cockpit at the start of the take-off run; and
   E. The required RVR value has been achieved for all of the relevant RVR reporting points.

ii. Subject to the approval of the Authority, an operator of an aeroplane using either:

A. An approved lateral guidance system; or,

B. An approved HUD / HUDLS for take-off may reduce the take-off minima to an RVR less than 125 m (Category A, B and C aeroplanes) or 150 m (Category D aeroplanes) but not lower than 75 m provided runway protection and facilities equivalent to Category III landing operations are available.

(b) Category I, APV and Non-Precision Approach Operations:

(1) ***A Category I approach operation.*** Is a precision instrument approach and landing using ILS, MLS, GLS (GBAS) or PAR with a decision height not lower than 200 ft and with an RVR not less than 550 m, unless accepted by the Authority.

(2) ***A Non-Precision Approach (NPA) operation.*** Is an instrument approach using any of the facilities described in Table 3 (System Minima), with a MDH or DH not lower than 250 ft and an RVR/CMV of not less than 750 m, unless accepted by the Authority.

(3) ***An APV operation*****.** Is an instrument approach which utilises lateral and vertical guidance, but does not meet the requirements established for precision approach and landing operations, with a DH not lower than 250 ft and a runway visual range of not less than 600m unless approved by the Authority.

(4) ***Decision Height (DH).*** An operator must ensure that the decision height to be used for an approach is not lower than the highest of:

i. The minimum height to which the approach aid can be used without the required visual reference; or

ii. The OCH for the category of aeroplane; or

iii. The published approach procedure decision height where applicable; or iv.200 ft for Category I approach operations; or

iv. The system minimum in Table 3; or

v. The lowest decision height specified in the Aeroplane Flight Manual (AFM) or equivalent document, if stated.

(5) ***Minimum Descent Height (MDH).*** An operator must ensure that the minimum descent height for an approach is not lower than the highest of:

i. The OCH for the category of aeroplane; or

ii. The system minimum in Table 3; or

iii.The minimum descent height specified in the Aeroplane Flight Manual (AFM) if stated; whichever is higher.

(6) ***Visual Reference.*** A pilot may not continue an approach below MDA/MDH unless at least one of the following visual references for the intended runway is distinctly visible and identifiable to the pilot:

i. Elements of the approach light system;

ii. The threshold;

iii. The threshold markings;

iv. The threshold lights;

v. The threshold identification lights;

vi.The visual glide slope indicator;

vii. The touchdown zone or touchdown zone markings;

viii. The touchdown zone lights;

ix. Runway edge lights; or

x. Other visual references accepted by the Authority.

Table 3 – System minima vs facilities.

System minima	
Facility	**Lowest DH / MDH**
ILS, MLS, GLS (GBAS) or PAR	200 ft
Localizer with or without DME	250 ft
GNSS (LNAV)	250 ft
GNSS LNAV/ VNAV	250 ft
SRA (terminating at ½ NM)	250 ft
SRA (terminating at 1 NM)	300 ft
SRA (terminating at 2 NM or more)	350 ft
VOR	300 ft
VOR/DME	250 ft
NDB/DME	300 ft
NDB	350 ft
VDF	350 ft

(c) Criteria for establishing RVR / Converted Met Visibility (Ref Table 6)

(1) In order to qualify for the lowest allowable values of RVR/CMV detailed in Table 6 (applicable to each approach grouping) the instrument approach shall meet at least the following facility requirements and associated conditions:

i. Instrument approaches with designated vertical profile up to and including 4.5° for Category A and B aeroplanes, or 3.77° for Category C and D aeroplanes, unless other approach angles are approved by the Authority, where the facilities are:

A. ILS / MLS / GLS / PAR; or

B. APV; and

C. where the final approach track is offset by not more than 15 degrees for Category A and B aeroplanes or by not more than 5 degrees for Category C and D aeroplanes.

ii. Instrument approaches flown using the CDFA technique with a nominal vertical profile, up to and including 4.5° for Category A and B aeroplanes, or 3.77° for Category C and D aeroplanes, unless other approach angles are approved by the Authority where the facilities are NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA or GNSS/LNAV, with a final-approach segment of at least 3NM, which also fulfil the following criteria:

A. The final approach track is offset by not more than 15 degrees for Category A and B aeroplanes or by not more than 5 degrees for Category C and D aeroplanes; and

B. The FAF or another appropriate fix where descent is initiated is available, or distance to THR is available by FMS/RNAV or DME; and

C. If the MAPt is determined by timing, the distance from FAF to THR is < 8 NM. iii.Instrument approaches where the facilities are NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA or GNSS/LNAV, not fulfilling the criteria in paragraph (c)(1)(ii) above, or with an MDH > 1200ft.

(2) The missed approach, after an approach has been flown using the CDFA technique, shall be executed when reaching the decision altitude (height) or the MAPt, whichever occurs first. The lateral part of the missed approach procedure must be flown via the MAPt unless otherwise stated on the approach chart.

(d) Determination of RVR / CMV / Visibility Minima for Category I, APV and Non-Precision Approach operations

(Note: See AMC to Appendix 1 to CAR OPS-1.430, paragraph (d))

(1) The minimum RVR / CMV / Visibility shall be the highest of the values derived from Table 5 or Table 6 but not greater than the maximum values shown in Table 6 where applicable

(2) The values in Table 5 are derived from the formula below:
Required RVR/Visibility(m) = [(DH/MDH(ft) x 0.3048) / tan α] – length of approach lights(m)

Note 1: Tan α is the calculation angle, being a default value of 3.00 degrees increasing in steps of 0.10 degrees for each line in Table 5 up to 3.77 degrees and then remains constant.

(3) With the approval of the Authority, the formula may be used with the actual approach slope and/or the actual length of the approach lights for a particular runway.

(4) If the approach is flown with a level flight segment at or above MDA/H, 200 metres shall be added for Cat A and B aeroplane and 400 metres for Cat C and D aeroplane to the minimum RVR / CMV value resulting from the application of Tables 5 and 6.
Note: The added value corresponds to the time/distance required to establish the aeroplane on the final descent.

(5) An RVR of less than 750 metres as indicated in Table 5 may be used:
   i. for Category I approach operations to runways with FALS (See below), Runway Touchdown Zone Lights (RTZL) and Runway Centreline Lights (RCLL) provided that the DH is not more than 200 ft; or
   ii. for Category I approach operations to runways without RTZL and RCLL when using an approved HUDLS, or equivalent approved system, or when conducting a coupled approach or flight-director-flown approach to a DH equal to or greater than 200 ft. The ILS must not be promulgated as a restricted facility; or
   iii. for APV approach operations to runways with FALS, RTZL and RCLL when using an approved HUD.

(6) The Authority may approve RVR values lower than those given in Table 5, for HUDLS and auto-land operations in accordance with paragraph (e) of this Appendix.

(7) The visual aids comprise standard runway day markings and approach and runway lighting (runway edge lights, threshold lights, runway end lights and in some cases also touch-down zone and/or runway centreline lights). The approach light configurations acceptable are classified and listed in Table 4 below.

(8) Notwithstanding the requirements in paragraph (d)(7) above, the Authority may approve that RVR values relevant to a Basic Approach Lighting System (BALS) are used on runways where the approach lights are restricted in length below 210m due to terrain or water, but where at least one cross-bar is available.

(9) For night operations or for any operation where credit for runway and approach lights is required, the lights must be on and serviceable except as provided for in AMC OPS 1.430 (b)(4) (Effects of unserviceable equipment)

Table 4. Approach Light Systems

CAR OPS Class of facility	Length, configuration and intensity of approach lights
FALS (Full approach light system)	ICAO: Precision approach CAT 1 Lighting system (HIALS 720m ≥) distance coded centerline. Barrette centerline
IALS (Intermediate approach light system)	ICAO: Simple approach lighting system (HIALS 420-719m) single source. Barrette
BALS (basic approach light system)	Any other approach lighting system (HIALS, MIALS or ALS 210-419m)
NALS (No approach light system)	Any other approach lighting system (HIALS, MIALS or ALS <210) or no approach light

Table 5. RVR / CMV (See Table 11) vs DH /

Table 5

RVR/CMV (See Table 11) v. DH/MDH

DH or MDH			Class of Lighting Facility			
			FALS	IALS	BALS	NALS
			See paragraphs (d)5, (d)6 and (d)10 about RVR < 750 m			
Feet			Metres			
200	—	210	550	750	1 000	1 200
211	—	220	550	800	1 000	1 200
221	—	230	550	800	1 000	1 200
231	—	240	550	800	1 000	1 200
241	—	250	550	800	1 000	1 300
251	—	260	600	800	1 100	1 300
261	—	280	600	900	1 100	1 300
281	—	300	650	900	1 200	1 400
301	—	320	700	1 000	1 200	1 400
321	—	340	800	1 100	1 300	1 500
341	—	360	900	1 200	1 400	1 600
361	—	380	1 000	1 300	1 500	1 700
381	—	400	1 100	1 400	1 600	1 800
401	—	420	1 200	1 500	1 700	1 900
421	—	440	1 300	1 600	1 800	2 000
441	—	460	1 400	1 700	1 900	2 100
461	—	480	1 500	1 800	2 000	2 200
481		500	1 500	1 800	2 100	2 300
501	—	520	1 600	1 900	2 100	2 400
521	—	540	1 700	2 000	2 200	2 400
541	—	560	1 800	2 100	2 300	2 500
561	—	580	1 900	2 200	2 400	2 600
581	—	600	2 000	2 300	2 500	2 700
601	—	620	2 100	2 400	2 600	2 800
621	—	640	2 200	2 500	2 700	2 900
641	—	660	2 300	2 600	2 800	3 000
661	—	680	2 400	2 700	2 900	3 100
681	—	700	2 500	2 800	3 000	3 200
701	—	720	2 600	2 900	3 100	3 300
721	—	740	2 700	3 000	3 200	3 400
741	—	760	2 700	3 000	3 300	3 500
761	—	800	2 900	3 200	3 400	3 600
801	—	850	3 100	3 400	3 600	3 800
851	—	900	3 300	3 600	3 800	4 000
901	—	950	3 600	3 900	4 100	4 300
951	—	1 000	3 800	4 100	4 300	4 500
1 001	—	1 100	4 100	4 400	4 600	4 900
1 101	—	1 200	4 600	4 900	5 000	5 000
1 201 and above			5 000	5 000	5 000	5 000

MDH

Table 6. Minimum & maximum applicable RVR/converted Met visibility (see Table 11) for all instrument approaches down to CAT 1 minima (lower and upper cut-off limits)

Facilities/conditions	RVR/CMV (m)	Aeroplane category			
		A	B	C	D
ILS, MLS, GLS, PAR and APV	Min	According to Table 5			
	Max	1 500	1 500	2 400	2 400
NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA, GNSS/LNAV, with a procedure which fulfills the criteria in paragraph (c) (1) ii	Min	750	750	750	750
	Max	1 500	1 500	2 400	2 400
For NDB, NDB/DME, VOR, VOR/DME, LLZ, LLZ/DME, VDF, SRA, GNSS/LNAV: • Not fulfilling the criteria in paragraph (c) (1) iii above; or • With a DH or MDH ≥ 1200ft	Min	1 000	1 000	1 200	1 200
	Max	According to Table 5 if flown using the CDFA technique, otherwise an add-on of 200/400m applies to the values in Table 5 but not result in a value exceeding 5 000m			

(10) Single pilot operations. For single pilot operations, an operator must calculate the minimum RVR/visibility for all approaches in accordance with CAR OPS-1.430 and this Appendix.

i. An RVR of less than 800 metres as indicated in Table 5 may be used for Category I approaches provided any of the following is used at least down to the applicable DH:

A. a suitable autopilot, coupled to an ILS or MLS which is not promulgated as restricted; or
B. an approved HUDLS (including, where appropriate, EVS), or equivalent approved system.

ii. Where RTZL and/or RCLL are not available, the minimum RVR/CMV shall not be less than 600 m.

iii. An RVR of less than 800 metres as indicated in Table 5 may be used for APV operations to runways with FALS, RTZL and RCLL when using an approved HUDLS, or equivalent approved system or when conducting a coupled approach to a DH equal to or greater than 250 ft.

(e) **Lower than Standard Category I Operations**

(1) Decision Height.

A Lower than Standard Category I Operation decision height must not be lower than the highest of:

i. The minimum decision height specified in the AFM, if stated; or
ii. The minimum height to which the precision approach aid can be used without the required visual reference; or
iii. The OCH for the category of aeroplane; or
iv. The decision height to which the flight crew is authorised to operate; or
v. 200 ft.

whichever is higher.

(2) Type of facility.

An ILS / MLS which supports a Lower than Standard Category I operation must be an unrestricted facility with a straight-in course (≤ 3º offset) and the ILS must be certificated to:

i. Class I/T/1 for operations to a minimum of 450m RVR; or

ii. Class II/D/2 for operations to less than 450m RVR.

Single ILS facilities are only acceptable if Level 2 performance is provided.

(3) Required RVR/CMV.

The lowest minima to be used by an operator for Lower than Standard Category I operations are stipulated in Table 6a below:

Table 6A - Lower Than Standard Category I Minimum RVR/CMV vs Approach Light System

Lower than Standard Category 1 Minima					
DH (ft)		Class of Lighting Facility			
		FALS	IALS	BALS	NALS
		RVR/CMV (Metres)			
200	210	400	500	600	750
211	220	450	550	650	800
221	230	500	600	700	900
231	240	500	650	750	1000
241	249	500	700	800	1100

Note 1: The visual aids comprise standard runway day markings, approach lighting, runway edge lights, threshold lights, runway end lights and, for operations below 450m, shall include touch-down zone and/or runway centre line lights.

(4) Visual reference. A pilot shall not continue an approach below decision height unless visual reference containing a segment of at least 3 consecutive lights being the centre line of the approach lights, or touchdown zone lights, or runway centre line lights, or runway edge lights, or a combination of these is attained and can be maintained. This visual reference must include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barrette of the touchdown zone lighting unless the operation is conducted utilising an approved HUDLS useable to at least 150ft.

(5) Approval.

To conduct Lower than Standard Category I operations:

i. The approach shall be flown auto-coupled to an auto-land; or an approved HUDLS shall be used to at least 150ft above the threshold.
ii. The aeroplane shall be certificated in accordance with CS-AWO to conduct Category II operations;
iii. The auto-land system shall be approved for Category IIIA operations;
iv. In service proving requirements shall be completed in accordance with Appendix 1 to CAR OPS-1.440 paragraph (h);
v. Training specified in Appendix 1 to CAR OPS-1.450 paragraph (h) shall be completed, this shall include training and checking in a Flight Simulator using the appropriate ground and visual aids at the lowest applicable RVR;
vi. The Operator must ensure that Low Visibility procedures are established and in operation at the intended aerodrome of landing; and
vii. The Operator shall be approved by the Authority.

(f) **Precision approach – Category II and other than Standard Category II Operations**

(1) General.

i. A Category II operation is a precision instrument approach and landing using ILS or MLS with:

A. A decision height below 200 ft but not lower than 100 ft; and
B. A runway visual range of not less than 300 m.

ii. Another than Standard Category II operation is a precision instrument approach and landing using ILS or MLS which meets facility requirements as established in paragraph below with:

A. A decision height below 200 ft but not lower than 100 ft; (See Table 7b below) and
B. A runway visual range of not less than 350/400 m. (See Table 7b below)

iii. The ILS / MLS that supports other than a Standard Category II operation shall be an unrestricted facility with a straight in course (≤ 3º offset) and the ILS shall be certificated to:

A. Class I/T/1 for operations down to 450m RVR and to a DH of 200 ft or more; or,
B. Class II/D/2 for operations in RVRs of less than 450m or to a DH of less than 200ft.

Single ILS facilities are only acceptable if Level 2 performance is provided.

(2) *Decision Height.* An operator must ensure that the decision height for:

i. Other than Standard Category II and Category II operations is not lower than the highest of:

A. The minimum decision height specified in the AFM, if stated; or
B. The minimum height to which the precision approach aid can be used without the required visual reference; or
C. The OCH for the category of aeroplane; or
D. The decision height to which the flight crew is authorised to operate; or
E. 100 ft.

whichever is higher.

(3) *Visual reference.*

A pilot may not continue an approach below either the Category II or the other than Standard Category II decision height determined in accordance with sub-paragraph (d)(2) above unless visual reference containing a segment of at least 3 consecutive lights being the centre line of the approach lights, or touchdown zone lights, or runway centre line lights, or runway edge lights, or a combination of these is attained and can be maintained. This visual reference must include a lateral element of the ground pattern, i.e. an approach lighting crossbar or the landing threshold or a barrette of the touchdown zone lighting unless the operation is conducted utilising an approved HUDLS to touchdown.

(4) *CAT II minima and Other than Standard Category II Operations*

i. Required RVR CAT II.

The lowest minima to be used by an operator for Category II operations are:

Table 7A – RVR for Cat II Operations vs DH Category II minima.

Auto-coupled/approved HUDLS to below DH (Note 1A)		
DH (ft)	**RVR/Aeroplane Cat A, B & C**	**RVR/Aeroplane Cat D**
100 - 120	300 m	300/350 m (Note 2A)
121 – 140	400 m	400 m
141 and above	450 m	450 m

Note 1A: The reference to 'auto-coupled to below DH / Approved HUDLS' in this table means continued use of the automatic flight control system or the HUDLS down to a height of

80% of the DH. Thus airworthiness requirements may, through minimum engagement height for the automatic flight control system, affect the DH to be applied.

Note 2A: 300 m may be used for a Category D aeroplane conducting an auto-land. (See GM to Appendix 1 to CAR OPS-1.430 paragraphs (f) and (g).

ii. Required RVR OTS Cat II.

The lowest minima to be used by an operator for other than Standard Category II operations are:

Table 7B - Other than Standard Category II Minimum RVR vs Approach Light System

Other than Standard Category II Minima					
DH (ft)	**Auto-land or Approved HUDLS utilised to touchdown Class of Lighting Facility**				
	FALS		**IALS**	**BALS**	**NALS**
	See para (d)(5), (d)(6) and (d10) about RVR < 750m				
	CAT C	**CAT D**	**CAT A – D**	**CAT A – D**	**CAT A - D**
100-120	350	400	450	600	700
121-140	400	450	500	600	700
141-160	450	500	500	600	750
161-199	450	500	550	650	750

Note: The visual aids required to conduct Other than Standard Category II Operations comprise standard runway day markings and approach and runway lighting (runway edge lights, threshold lights, runway end lights). For operations in RVR of 400 m or less, centre line lights must be available. The approach light configurations are classified and listed in Table 4 above.

iii. To conduct other than Standard Category II operations the operator must ensure that appropriate Low Visibility procedures are established and in operation at the intended aerodrome of landing.

(g) **Precision approach – Category III operations**

(1) General. Category III operations are subdivided as follows:

i. Category III A operations. A precision instrument approach and landing using ILS or MLS with:

A. A decision height lower than 100 ft; and

B. A runway visual range not less than 200 m.

ii. Category III B operations. A precision instrument approach and landing using ILS or MLS with:

A. A decision height lower than 100 ft, or no decision height; and

B. A runway visual range lower than 200 m but not less than 75 m.

Note: Where the decision height (DH) and runway visual range (RVR) do not fall within the same Category, the RVR will determine in which Category the operation is to be considered.

(2) Decision Height. For operations in which a decision height is used, an operator must ensure that the decision height is not lower than:

i. The minimum decision height specified in the AFM, if stated; or

ii. The minimum height to which the precision approach aid can be used without the required visual reference; or

iii. The decision height to which the flight crew is authorised to operate.

(3) No Decision Height Operations. Operations with no decision height may only be conducted if:

i. The operation with no decision height is authorised in the AFM; and
ii. The approach aid and the aerodrome facilities can support operations with no decision height; and
iii. The operator has an approval for CAT III operations with no decision height.

Note: In the case of a CAT III runway it may be assumed that operations with no decision height can be supported unless specifically restricted as published in the AIP or NOTAM.

(4) Visual reference

i. For Category IIIA operations, and for Category IIIB operations conducted either with fail-passive flight control systems, or with the use of an approved HUDLS, a pilot may not continue an approach below the decision height determined in accordance with sub-paragraph (g)(2) above unless a visual reference containing a segment of at least 3 consecutive lights being the centreline of the approach lights, or touchdown zone lights, or runway centreline lights, or runway edge lights, or a combination of these is attained and can be maintained.

ii. For Category IIIB operations conducted either with fail-operational flight control systems or with a fail-operational hybrid landing system (comprising e.g. a HUDLS) using a decision height a pilot may not continue an approach below the Decision Height, determined in accordance with sub-paragraph (e)(2) above, unless a visual reference containing at least one centreline light is attained and can be maintained.

(5) Required RVR. The lowest minima to be used by an operator for Category III operations are:

Table 8 – RVR for Cat III Operations vs DH and roll-out control/guidance system.

Category III minima			
Category	**Decision Height (ft) (Note 3)**	**Roll-out Control/Guidance System**	**RVR (m)**
IIIA	Less than 100 ft	Not required	200 m (Note 1)
IIIB	Less than 100 ft	Fail-passive	150 m Notes 1 & 2)
IIIB	Less than 50 ft	Fail-passive	125 m
IIIB	Less than 50 ft or No DH	Fail-operational (Note 4)	75 m

Note 1: For fail-passive operations see GM to Appendix 1 to CAR OPS-1.430, paragraph (g)(5). Crew actions in case of autopilot failure at or below decision height in fail-passive Category III operations.

Note 2: For aeroplanes certificated in accordance with CS-AWO 321(b)(3) or equivalent.

Note 3: Flight control system redundancy is determined under CS-AWO (or equivalent) by the minimum certificated decision height.

Note 4: The fail-operational system referred to may consist of a fail-operational hybrid system.

(See GM to Appendix 1 to CAR OPS-1.430 (f) & (g).)

(h) **Enhanced Vision Systems**

(See AMC to Appendix 1 to CAR OPS-1.430(h))

(1) A pilot using an enhanced vision system certificated for the purpose of this paragraph and used in accordance with the procedures and limitations of the approved flight manual, may:

i. Continue an approach below DH or MDH to 100 feet above the threshold elevation of the runway provided that at least one of the following visual references is displayed and identifiable on the enhanced vision system:

A. Elements of the approach lighting; or

B. The runway threshold, identified by at least one of the following: the beginning of the runway landing surface, the threshold lights, the threshold identification lights; and the touchdown zone, identified by at least one of the following: the runway touchdown zone landing surface, the touchdown zone lights, the touchdown zone markings or the runway lights.

ii. Reduce the calculated RVR/CMV for the approach from the value in column 1 of Table 9 below to the value in column 2:

Table 9 –Approach utilising EVS RVR/CMV Reduction vs Normal RVR/CMV.

RVR/CMV Normally required	RVR/CMV for approach utilising EVS		RVR/CMV Normally required	RVR/CMV for approach utilising EVS
550	350		2700	1800
600	400		2800	1900
650	450		2900	1900
700	450		3000	2000
750	500		3100	2000
800	550		3200	2100
900	600		3300	2200
1000	650		3400	2200
1100	750		3500	2300
1200	800		3600	2400
1300	900		3700	2400
1400	900		3800	2500
1500	1000		3900	2600
1600	1100		4000	2600
1700	1100		4100	2700
1800	1200		4200	2800
1900	1300		4300	2800
2000	1300		4400	2900
2100	1400		4500	3000
2200	1500		4600	3000
2300	1500		4700	3100
2400	1600		4800	3200
2500	1700		4900	3200
2600	1700		5000	3300

(2) Paragraph (h)(1) above may only be used for ILS, MLS, PAR, GLS and APV Operations with a DH no lower than 200 feet or an approach flown using approved vertical flight path guidance to a MDH or DH no lower than 250 feet.

(3) A pilot may not continue an approach below 100 feet above runway threshold elevation for the intended runway, unless at least one of the visual references specified below is distinctly visible and identifiable to the pilot without reliance on the enhanced vision system:

A. The lights or markings of the threshold; or

B. The lights or markings of the touchdown zone.

(i) **Intentionally left blank**

(j) **Circling**

(1) Minimum Descent Height (MDH). The MDH for circling shall be the higher of:

i. The published circling OCH for the aeroplane category; or

ii. The minimum circling height derived from Table 10 below; or

iii. The DH / MDH of the preceding instrument approach procedure.

(2) Minimum Descent Altitude (MDA). The MDA for circling shall be calculated by adding the published aerodrome elevation to the MDH, as determined by (1) above.

(3) Visibility. The minimum visibility for circling shall be the higher of:

i. The circling visibility for the aeroplane category, if published; or

ii. The minimum visibility derived from Table 10 below; or

iii. The RVR/CMV derived from Tables 5 and 6 for the preceding instrument approach procedure.

(4) Notwithstanding the requirements in sub paragraph (3) above, an Authority may exempt an operator from the requirement to increase the visibility above that derived from Table 10.

(5) Exemptions as described in para (4) must be limited to locations where there is a clear public interest to maintain current operations. The exemptions must be based on the operator's experience, training programme and flight crew qualification. The exemptions must be reviewed at regular intervals.

Table 10 – Minimum Visibility and MDH for circling vs. aeroplane category

MDH (ft)	Aeroplane Category			
	A	B	C	D
	400	500	600	700
Minimum meteorological visibility (m)	1500	1600	2400	3600

(6) Circling with prescribed tracks is an accepted procedure within the meaning of this paragraph. (See AMC to Appendix 1 to CAR OPS-1.430 (j)).

(k) Visual Approach.

An operator shall not use an RVR of less than 800 m for a visual approach.

(l) Conversion of Reported Meteorological Visibility to RVR/CMV.

(1) An operator must ensure that a meteorological visibility to RVR/CMV conversion is not used for takeoff, for calculating any other required RVR minimum less than 800 m, or when reported RVR is available. Note: If the RVR is reported as being above the maximum value assessed by the aerodrome operator, e.g. "RVR more than 1,500 metres", it is not considered to be a reported value for the purpose of this paragraph.

(2) When converting meteorological visibility to RVR in all other circumstances than those in sub-paragraph (l)(1) above, an operator must ensure that the following Table is used:

Table 11 – Conversion of Met visibility to RVR/CMV.

Light elements in operation	RVR/CMV = Reported Met visibility	
	Day	Night
HI approach and runway lighting	1.5	2.0
Any type of lighting installation other than above	1.0	1.5
No lighting	1.0	Not applicable

AMC to Appendix 1 to CAR-OPS 1.430(d) Aerodrome Operating Minima: RVR for Cat 1, APV, NPA

Determination of RVR / Visibility Minima for Category I, APV and non-precision approaches

1. **Introduction**

1.1 The minimum RVR values for the conduct of Category I, APV and non-precision approaches shall be the higher of the values derived from Table 5 or 6 of Appendix 1 to CAR-OPS 1.430(d).

1.2 The tables are to be used for the determination of all applicable operational RVR values except as prescribed in paragraph 1.3 below.

1.3 With the approval of the Authority, the formula below may be used with the actual approach slope and or the actual length of the approach lights for a particular runway. This formula may also be used with the approval of the Authority to calculate the applicable RVR for special (oneoff) approach operations which are allowed under CAR-OPS 1.430 paragraph (d) (4).

1.4 When the formula is utilised as described above, the calculation conventions and methodologies described in the notes applicable to Paragraph 2 below should be used.

2. **Derivation of Minimum RVR Values.**

2.1 The values in Table 5 in Appendix 1 to CAR-OPS 1.430(d) are derived from the formula below:

RVR/Visibility (m) = *[(DH/MDH (ft) x 0.3048) / tan α] – length of approach lights (m)*

Note 1: Tan α is the calculation angle, being a default value of 3.00 degrees increasing in steps of 0.10 degrees for each line in Table 5 up to 3.77 degrees and then remains constant.

Note 2: The default value for the length of the approach lights is equal to the minimum length of the various systems described in Table 4 in Appendix 1 to CAR-OPS 1.430(d).

Note 3: The values derived from the above formula have been rounded to the nearest 50 metres up to a value of 800 metres RVR and thereafter to the nearest 100 metres.

Note 4: The DH/MDH intervals in Table 5 have been selected to avoid anomalies caused by the rounding of the calculated OCA(H).

Note 5: The height intervals, referred in Note 4 above, are 10 feet up to a DH/MDH of 300 feet, 20 feet up to a DH/MDH of 760 feet and then 50 feet for DH/MDH above 760 feet.

Note 6: The minimum value of the table is 550 metres.

2.2 With the approval of the Authority, the formula may be used to calculate the applicable RVR value for approaches with approach-slopes of greater than 4.5 degrees.

3. Approach Operations with an RVR of less than 750m (800m for single-pilot operations)

3.1 Providing the DH is not more than 200 ft, approach operations are almost unrestricted with a runway which is equipped with FALS, RTZL and RCLL. Under these circumstances, the applicable RVR of less than 750m (800m for single-pilot operations) may be taken directly from Table 5. The ILS should not be promulgated as restricted in AIPs, NOTAMS or other documents. Unacceptable ILS restrictions would include limitations on the use of the localiser and / or glideslope below a certain height, prohibitions on its use auto-coupled or limitations on the ILS classification.

3.2 Without RTZL and RCLL in order to be able to operate to the RVR values of less than 750m (800m for single-pilot operations) in Table 5, the approach must be conducted utilising an approved HUDLS (or equivalent approved system), or be flown as a coupled approach or flight-directorflown approach (Note: not for single-pilot operations) to a DH of not greater than 200 ft. The equivalent system could for instance be an approved HUD which is not certificated as a landing system but is able to provide adequate guidance cues. Other devices may also be suitable, such as Enhanced/Synthetic Vision Systems (E/SVS) or other hybrids of such devices.

4. Description of Approach Lighting Systems

4.1 The following table describes the types of approach lighting systems which are acceptable for calculation of the aerodrome operating minima. The systems described are basically the ICAO systems as described in Annex 14. However, the table also contains shorter systems which are acceptable for operational use. This is concurrent with the fact that approach lighting systems may sometimes be adjusted to the conditions existing before the threshold. Additionally, the table describes the FAA approach lighting systems which are considered to be corresponding for calculation of aerodrome operating minima.

CAR-OPS Class of Facility	Length, configuration and intensity of approach lights
FALS (Full Approach Light System)	Precision approach category I lighting system as specified in Annex 14, high intensity lights, 720 m or more **FAA:** ALSF1, ALSF2, SSALR, MALSR, high or medium intensity and/or flashing lights, 720 m or more
CAR-OPS Class of Facility	**Length, configuration and intensity of approach lights**
IALS (Intermediate Approach Light System)	**EASA:** Simplified Approach Light System as specified in Annex 14, high intensity lights, 420 – 719 m **FAA:** MALSF, MALS, SALS/SALSF, SSALF, SSALS, high or medium intensity and/or flashing lights, 420 – 719 m
BALS (Basic Approach Light System)	**EASA:** High, medium or low intensity lights, 210 - 419 m including one crossbar **FAA:** ODALS, high or medium intensity or flashing lights 210 - 419m
NALS (No Approach Light System)	**EASA:** Approach Light System shorter than 210 m or no approach lights

GM to Appendix 1 to CAR-OPS 1.430(f) & (g) RVR – Category II & III

Establishment of minimum RVR for Category II and III Operations

(See Appendix 1 to CAR-OPS 1.430, paragraphs (d) and (e) or (f) and (g) for CAR OPS-1.430)

1 General

1.1 When establishing minimum RVR for Category II and III Operations, operators should pay attention to the following information which originates in ECAC Doc 17, 3rd Edition, Subpart A. It is retained as background information and, to some extent, for historical purposes although there may be some conflict with current practices.

1.2 Since the inception of precision approach and landing operations various methods have been devised for the calculation of aerodrome operating minima in terms of decision height and runway visual range. It is a comparatively straightforward matter to establish the decision height for an operation but establishing the minimum RVR to be associated with that decision height so as to provide a high probability that the required visual reference will be available at that decision height has been more of a problem.

1.3 The methods adopted by various States to resolve the DH/RVR relationship in respect of Category II and Category III operations have varied considerably. In one instance there has been a simple approach which entailed the application of empirical data based on actual operating experience in a particular environment. This has given satisfactory results for application within the environment for which it was developed. In another instance a more sophisticated method was employed which utilised a fairly complex computer programme to take account of a wide range of variables. However, in the latter case, it has been found that with the improvement in the performance of visual aids, and the increased use of automatic equipment in the many different types of new aircraft, most of the variables cancel each other out and a simple tabulation can be constructed which is applicable to a wide range of aircraft. The basic principles which are observed in establishing the values in such a table are that the scale of visual reference required by a pilot at and below decision height depends on the task that he has to carry out, and that the degree to which his vision is obscured depends on the obscuring medium, the general rule in fog being that it becomes denser with increase in height. Research using flight simulators coupled with flight trials has shown the following:

(a) Most pilots require visual contact to be established about 3 seconds above decision height though it has been observed that this reduces to about 1 second when a failoperational automatic landing system is being used;

(b) To establish lateral position and cross-track velocity most pilots need to see not less than a 3-light segment of the centre line of the approach lights, or runway centre line, or runway edge lights;

(c) For roll guidance most pilots need to see a lateral element of the ground pattern, i.e. an approach lighting cross bar, the landing threshold, or a barrette of the touchdown zone lighting; and

(d) To make an accurate adjustment to the flight path in the vertical plane, such as a flare, using purely visual cues, most pilots need to see a point on the ground which has a low or zero rate of apparent movement relative to the aircraft.

(e) With regard to fog structure, data gathered in the United Kingdom over a twenty-year period have shown that in deep stable fog there is a 90% probability that the slant visual range from eye heights higher than 15ft above the ground will be less that the horizontal visibility at ground level, i.e. RVR. There are at present no data available to show what the relationship is between the Slant Visual Range and RVR in other low visibility conditions such as blowing snow, dust or heavy rain, but there is some evidence in pilot reports that the lack of contrast between visual aids and the background in such conditions can produce a relationship similar to that observed in fog.

2 Category II Operations

2.1 The selection of the dimensions of the required visual segments which are used for Category II operations is based on the following visual requirements:

(a) A visual segment of not less than 90 metres will need to be in view at and below decision height for pilot to be able to monitor an automatic system;

(b) A visual segment of not less than 120 metres will need to be in view for a pilot to be able to maintain the roll attitude manually at and below decision height; and

(c) For a manual landing using only external visual cues, a visual segment of 225 metres will be required at the height at which flare initiation starts in order to provide the pilot with sight of a point of low relative movement on the ground.

3 Category III fail passive operations

3.1 Category III operations utilising fail-passive automatic landing equipment were introduced in the late 1960's and it is desirable that the principles governing the establishment of the minimum RVR for such operations be dealt with in some detail.

3.2 During an automatic landing the pilot needs to monitor the performance of the aircraft system, not in order to detect a failure which is better done by the monitoring devices built into the system, but so as to know precisely the flight situation. In the final stages he should establish visual contact and, by the time he reaches decision height, he should have checked the aircraft position relative to the approach or runway centre-line lights. For this he will need sight of horizontal elements (for roll reference) and part of the touchdown area. He should check for lateral position and cross-track velocity and, if not within the pre-stated lateral limits, he should carry out a go-around. He should also check longitudinal progress and sight of the landing threshold is useful for this purpose, as is sight of the touchdown zone lights.

3.3 In the event of a failure of the automatic flight guidance system below decision height, there are two possible courses of action; the first is a procedure which allows the pilot to complete the landing manually if there is adequate visual reference for him to do so, or to initiate a go- around if there is not; the second is to make a go-around mandatory if there is a system disconnect regardless of the pilot's assessment of the visual reference available.

(a) If the first option is selected then the overriding requirement in the determination of a minimum RVR is for sufficient visual cues to be available at and below decision height for the pilot to be able to carry out a manual landing. Data presented in ICAO Doc 9365 showed that a minimum value of 300 metres would give a high probability that the cues needed by the pilot to assess the aircraft in pitch and roll will be available and this should be the minimum RVR for this procedure.

(b) The second option, to require a go-around to be carried out should the automatic flightguidance system fail below decision height, will permit a lower minimum RVR because the visual reference requirement will be less if there is no need to provide for the possibility of a manual landing. However, this option is only acceptable if it can be shown that the probability of a system failure below decision height is acceptably low. It should be recognised that the inclination of a pilot who experiences such a failure would be to continue the landing manually but the results of flight trials in actual conditions and of simulator experiments show that pilots do not always recognise that the visual cues are inadequate in such situations and present recorded data reveal that pilots' landing performance reduces progressively as the RVR is reduced below 300 metres. It should further be recognised that there is some risk in carrying out a manual go-around from below 50ft in very low visibility and it should therefore be accepted that if an RVR lower than 300 metres is to be authorised, the flight deck procedure should not normally allow the pilot to continue the landing manually in such conditions and the aeroplane system should be sufficiently reliable for the go-around rate to be low.

3.4 These criteria may be relaxed in the case of an aircraft with a fail-passive automatic landing system which is supplemented by a head-up display which does not qualify as a fail- operational system but which gives guidance which will enable the pilot to complete a landing in the event of a failure of the automatic landing system. In this case it is not necessary to make a go-around mandatory in the event of a failure of the automatic landing system when the RVR is less than 300 metres.

4 Category III fail operational operations - with a Decision Height

4.1 For Category III operations utilising a fail-operational landing system with a Decision Height, a pilot should be able to see at least 1 centre line light.

4.2 For Category III operations utilising a fail-operational hybrid landing system with a Decision Height, a pilot should have a visual reference containing a segment of at least 3 consecutive lights of the runway centre line lights.

5 Category III fail operational operations - with No Decision Height

5.1 For Category III operations with No Decision Height the pilot is not required to see the runway prior to touchdown. The permitted RVR is dependent on the level of aeroplane equipment.

5.2 A CAT III runway may be assumed to support operations with no Decision Height unless specifically restricted as published in the AIP or NOTAM.

GM to Appendix 1 to CAR-OPS 1.430, para (g)(5) Table 8 Crew actions in case of autopilot failure

Crew actions in case of autopilot failure at or below decision height in fail-passive Category III operations.

For operations to actual RVR values less than 300m, a go-around is assumed in the event of an autopilot failure at or below DH.

This means that a go-around is the normal action. However, the wording recognises that there may be circumstances where the safest action is to continue the landing. Such circumstances include the height at which the failure occurs, the actual visual references, and other malfunctions. This would typically apply to the late stages of the flare.

In conclusion it is not forbidden to continue the approach and complete the landing when the commander or the pilot to whom the conduct of the flight has been delegated, determines that this is the safest course of action.

Operational instructions should reflect the information given in this GM and the operators policy.

AMC to Appendix 1 to CAR OPS-1.430(h) – EVS

1. Introduction

1.1 Enhanced vision systems use sensing technology to improve a pilot's ability to detect objects, such as runway lights or terrain, which may otherwise not be visible. The image produced from the sensor and/or image processor can be displayed to the pilot in a number of ways including use of a head up display. The systems can be used in all phases of flight and can improve situational awareness. In particular, infrared systems can display terrain during operations at night, improve situational awareness during night and low-visibility taxiing, and may allow earlier acquisition of visual references during instrument approaches.

2. Background to EVS rule

2.1 The rule for EVS was developed after an operational evaluation of two different EVS systems, along with data and support kindly provided by the FAA. Approaches using EVS were flown in a variety of conditions including fog, rain and snow showers, as well as at night to aerodromes located in mountainous terrain. The infrared EVS performance can vary depending on the weather conditions encountered. Therefore, the Rule takes a conservative approach to cater for the wide variety of conditions which may be encountered. It may be necessary to amend the Rule in future to take account of greater operational experience.

2.2 A rule for the use of EVS during take-off has not been developed. The systems evaluated did not perform well when the RVR was below 300 metres. There may be some benefit for use of EVS during take-off with greater visibility and reduced lighting; however, such operations would need to be evaluated.

2.3 The Rule has been developed to cover use of infrared systems only. Other sensing technologies are not intended to be excluded; however, their use will need to be evaluated to determine the appropriateness of this, or any other rule. During the development of the Rule material in CAR-OPS 1.430 (h), it was envisaged what equipment should be fitted to the aeroplane, as a minimum. Given the present state of technological development, it is considered that a HUD is an essential element of the EVS equipment.

2.4 In order to avoid the need for tailored charts for approaches utilising EVS, it is envisaged that an operator will use Table 9 to determine the applicable RVR at the commencement of the approach.

3. Additional Operational requirements

3.1 An enhanced vision system equipment certificated for the purpose of Appendix 1 to CAR OPS-1.403(h) should have:

(a) A head up display system (capable of displaying, airspeed, vertical speed, aircraft attitude, heading, altitude, command guidance as appropriate for the approach to be flown, path deviation indications, flight path vector, and flight path angle reference cue and the EVS imagery),

(b) For two-pilot operation, a head-down view of the EVS image, or other means of displaying the EVS derived information easily to the pilot monitoring the progress of the approach.

Note: If the aircraft is equipped with a radio altimeter, it will be used only as enhanced terrain awareness during approach using EVS and will be not taken into account for the operational procedures development.

4. Two-pilot operations

4.1 For operations in RVRs below 550 m, two-pilot operation will be required.

4.2 The requirement for a head-down view of the EVS image is intended to cover for multi-pilot philosophy, whereby the pilot monitoring (PM) is kept in the 'loop' and CRM does not break down. The PM can be very isolated from the information necessary for monitoring flight progress and decision making if the PF is the only one to have the EVS image.

AMC to Appendix 1 to CAR-OPS 1.430(j) Circling

Terminology: XLS= ILS/MLS/GLS etc.

1. Visual Maneuvering (circling)

1.1 The purpose of this AMC is to provide operators with supplemental information regarding the application of aerodrome operating minima in relation to circling approaches.

2. Conduct of flight – General

2.1 The Minimum Descent Height (MDH) and Obstacle Clearance Height (OCH) included in the procedure are referenced to aerodrome elevation.

2.2 The Minimum Descent Altitude (MDA) is referenced to mean sea level.

2.3 For these procedures, the applicable visibility is the meteorological visibility (VIS).

3. Instrument approach followed by visual manoeuvring (circling) without prescribed tracks

3.1 When the aeroplane is on the initial instrument approach, before visual reference is stabilised, but not below MDH/MDA - the aeroplane should follow the corresponding instrument approach procedure until the appropriate instrument Missed Approach Point (MAPt) is reached.

3.2 At the beginning of the level flight phase at or above the MDH/MDA, the instrument approach track determined by radio navigation aids, RNAV, RNP or XLS should be maintained until:

(a) The pilot estimates that, in all probability, visual contact with the runway of intended landing or the runway environment will be maintained during the entire circling procedure; and

(b) The pilot estimates that the aeroplane is within the circling area before commencing circling; and

(c) The pilot is able to determine the aeroplane's position in relation to the runway of intended landing with the aid of the appropriate external references.

3.3 When reaching the published instrument MAPt and the conditions stipulated in paragraph (3.2) above, are unable to be established by the pilot, a missed approach should be carried out in accordance with that instrument approach procedure. (See paragraph 5.)

3.4 After the aeroplane has left the track of the initial (letdown) instrument approach, the flight phase outbound from the runway should be limited to an appropriate distance, which is required to align the aeroplane onto the final approach. Such manoeuvres should be conducted to enable the aeroplane:

(a) To attain a controlled and stable descent path to the intended landing runway; and

(b) Remain within the circling area and in such way that visual contact with the runway of intended landing or runway environment is maintained at all times.

3.5 Flight manoeuvres should be carried out at an altitude/height that is not less than the circling MDH/MDA.

3.6 Descent below MDH/MDA should not be initiated until the threshold of the runway to be used has been appropriately identified and the aeroplane is in a position to continue with a normal rate of descent and land within the touchdown zone.

4. Instrument approach followed by a visual manoeuvring (circling) with prescribed track

4.1 The aeroplane should remain on the initial instrument approach or letdown procedure until one of the following is reached:

(a) The prescribed divergence point to commence circling on the prescribed track; or
(b) The appropriate initial instrument MAPt.

4.2 The aeroplane should be established on the instrument approach track determined by the radio navigation aids, RNAV, RNP, or XLS in level flight at or above the MDH/MDA at or by the circling manoeuvre divergence point.

4.3 If the divergence point is reached before the required visual reference is acquired, a missed approach should be initiated not later than the initial instrument approach MAPt and completed in accordance with the initial instrument approach procedure.

4.4 When commencing the prescribed track-circling manoeuvre at the published divergence point, the subsequent manoeuvres should be conducted to comply with the published routing and promulgated heights/altitudes.

4.5 Unless otherwise specified, once the aeroplane is established on the prescribed track(s), the promulgated visual reference should not be required to be maintained unless:

(a) Required by the Authority;
(b) The Circling MAPt (if published) is reached.

4.6 If the prescribed track-circling manoeuvre has a published MAPt and the required visual reference has not been obtained a missed approach should be executed in accordance with paragraphs 5.2 and 5.3 below.

4.7 Subsequent further descent below MDH/MDA should only commence when the required visual reference is obtained.

4.8 Unless otherwise specified in the procedure, final descent should not be initiated from MDH/MDA until the threshold of the intended landing runway has been appropriately identified and the aeroplane is in a position to continue with a normal rate of descent and land within the touchdown zone.

5. Missed approach

5.1 Missed Approach during Instrument Approach prior to Circling:

(a) If the decision to carry out a missed approach is taken when the aeroplane is positioned on the instrument approach track defined by radio-navigation aids RNAV, RNP, or XLS, and before commencing the circling manoeuvre, the published missed approach for the instrument approach should be followed.
(b) If the instrument approach procedure is carried out with the aid of an XLS or Stabilised Approach (SAp), the (MAPt) associated with an XLS procedure without glide path (GP out procedure) or the SAp, where applicable, should be used.

5.2 If a prescribed missed approach is published for the circling manoeuvre, this overrides the manoeuvres prescribed below.

5.3 If visual reference is lost while circling to land after the aeroplane has departed from the initial instrument approach track, the missed approach specified for that particular instrument approach should be followed. It is expected that the pilot will make an initial climbing turn toward the intended landing runway and continue overhead the aerodrome where the pilot will establish the aeroplane in a climb on the instrument missed approach track.

5.4 The aeroplane should not leave the visual manoeuvring (circling) area, which is obstacle protected, unless:

(a) Established on the appropriate missed approach track; or
(b) At Minimum Sector Altitude (MSA)

5.5 All turns should (See Note 1 below) be made in the same direction and the aeroplane should remain within the circling protected area while climbing to either:

(a) The altitude assigned to any published circling missed approach manoeuvre if applicable;

(b) The altitude assigned to the missed approach of the initial instrument approach;
(c) The Minimum Sector Altitude (MSA);
(d) The Minimum Holding Altitude (MHA) applicable for transition to a holding facility or fix, or continue to climb to a Minimum Safe Altitude; or
(e) As directed by ATS (C).

Note 1: When the go-around is commenced on the "downwind" leg of the circling manoeuvre, an "S" turn may be undertaken to align the aeroplane on the initial instrument approach missed approach path, provided the aeroplane remains within the protected circling area.

Note 2: The commander should be responsible for ensuring adequate terrain clearance during the above stipulated manoeuvres, particularly during the execution of a missed approach initiated by ATS.

5.6 In as much as the circling manoeuvre may be accomplished in more than one direction, different patterns will be required to establish the aeroplane on the prescribed missed approach course depending on its position at the time visual reference is lost. In particular, all turns are to be in the prescribed direction if this is restricted, e.g. to the west/east (left or right hand) to remain within the protected circling area.

5.7 If a missed approach procedure is promulgated for the runway (XX) onto which the aeroplane is conducting a circling approach and the aeroplane has commenced a manoeuvre to align with the runway; the missed approach for this direction may be accomplished. The ATS should be informed of the intention to fly the promulgated missed approach procedure for runway XX.

5.8 When the option described in paragraph (5.7) above is undertaken the commander should whenever possible, advise at the earliest opportunity, the ATS(C) of the intended go around procedure. This dialogue should, if possible occur during the initial approach phase and include the intended missed approach to be flown and the level off altitude.

5.9 In addition to paragraph (5.8) above, the commander should advise ATS(C) when any go around has commenced the height / altitude the aeroplane is climbing to and the position the aeroplane is proceeding towards and or heading the aeroplane is established on.

GM to Appendix 1 to CAR OPS-1.430 Visual Manoeuvring (circling)

(See Appendix 1 to CAR OPS-1.430)

(1) The purpose of this GM is to provide operators with supplemental information regarding the application of aerodrome operating minima in relation to circling approaches.

(2) Conduct of flight – General
  (a) For these procedures, the applicable visibility is the meteorological visibility (VIS).
  (b) The MDA/H and OCA/H minimums included in the procedure are related to aerodrome elevation.

(3) Missed approach
  (a) If the decision to carry out a missed approach is taken when the aircraft is positioned on the approach axis (track) defined by radio-navigation aids, the published missed approach procedure must be followed. If visual reference is lost while circling to land from an instrument approach, the missed approach specified for that particular instrument approach must be followed. It is expected that the pilot will make an initial climbing turn toward the landing runway and overhead the aerodrome where he will establish the aeroplane in a climb on the missed approach track. In as much as the circling manoeuvre may be accomplished in more than one direction, different patterns will be required to establish the aeroplane on the prescribed missed approach course depending on its position at the time visual reference is lost unless otherwise prescribed.
  (b) If the instrument approach procedure is carried out with the aid of an ILS, the Missed Approach Point (MAPt) associated with an ILS procedure without glide path (GP out procedure) should be taken in account.

(4) Instrument approach followed by visual manoeuvring (circling) without prescribed tracks:
- (a) Before visual reference is established, but not below MDA/H – The flight should follow the corresponding instrument approach procedure.
- (b) At the beginning of the level flight phase at or above the MDA/H – From the beginning of the level flight phase, the instrument approach track determined by radio navigation aids should be maintained until:
  - i. The pilot estimates that, in all probability, visual contact with the runway or runway environment will be maintained during the entire procedure;
  - ii. The pilot estimates that his aircraft is within the circling area before commencing circling; and
  - iii. The pilot is able to determine his aircraft's position in relation to the runway with the aid of the external references.
- (c) If the conditions in paragraph (b) above are not met by the MAPt, a missed approach must be carried out in accordance with the instrument approach procedure.
- (d) After the aeroplane has left the track of the corresponding instrument approach procedure, the flight phase outbound from the runway should be limited to the distance which is required to align the aeroplane for the final approach. Flight manoeuvres should be conducted within the circling area and in such way that visual contact with the runway or runway environment is maintained at all times.
- (e) Flight manoeuvres should be carried out at an altitude/height which is not less than the circling minimum descent/altitude height (MDA/H).
- (f) Descent below MDA/H should not be initiated until the threshold of the runway to be used has been identified and the aeroplane is in a position to continue with a normal rate of descent and land within the touchdown zone.

(5) Instrument approach followed by a visual manoeuvring (circling) with prescribed track
- (a) Before visual reference is established, but not below MDA/H – The flight should follow the corresponding instrument approach procedure.
- (b) The aeroplane should be established in level flight at or above the MDA/H and the instrument approach track determined by the radio navigation aids maintained until visual contact can be achieved and maintained. At the divergence point, the aeroplane should leave the instrument approach track and the published routing and heights followed.
- (c) If the divergence point is reached before the necessary visual reference is acquired, a missed approach procedure should be initiated not later than the MAPt and carried out in accordance with the instrument approach procedure.
- (d) The instrument approach track determined by radio navigation aids should only be left at the prescribed divergence point when only the published routing and heights should be followed.
- (e) Unless otherwise specified in the procedure, final descent should not be initiated until the threshold of the runway to be used has been identified and the aeroplane is in a position to continue with a normal rate of descent and land within the touchdown zone.

Appendix 1 to CAR OPS-1.440 Low Visibility Operations – General Operating Rules

(See AC to Appendix 1 to CAR OPS-1.440)

(a) ***General.*** The following procedures apply to the introduction and approval of low visibility operations.

(b) ***Operational demonstration.*** The purpose of the operational demonstration is to determine or validate the use and effectiveness of the applicable aircraft flight guidance systems, including HUDLS if appropriate, training, flight crew procedures, maintenance programme, and manuals applicable to the Category II/III programme being approved.

- (1) At least 30 approaches and landings must be accomplished in operations using the

Category II/III systems installed in each aircraft type if the requested DH is 50 ft or higher. If the DH is less than 50 ft, at least 100 approaches and landings will need to be accomplished unless otherwise approved by the Authority.

(2) If an operator has different variants of the same type of aircraft utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of aircraft, the operator must show that the various variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant. The Authority may also accept a reduction of the number of approach and landings based on credit given for the experience gained by another operator with an AOC issued in accordance with CAR OPS-1 using the same aeroplane type or variant and procedures.

(3) If the number of unsuccessful approaches exceeds 5 % of the total (e.g. unsatisfactory landings, system disconnects) the evaluation programme must be extended in steps of at least ten (10) approaches and landings until the overall failure rate does not exceed 5 %.

(c) ***Data collection for operational demonstrations.*** Each applicant must develop a data collection method (e.g. a form to be used by the flight crew) to record approach and landing performance. The resulting data and a summary of the demonstration data shall be made available to the Authority for evaluation.

(d) ***Data analysis***. Unsatisfactory approaches and/or automatic landings shall be documented and analysed.

(e) ***Continuous monitoring:***

(1) After obtaining the initial authorisation, the operations must be continuously monitored by the operator to detect any undesirable trends before they become hazardous. Flight crew reports may be used to achieve this.

(2) The following information must be retained for a period of twelve (12) months:

i. the total number of approaches, by aeroplane type, where the airborne Category II or III equipment was utilise to make satisfactory, actual or practice, approaches to the applicable Category II or III minima; and

ii. reports of unsatisfactory approaches and/or automatic landings, by aerodrome and aeroplane registration, in the following categories:

A. airborne equipment faults;

B. ground facility difficulties;

C. missed approaches because of ATC instructions; or

D. other reasons.

iii. An operator must establish a procedure to monitor the performance of the automatic landing system or HUDLS to touchdown performance, as appropriate, of each aeroplane.

(f) ***Transitional periods:***

(1) Operators with no previous Category II or III experience

i. An operator without previous Category II or III operational experience may be approved for Category II or IIIA operations, having gained a minimum experience of six months of Category I operations on the aeroplane type.

ii. On completing six months of Category II or IIIA operations on the aeroplane type the operator may be approved for Category IIIB operations. When granting such an approval, the Authority may impose higher minima than the lowest applicable for an additional period. The increase in minima will normally only refer to RVR and/or a restriction against operations with no decision height and must be selected such that they will not require any change of the operational procedures.

(2) Operators with previous Category II or III experience.

i. An operator with previous Category II or III experience may obtain authorisation for a reduced transition period by application to the Authority.

ii. An operator authorised for Category II or III operations using auto-coupled approach procedures, with or without auto-land, and subsequently introducing manually flown Category II or III operations using a HUDLS shall be considered to be a "New Category II/III operator" for the purposes of the demonstration period provisions.

(g) ***Maintenance of Category II, Category III and LVTO equipment.*** Maintenance instructions for the on-board guidance systems must be established by the operator, in liaison with the manufacturer, and included in the operator's aeroplane maintenance programme prescribed in CAR-M, paragraph M.A.302 which must be approved by the Authority.

(h) ***Eligible aerodromes and runways:***

(1) Each aeroplane type/runway combination must be verified by the successful completion of at least one approach and landing in Category II or better conditions, prior to commencing Category III operations.

(2) For runways with irregular pre-threshold terrain or other foreseeable or known deficiencies, each aeroplane type/runway combination must be verified by operations in standard Category I or better conditions, prior to commencing Lower than Standard Category I, Category II, or other than Standard Category II or Category III operations.

(3) If an operator has different variants of the same type of aeroplane in accordance with subparagraph (4) below, utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of aeroplane in accordance with sub paragraph 4 below, the operator must show that the variants have satisfactory operational performance, but the operator need not conduct a full operational demonstration for each variant/runway combination.

(4) For the purpose of paragraph (h), an aeroplane type or variant of an aeroplane type is deemed to be the same type/variant of aeroplane if that type/variant has the same or similar:

i. level of technology, including the:

A. FGS and associated displays and controls;

B. the FMS and level of integration with the FGS;

C. use of HUDLS.

ii. Operational procedures, including:

A. alert height;

B. manual landing/automatic landing;

C. no decision height operations;

D. use of HUD/HUDLS in hybrid operations.

iii. Handling characteristics, including:

A. manual landing from automatic or HUDLS guided approach;

B. manual go-around from automatic approach;

C. automatic/manual roll out.

(5) Operators using the same aeroplane type/class or variant of a type in accordance with subparagraph (4) above may take credit from each other's' experience and records in complying with this paragraph.

(6) Operators conducting Other than Standard Category II operations shall comply with Appendix 1 to CAR OPS-1.440 — Low Visibility Operations — General Operating Rules applicable to Category II operations.

AC to Appendix 1 to CAR OPS-1.440 Operational Demonstrations

(See Appendix 1 to CAR OPS-1.440)

(1) General

(a) Demonstrations may be conducted in line operations, or any other flight where the Operator's procedures are being used.

(b) In unique situations where the completion of 100 successful landings could take an unreasonably long period of time due to factors such as a small number of aeroplanes in the fleet, limited opportunity to use runways having Category II/III procedures, or inability to obtain ATS sensitive area protection during good weather conditions, and equivalent reliability assurance can be achieved, a reduction in the required number of landings may be considered on a case-by-case basis. Reduction of the number of landings to be demonstrated requires a justification for the reduction, and prior approval from Authority. However, at the operator's option, demonstrations may be made on other runways and facilities. Sufficient information should be collected to determine the cause of any unsatisfactory performance (e.g. sensitive area was not protected).

(c) If an operator has different variants of the same type of aeroplane utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type/classes of aeroplane, the operator should show that the various variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant.

(d) Not more than 30% of the demonstration flights should be made on the same runway.

(2) Data Collection for Operational Demonstrations

(a) Data should be collected whenever an approach and landing is attempted utilising the Category II/ III system, regardless of whether the approach is abandoned, unsatisfactory, or is concluded successfully.

(b) The data should, as a minimum, include the following information:

i. Inability to initiate an Approach. Identify deficiencies related to airborne equipment which preclude initiation of a Category II/III approach.

ii. Abandoned Approaches. Give the reasons and altitude above the runway at which approach was discontinued or the automatic landing system was disengaged.

iii. Touchdown or Touchdown and Roll-out Performance. Describe whether or not the aircraft landed satisfactorily (within the desired touchdown area) with lateral velocity or cross track error which could be corrected by the pilot or automatic system so as to remain within the lateral confines of the runway without unusual pilot skill or technique. The approximate lateral and longitudinal position of the actual touchdown point in relation to the runway centreline and the runway threshold, respectively, should be indicated in the report. This report should also include any Category II/III system abnormalities which required manual intervention by the pilot to ensure a safe touchdown or touchdown and roll-out, as appropriate.

(3) Data Analysis

(a) Unsuccessful approaches due to the following factors may be excluded from the analysis:

i. ATS Factors. Examples include situations in which a flight is vectored too close to the final approach fix/point for adequate localiser and glide slope capture, lack of protection of ILS sensitive areas, or ATS requests the flight to discontinue the approach.

ii. Faulty Navaid Signals. Navaid (e.g. ILS localiser) irregularities, such as those caused by other aircraft taxiing, over-flying the navaid (antenna).

iii. Other Factors. Any other specific factors that could affect the success of Category II/III operations that are clearly discernible to the flight crew should be reported.

IEM to Appendix 1 to CAR OPS-1.440(b) Criteria for a successful CAT II/III approach and automatic landing

(See Appendix 1 to CAR OPS-1.440, paragraph (b))

(1) The purpose of this IEM is to provide operators with supplemental information regarding the criteria for a successful approach and landing to facilitate fulfilling the requirements prescribed

in Appendix 1 to CAR OPS-1.440, paragraph (b).

(2) An approach may be considered to be successful if:

(a) From 500 feet to start of flare:

i. Speed is maintained as specified in AC-AWO 231, paragraph 2 'Speed Control'; and

ii. No relevant system failure occurs; and

(b)From 300 feet to DH:

i. No excess deviation occurs; and

ii. No centralised warning gives a go-around command (if installed).

(3) An automatic landing may be considered to be successful if:

(a) No relevant system failure occurs;

(b) No flare failure occurs;

(c) No de-crab failure occurs (if installed);

(d) Longitudinal touchdown is beyond a point on the runway 60 metres after the threshold and before the end of the touchdown zone lighting (900 metres from the threshold);

(e) Lateral touchdown with the outboard landing gear is not outside the touchdown zone lighting edge;

(f) Sink rate is not excessive;

(g) Bank angle does not exceed a bank angle limit; and

(h) No roll-out failure or deviation (if installed) occurs.

(4) More details can be found in CS-AWO or an equivalent accepted by the CAA.

IEM OPS-1.450(g)(1) Low Visibility Operations - Training & Qualifications

(See Appendix 1 to CAR OPS-1.450(g)(1))

The number of approaches referred to in Appendix 1 to CAR OPS-1.450(g)(1) includes one approach and landing that may be conducted in the aeroplane using approved Category II/III procedures. This approach and landing may be conducted in normal line operation or as a training flight. It is assumed that such flights will only be conducted by pilots qualified in accordance CAR OPS-1.940 and qualified for the particular category of operation.

Appendix 1 to CAR OPS-1.450 Low Visibility Operations – Training & Qualifications

(See CAR OPS-1.450)

(a) *General.*

An operator must ensure that flight crew member training programmes for Low Visibility Operations include structured courses of ground, Flight Simulator and/or flight training. The operator may abbreviate the course content as prescribed by sub-paragraphs (2) and (3) below provided the content of the abbreviated course is acceptable to the Authority.

(1) Flight crew members with no Category II or Category III experience must complete the full training programme prescribed in subparagraphs (b), (c) and (d) below.

(2) Flight crew members with Category II or Category III experience with a similar type of operation (auto coupled/ auto-land, HUDLS/Hybrid HUDLS or EVS) or Category II with manual land if appropriate with another operator may undertake an:

i. abbreviated ground training course if operating a different type/class from that on which the previous Category II or Category III experience was gained;

ii. abbreviated ground, flight simulator and/or flight training course if operating the same type/class and variant of the same type or class on which the previous Category II or Category III experience was gained. The abbreviated course is to include at least the requirements of subparagraphs (d)1, (d)2(i) or (d)2(ii) as appropriate and (d)3(i). With the approval of the Authority, the operator may reduce the number of approaches/landings required by subparagraph (d)2(i) if the type/class or the variant of the type or class has the same or similar:

A. level of technology — flight control/guidance system (FGS); and
B. operational procedures;
C. handling characteristics (See paragraph 4 below); as the previously operated type or class, otherwise the requirement of (d)2(i) has to be met in full;
D. use of HUDLS/hybrid HUDLS;
E. use of EVS.

(3) Flight crew members with Category II or Category III experience with the operator may undertake an abbreviated ground, Flight simulator and/or flight training course. The abbreviated course when changing:

i. aeroplane type/class is to include at least the requirements of subparagraphs (d)1, (d)2(i) or (d)2(ii) as appropriate and (d)3(i);
ii. to a different variant of

aeroplane within the same type or class rating that has the same or similar:

A. level of technology — flight control/guidance system (FGS); and
B. operational procedures — integrity;
C. handling characteristics (See paragraph 4 below);
D. use of HUDLS/Hybrid HUDLS;
E. use of EVS. as the previously operated type or class, then a difference course or familiarisation appropriate to the change of variant fulfils the abbreviated course requirements.

iii. to a different variant of aeroplane within the same type or class rating that has a significantly different:

A. level of technology — flight control/guidance system (FGS); and
B. operational procedures — integrity;
C. handling characteristics (See paragraph 4 below);
D. use of HUDLS/Hybrid HUDLS;
E. use of EVS then the requirements of subparagraphs (d)1, (d)2(i) or (d)2(ii) as appropriate and (d)3(i) shall be fulfilled. With the approval of the Authority the operator may reduce the number of approaches/landings required by subparagraph

(d)2(i).

(4) An operator must ensure when undertaking Category II or Category III operations with different variant(s) of aeroplane within the same type or class rating that the differences and/or similarities of the aeroplanes concerned justify such operations, taking account at least the following:

i. the level of technology, including the:
   A. FGS and associated displays and controls;
   B. the Flight Management System and its integration or not with the FGS;
   C. use of HUD/HUDLS with hybrid systems and/or EVS;
ii. operational procedures, including:
   A. fail-passive/fail-operational, alert height;
   B. manual landing/automatic landing;
   C. no decision height operations;
   D. use of HUD/HUDLS with hybrid systems;
iii. handling characteristics, including:
   A. manual landing from automatic HUDLS and/or EVS guided approach;
   B. manual go-around from automatic approach;
   C. automatic/manual roll out.

(b) *Ground training.*
An operator must ensure that the initial ground training course for low visibility operations covers at least:
(1) the characteristics and limitations of the ILS and/or MLS;
(2) the characteristics of the visual aids;
(3) the characteristics of fog;
(4) the operational capabilities and limitations of the particular airborne system to include HUD symbology and EVS characteristics if appropriate;
(5) the effects of precipitation, ice accretion, low level wind shear and turbulence;
(6) the effect of specific aeroplane/system malfunctions;
(7) the use and limitations of RVR assessment systems;
(8) the principles of obstacle clearance requirements;
(9) recognition of and action to be taken in the event of failure of ground equipment;
(10) the procedures and precautions to be followed with regard to surface movement during operations when the RVR is 400 m or less and any additional procedures required for take-off in conditions below 150 m (200 m for Category D aeroplanes);
(11) the significance of decision heights based upon radio altimeters and the effect of terrain profile in the approach area on radio altimeter readings and on the automatic approach/landing systems;
(12) the importance and significance of alert height if applicable and the action in the event of any failure above and below the alert height;
(13) the qualification requirements for pilots to obtain and retain approval to conduct low visibility take-offs and Category II or III operations; and
(14) the importance of correct seating and eye position.

(c) *Flight Simulator training and/or flight training*
(1) An operator must ensure that Flight Simulator and/or flight training for Low Visibility Operations includes:
i. Checks of satisfactory functioning of equipment, both on the ground and in flight;
ii. Effect on minima caused by changes in the status of ground installations;
iii. Monitoring of:
A. automatic flight control systems and auto land status annunciators with emphasis on the action to be taken in the event of failures of such systems; and
B. HUD/HUDLS/EVS guidance status and annunciators as appropriate, to include head down displays;
iv. Actions to be taken in the event of failures such as engines, electrical systems, hydraulics or flight control systems;
v. The effect of known unserviceabilities and use of minimum equipment lists;
vi. Operating limitations resulting from airworthiness certification;
vii. Guidance on the visual cues required at decision height together with information on maximum deviation allowed from glide path or localiser; and
viii. The importance and significance of Alert Height if applicable and the action in the event of any failure above and below the Alert Height.
(2) An operator must ensure that each flight crew member is trained to carry out his duties and instructed on the coordination required with other crew members. Maximum use should be made of Flight Simulators.
(3) Training must be divided into phases covering normal operation with no aeroplane or equipment failures but including all weather conditions which may be encountered and detailed scenarios of aeroplane and equipment failure which could affect Category II or III operations. If the aeroplane system involves the use of hybrid or other special systems (such as head up displays or enhanced vision equipment) then flight crew members must practice the use of these systems in normal and abnormal

modes during the Flight Simulator phase of training.

(4) Incapacitation procedures appropriate to Low Visibility Take-offs and Category II and III operations shall be practiced.

(5) For aeroplanes with no Flight Simulator available to represent that specific aeroplane operators must ensure that the flight training phase specific to the visual scenarios of Category II operations is conducted in a specifically approved Flight Simulator. Such training must include a minimum of four (4) approaches. The training and procedures that are type specific shall be practiced in the aeroplane.

(6) Initial Category II and III training shall include at least the following exercises:

i. approach using the appropriate flight guidance, autopilots and control systems installed in the aeroplane, to the appropriate decision height and to include transition to visual flight and landing;

ii. approach with all engines operating using the appropriate flight guidance systems, autopilots, HUDLS and/or EVS and control systems installed in the aeroplane down to the appropriate decision height followed by missed approach; all without external visual reference;

iii. where appropriate, approaches utilising automatic flight systems to provide automatic flare, landing and rollout; and

iv. normal operation of the applicable system both with and without acquisition of visual cues at decision height.

(7) Subsequent phases of training must include at least:

i. Approaches with engine failure at various stages on the approach;

ii. Approaches with critical equipment failures (e.g. electrical systems, auto flight systems, ground and/or airborne ILS/MLS systems and status monitors);

iii. approaches where failures of auto flight equipment and/or HUD/HUDLS/EVS at low level require either;

A. reversion to manual flight to control flare, landing and roll out or missed approach; or

B. reversion to manual flight or a downgraded automatic mode to control missed approaches from, at or below decision height including those which may result in a touchdown on the runway;

iv. Failures of the systems which will result in excessive localiser and/or glideslope deviation, both above and below decision height, in the minimum visual conditions authorised for the operation. In addition, a continuation to a manual landing must be practiced if a head-up display forms a downgraded mode of the automatic system or the head-up display forms the only flare mode; and

v. Failures and procedures specific to aeroplane type or variant.

(8) The training programme must provide practice in handling faults which require a reversion to higher minima.

(9) The training programme must include the handling of the aeroplane when, during a fail passive Category III approach, the fault causes the autopilot to disconnect at or below decision height when the last reported RVR is 300 m or less.

(10) Where take-offs are conducted in RVRs of 400 m and below, training must be established to cover systems failures and engine failure resulting in continued as well as rejected take-offs.

(11) The training programme must include, where appropriate, approaches where failures of the HUDLS and/or EVS equipment at low level require either:

i. reversion to head down displays to control missed approach; or

ii. reversion to flight with no, or downgraded, HUDLS Guidance to control missed approaches from decision height or below, including those which may result in a touchdown on the runway.

(12) An operator shall ensure that when undertaking low visibility take-off, lower than

Standard Category I, other than Standard Category II, and Category II and III Operations utilising a HUD/HUDLS or hybrid HUD/HUDLS or an EVS, that the training and checking programme includes, where appropriate, the use of the HUD/HUDLS in normal operations during all phases of flight.

(d) *Conversion training requirements to conduct low visibility take-off, lower than Standard Category I, other than Standard Category II, approach utilising EVS and Category II and III Operations.*

An operator shall ensure that each flight crew member completes the following low visibility procedures training if converting to a new type/class or variant of aeroplane in which low visibility take-off, lower than Standard Category I, Other than Standard Category II, Approach utilising EVS with an RVR of 800m or less and Category II and III Operations will be conducted. The flight crew member experience requirements to undertake an abbreviated course are prescribed in subparagraphs (a)(2), (a)(3) and (a)(4), above:

(1) Ground Training. The appropriate requirements prescribed in sub-paragraph (b) above, taking into account the flight crew member's Category II and Category III training and experience.

(2) Flight Simulator Training and/or Flight training.

i. A minimum of six (eight for HUDLS with or without EVS) approaches and/or landings in a flight simulator. The requirements for eight HUDLS approaches may be reduced to six when conducting Hybrid HUDLS operations. See subparagraph (4)(i) below.

ii. Where no Flight simulator is available to represent that specific aeroplane, a minimum of three (five for HUDLS and/or EVS) approaches including at least one go-around is required on the aeroplane. For Hybrid HUDLS operations a minimum of three approaches are required, including at least one go- around.

iii.Appropriate additional training if any special equipment is required such as head-up displays or enhanced vision equipment. When approach operations utilising EVS are conducted with an RVR of less than 800m, a minimum of five approaches, including at least one go-around are required on the aeroplane.

(3) Flight Crew Qualification. The flight crew qualification requirements are specific to the operator and the type of aeroplane operated.

i. The operator must ensure that each flight crew member completes a check before conducting Category II or III operations.

ii. The check prescribed in sub-paragraph (i) above may be replaced by successful completion of the Flight Simulator and/or flight training prescribed in sub-paragraph (d)(2) above.

(4) Line Flying under Supervision. An operator must ensure that each flight crew member undergoes the following line flying under supervision:

i. for Category II when a manual landing or a HUDLS approach to touchdown is required, a minimum of:

A. three landings from autopilot disconnect;

B. four landings with HUDLS used to touchdown; except that only one manual landing (two using HUDLS to touchdown) is required when the training required in subparagraph (d)2 above has been carried out in a flight simulator qualified for zero flight time conversion.

ii. For Category III, a minimum of two auto lands except that:

A. only 1 auto land is required when the training required in subparagraph (d)(2). above has been carried out in a flight simulator qualified for zero flight time conversion;

B. no auto land is required during LIFUS when the training required in subparagraph (d)(2) above has been carried out in a flight simulator qualified for zero flight time (ZFT) conversion and the flight crew member successfully completed the ZFT type rating conversion course;

C. the flight crew member, trained and qualified in accordance with paragraph (B) above, is qualified to operate during the conduct of LIFUS to the lowest approved DA(H) and RVR as stipulated in the Operations Manual.

iii. For Category III approaches using HUDLS to touchdown a minimum of four approaches.

(e) *Type and command experience.*

Before commencing Category II/III operations, the following additional requirements are applicable to commanders or pilots to whom conduct of the flight may be delegated, who are new to the aeroplane type:

(1) Before commencing Category II operations, the following additional requirements are applicable to commanders, or pilots to whom conduct of the flight may be delegated, who are new to the aeroplane type/class:

i. 50 hours or 20 sectors on the type, including line flying under supervision; and

ii. 100 m must be added to the applicable Category II RVR minima when the operation requires a Category II manual landing or use of HUDLS to touchdown until:

A. a total of 100 hours or 40 sectors, including LIFUS has been achieved on the type; or

B. a total of 50 hours or 20 sectors, including LIFUS has been achieved on the type where the flight crew member has been previously qualified for Category II manual landing operations with another operator;

C. for HUDLS operations the sector requirements in paragraphs (e)(1). and (e)(2)(i) shall always be applicable, the hours on type/class does not fulfil the requirement.

(2) Before commencing Category III operations, the following additional requirements are applicable to commanders, or pilots to whom conduct of the flight may be delegated, who are new to the aeroplane type:

i. 50 hours or 20 sectors on the type, including line flying under supervision; and

ii. 100 m must be added to the applicable Category II or Category III RVR minima unless he has previously qualified for Category II or III operations with a community operator, until a total of 100 hours or 40 sectors, including line flying under supervision, has been achieved on the type.

(3) The Authority may authorise a reduction in the above command experience requirements for flight crew members who have Category II or Category III command experience.

(f) *Low Visibility Take-Off with RVR less than 150/200 m.*

(1) An operator must ensure that prior to authorisation to conduct take-offs in RVRs below 150 m (below 200 m for Category D aeroplanes the following training is carried out:

i. Normal take-off in minimum authorised RVR conditions;

ii. Take-off in minimum authorised RVR conditions with an engine failure between V1 and V2, or as soon as safety considerations permit; and

iii. Take-off in minimum authorised RVR conditions with an engine failure before V1 resulting in a rejected take-off.

(2) An operator must ensure that the training required by sub-paragraph (1) above is carried out in a Flight Simulator. This training must include the use of any special procedures and equipment. Where no Flight Simulator is available to represent that specific aeroplane, the Authority may approve such training in an aeroplane without the requirement for minimum RVR conditions. (See Appendix 1 to CAR OPS-1.965)

(3) An operator must ensure that a flight crew member has completed a check before conducting low visibility take-offs in RVRs of less than 150 m (less than 200 m for Category D aeroplanes) if applicable. The check may only be replaced by successful completion of the Flight Simulator and/or flight training prescribed in sub-paragraph (f)(1) on conversion to an aeroplane type.

(g) *Recurrent Training and Checking – Low Visibility Operations*

(1) An operator must ensure that, in conjunction with the normal recurrent training and operator proficiency checks, a pilot's knowledge and ability to perform the tasks associated with the particular category of operation for which he is authorised is checked. The required number of approaches within the validity period of the operator proficiency check (as prescribed in CAR OPS-1.965(b)) is to be a minimum of three, one of which may be substituted by an approach and landing in the aeroplane using approved Category II or III procedures. One missed approach shall be flown during the conduct of the operator proficiency check. If the operator is authorised to conduct take-off with RVR less than 150/200 m, at least one LVTO to the lowest applicable minima shall be flown during the conduct of the operator proficiency check. (See IEM OPS-1.450(g)(1).)

(2) For Category III operations an operator must use a Flight Simulator.

(3) An operator must ensure that, for Category III operations on aeroplanes with a fail passive flight control system, including HUDLS, a missed approach is completed at least once over the period of three consecutive operator proficiency checks as the result of an autopilot failure at or below decision height when the last reported RVR was 300 m or less.

(4) The Authority may authorise recurrent training and checking for Category II and LVTO operations in an aeroplane type where no Flight Simulator to represent that specific aeroplane or an acceptable alternate is available.

(h) *Additional training requirements for operators conducting lower than Standard Category I, approaches utilising EVS and other than Standard Category II Operations.*

(1) Operators conducting lower than Standard Category I operations shall comply with the requirements of Appendix 1 to CAR OPS-1.450 — Low Visibility Operations — training and qualifications applicable to Category II operations to include the requirements applicable to HUDLS (if appropriate). The operator may combine these additional requirements where appropriate provided that the operational procedures are compatible. During conversion training the total number of approaches required shall not be additional to the requirements of CAR OPS-1 Subpart N provided the training is conducted utilising the lowest applicable RVR. During recurrent training and checking the operator may also combine the separate requirements provided the above operational procedure requirement is met, provided that at least one approach using lower than Standard Category I minima is conducted at least once every eighteen (18) months.

(2) Operators conducting other than Standard Category II operations shall comply with the requirements of Appendix 1 to CAR OPS-1.450 — Low Visibility Operations — training and qualifications applicable to Category II operations to include the requirements applicable to HUDLS (if appropriate). The operator may combine these additional requirements where appropriate provided that the operational procedures are compatible. During conversion training the total number of approaches required shall not be less than that required to complete Category II training utilising a HUD/HUDLS. During recurrent training and checking the operator may also combine the separate requirements provided the above operational procedure requirement is met, provided that at least one approach using other than Standard Category II minima is conducted at least once every eighteen (18) months.

(3) Operators conducting approach operations utilising EVS with RVR of 800 m or less shall comply with the requirements of Appendix 1 to CAR OPS-1.450 — Low Visibility Operations — Training and Qualifications applicable to Category II operations to include the requirements applicable to HUD (if appropriate). The operator may combine these additional requirements where appropriate provided that the operational procedures are compatible. During conversion training the total number of approaches required shall not be less than that required to complete Category II

training utilising a HUD. During recurrent training and checking the operator may also combine the separate requirements provided the above operational procedure requirement is met, provided that at least one approach utilising EVS is conducted at least once every twelve (12) months.

Appendix 1 to CAR–OPS 1.455 Low Visibility Operations – Operating procedures

(a) General. Low visibility operations include:
(1) manual take-off (with or without electronic guidance systems or HUDLS/Hybrid HUD/HUDLS);
(2) auto-coupled approach to below DH, with manual flare, landing and roll-out;
(3) approach flown with the use of a HUDLS/Hybrid HUD/HUDLS and/or EVS);
(4) auto-coupled approach followed by auto-flare, auto landing and manual roll-out; and
(5) auto-coupled approach followed by auto-flare, auto landing and auto-roll-out, when the applicable RVR is less than 400 m.
Note 1: A hybrid system may be used with any of these modes of operations.
Note 2: Other forms of guidance systems or displays may be certificated and approved.

(b) Procedures and operating instructions

(1) The precise nature and scope of procedures and instructions given depend upon the airborne equipment used and the flight deck procedures followed. An operator must clearly define flight crew member duties during take-off, approach, flare, roll-out and missed approach in the Operations Manual. Particular emphasis must be placed on flight crew responsibilities during transition from non-visual conditions to visual conditions, and on the procedures to be used in deteriorating visibility or when failures occur. Special attention must be paid to the distribution of flight deck duties so as to ensure that the workload of the pilot making the decision to land or execute a missed approach enables him/her to devote himself/herself to supervision and the decision-making process.
(2) An operator must specify the detailed operating procedures and instructions in the Operations Manual. The instructions must be compatible with the limitations and mandatory procedures contained in the Aeroplane Flight Manual and cover the following items in particular:
i. checks for the satisfactory functioning of the aeroplane equipment, both before departure and in flight;
ii. effect on minima caused by changes in the status of the ground installations and airborne equipment;
iii. procedures for the take-off, approach, flare, landing, roll-out and missed approach;
iv. procedures to be followed in the event of failures, warnings to include HUD/HUDLS/EVS and other non-normal
v. situations;
vi. the minimum visual reference required;
vii. the importance of correct seating and eye position;
viii. action which may be necessary arising from a deterioration of the visual reference;
ix. allocation of crew duties in the carrying out of the procedures according to subparagraphs to (iv) and (vi) above, to allow the Commander to devote himself/herself mainly to supervision and decision making;
x. the requirement for all height calls below 200 ft to be based on the radio altimeter and for one pilot to continue to monitor the aeroplane instruments until the landing is completed;
xi. the requirement for the Localiser Sensitive Area to be protected;
xii. the use of information relating to wind velocity, wind shear, turbulence,

runway contamination and use of multiple RVR assessments;

xiii. procedures to be used for:
  A. lower than Standard Category I;
  B. other than Standard Category II;
  C. approaches utilising EVS; and
  D. Practice approaches and landing on runways at which the full Category II or Category III aerodrome procedures are not in force;

xiv. operating limitations resulting from airworthiness certification; and

xv. information on the maximum deviation allowed from the ILS glide path and/or localiser.

Appendix 1 to CAR OPS-1.465 Minimum Visibilities for VFR Operations.

Airspace Class	**A B C D E *(Note 1)***	**F**	**G**
		Above 900 m (3000 ft) AMSL or above 300m (1000 ft) above terrain, whichever is the higher	At and below 900 m (300 ft) AMSL or 300m (1000 ft) above terrain, whichever is the higher
Distance from cloud	1500 m horizontally 300 m (1000 ft) vertically		Clear of cloud and in sight of the surface
Flight visibility	8 km at and above 3050 m (10,000 ft) AMSL *(Note 1)* 5 km below 3050 m (10,000ft) AMSL		5 km *(Note 3)*

Note 1: VMC Minima for Class A airspace are included for guidance but do not imply acceptance of VFR flights in Class A airspace.

Note 2: When the height of the transition altitude is lower than 3 050 m (10,000 ft) AMSL, FL 100 should be used in lieu of 10,000ft.

Note 3: CAT A and B aeroplanes may be operated in flight visibilities down to 3000 m, provided the appropriate ATS Authority permits use of a flight visibility less than 5 km, and the circumstances are such, that the probability of encounters with other traffic is low, and the IAS is 140 kt or less.

SUBPART F PERFORMANCE - GENERAL

CAR OPS-1.470 Applicability

(a) An operator shall ensure that multi-engine aeroplanes powered by turbo propeller engines with a maximum approved passenger seating configuration of more than nine (9) or a maximum take-off mass exceeding 5,700 kg, and all multi-engine turbojet powered aeroplanes are operated in accordance with Subpart G (Performance Class A).

(b) An operator shall ensure that propeller driven aeroplanes with a maximum approved passenger seating configuration of nine (9) or less, and a maximum take-off mass of 5,700 kg or less are operated in accordance with Subpart H (Performance Class B).

(c) An operator shall ensure that aeroplanes powered by reciprocating engines with a maximum approved passenger seating configuration of more than nine (9) or a maximum take-off mass exceeding 5,700 kg are operated in accordance with Subpart I (Performance Class C).

(d) Where full compliance with the requirements of the appropriate Subpart cannot be shown due to specific design characteristics (e.g. seaplanes – see Subpart T or supersonic aeroplanes), the operator shall apply approved performance standards that ensure a level of safety equivalent to that of the appropriate Subpart.

(e) An operator must ensure, if applicable, that the aeroplane is operated within the mass limitations imposed by compliance with the applicable noise certification Standards in Annex 16, Volume I, unless otherwise authorized in exceptional circumstances for a certain aerodrome or a runway where there is no noise disturbance problem, by the competent Authority of the State in which the aerodrome is situated.

CAR OPS-1.475 General

(See AMC OPS-1.475(b), GM-1 OPS-1.475(b) & GM-2 OPS-1.475(f))

(a) An operator shall ensure that the mass of the aeroplane:

(1) At the start of the take-off; or

(2) In the event of in-flight re-planning

At the point from which the revised operational flight plan applies is not greater than the mass at which the requirements of the appropriate Subpart can be complied with for the flight to be undertaken, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is provided for in the particular requirement.

(b) An operator shall ensure that aeroplanes are operated in accordance with a comprehensive and detailed code of performance established by the Authority in compliance with the applicable Standards and approved performance Data contained in the Aeroplane Flight Manual, is used to determine compliance with the requirements of the appropriate Subpart, supplemented as necessary with other data acceptable to the Authority as prescribed in the relevant Subpart. When applying the factors prescribed in the appropriate Subpart, account may be taken of any operational factors already incorporated in the Aeroplane Flight Manual performance data to avoid double application of factors. (See AMC CAR OPS-1.475(b) & GM1 to CAR OPS-1.475(b)).

(c) When showing compliance with the requirements of the appropriate Subpart, due account shall be taken of aeroplane configuration, environmental conditions and the operation of systems which have an adverse effect on performance.

(d) For performance purposes, a damp runway, other than a grass runway, may be considered to be dry.

(e) An operator shall take account of charting accuracy when assessing compliance with the takeoff requirements of the applicable subpart.

(f) As of 5 November 2021, factors that significantly affect the aircraft braking performance due to actual or reported runway conditions (Runway Condition Report – RCR), shall be taken into account. (See GM-2 to OPS 1.475(f))

(g) The in-flight determination of the landing distance should be based on the latest available meteorological or runway condition report, preferably not more than 30 minutes before the expected landing time. (See GM-3 to OPS-1.475(g)

CAR–OPS 1.480 Terminology

(a) Terms used in Subparts F, G, H, I and J, and not defined in CAR–1, have the following meaning:
   (1) ***Accelerate-stop distance available (ASDA).*** The length of the take-off run available plus the length of stopway, if provided.
   (2) ***Contaminated runway.*** A runway is considered to be contaminated when more than 25% of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by the following:
      i. Surface water more than 3 mm (0.125 in) deep, or by slush, or loose snow, equivalent to more than 3 mm (0.125 in) of water;
      ii. Snow which has been compressed into a solid mass which resists further compression and will hold together or break into lumps if picked up (compacted snow); or
      iii. Ice, including wet ice.
   (3) ***Damp runway***. A runway is considered damp when the surface is not dry, but when the moisture on it does not give it a shiny appearance.
   (4) ***Dry runway***. A dry runway is considered dry if its surface is free of visible moisture and not contaminated within the area intended to be used.
   (5) ***Landing distance available (LDA).*** The length of the runway which is declared available by the appropriate Authority and suitable for the ground run of an aeroplane landing.
   (6) ***Maximum approved passenger seating configuration.*** The maximum passenger seating capacity of an individual aeroplane, excluding pilot seats or flight deck seats and cabin crew seats as applicable, used by the operator, approved by the AUTHORITY and specified in the Operations Manual.
   (7) ***Take-off distance available (TODA).*** The length of the take-off run available plus the length of the clearway available.
   (8) ***Take-off mass.*** The take-off mass of the aeroplane shall be taken to be its mass, including everything and everyone carried at the commencement of the take-off run.
   (9) ***Take-off run available (TORA).*** The length of runway which is declared available by the appropriate Authority and suitable for the ground run of an aeroplane taking off.
   (10) ***Wet runway.*** A runway is considered wet when the runway surface is covered with water, or equivalent, less than specified in sub-paragraph (a)(2) above or when there is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water.

(b) The terms 'accelerate-stop distance', 'take-off distance', 'take-off run', 'net take-off flight path', 'one engine inoperative en-route net flight path' and 'two engines inoperative enroute net flight path' as relating to the aeroplane have their meanings defined in the airworthiness requirements under which the aeroplane was certificated, or as specified by the Authority if it finds that definition inadequate for showing compliance with the performance operating limitations.

SECTION 2 – SUBPART F – AMC/IEM – PERFORMANCE GENERAL

AMC OPS-1.475(b) Landing - Reverse Thrust Credit

(See CAR OPS-1.475(b))

Landing distance data included in the AFM (or POH etc.) with credit for reverse thrust can only be considered to be approved for the purpose of showing compliance with the applicable requirements if it contains a specific statement from the appropriate airworthiness Authority that it complies with a recognised airworthiness code (e.g. FAR 23/25, CS 23/25, BCAR Section ‘D’/’K’).

GM-1 to OPS-1.475(b) Factoring of Automatic Landing Distance Performance Data (Performance Class-A Aeroplanes only)

(See CAR OPS 1.475(b))

(a) In those cases where the landing requires the use of an automatic landing system, and the distance published in the Aeroplane Flight Manual (AFM) includes safety margins equivalent to those contained in CAR OPS-1.515(a)(1) and CAR OPS-1.520, the landing mass of the aeroplane should be the lesser of:
   (1) The landing mass determined in accordance with CAR OPS-1.515(a)(1) or CAR OPS-1.520 as appropriate; or
   (2) The landing mass determined for the automatic landing distance for the appropriate surface condition as given in the AFM, or equivalent document. Increments due to system features such as beam location or elevations, or procedures such as use of overspeed, should also be included.

GM-2 to OPS 1.475(f) Field Performance

(a) Approach to land shall not be continued below 1000ft Above Airport Elevation unless the PIC is satisfied that the RCR (Runway Condition Report) information is available for a safe landing.

(b) Account should be taken of all factors that significantly affect the aeroplane performance, including but not limited to:

   (1) the operating procedures,
   (2) the pressure-altitude appropriate to the elevation of the aerodrome,
   (3) the mass of the aeroplane,
   (4) the runway slope,
   (5) the ambient temperature,
   (6) the wind, and
   (7) surface conditions of the runway at the expected time of use, i.e. presence of snow, slush, water, standing water, and/or ice for landplanes (Runway Condition Reports – RCR), and water surface condition for seaplanes.

(c) Such factors should be taken into account directly as operational parameters or indirectly by means of allowance or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance in accordance with which the aeroplane is being operated.

GM-3 to OPS-1.475(g) Landing Distance Assessment

(a) The in-flight landing distance assessment should be based on the latest available weather report and runway condition report (RCR) or equivalent information based on the RCR.
(b) The assessment should be initially carried out when the weather report and the RCR are obtained, usually around top of descent. If the planned duration of the flight does not allow the

flight crew to carry out the assessment in non-critical phases of flight, the assessment should be carried out before departure.

(c) When meteorological conditions may lead to a degradation of the runway surface condition, the assessment should include consideration of how much deterioration in runway surface friction characteristics may be tolerated, so that a quick decision can be made prior to landing.

(d) The flight crew should monitor the evolution of the actual conditions during the approach, to ensure that they do not degrade below the condition that was previously determined to be the minimum acceptable.

(e) The information on wind contained in METAR/SPECI/ATIS reports (average of a 10-minute period) should be the basis for the landing performance calculations, while instant wind information reported by the tower should be monitored during the approach to ensure that the wind speed does not exceed the assumptions made for landing performance calculations.

SUBPART G – PERFORMANCE CLASS – A AIRCRAFT

CAR OPS-1.485 General

(a) An operator shall ensure that, for determining compliance with the requirements of this Subpart, the approved performance data in the Aeroplane Flight Manual is supplemented as necessary with other data acceptable to the Authority if the approved performance Data in the Aeroplane Flight Manual is insufficient in respect of items such as:
 (1) Accounting for reasonably expected adverse operating conditions such as take-off and landing on contaminated runways; and
 (2) Consideration of engine failure in all flight phases.

(b) An operator shall ensure that, for the wet and contaminated runway case, performance data determined in accordance with applicable requirements on certification of large aeroplanes or equivalent acceptable to the Authority is used.

CAR OPS-1.487 Definitions

The following definitions are applicable within this section are as follows:

Global Reporting Format (GRF): Is a global harmonized methodology for assessing and reporting runway surface conditions.

Landing Distance at Time of Arrival (LDTA): Landing distance at time of arrival (LDTA)" means a landing distance that is achievable in normal operations based on landing performance data and associated procedures determined for the prevailing conditions at the time of landing.

Runway condition assessment matrix (RCAM)*:* A matrix allowing the assessment of the runway condition code, using associated procedures, from a set of observed runway surface condition(s) and pilot report of braking action.

Runway condition report (RCR): A comprehensive standardized report relating to runway surface conditions and its effect on the aeroplane landing and take-off performance.

Runway condition code (RWYCC): A number describing the runway surface condition to be used in the runway condition report.

Note: The purpose of the runway condition code is to permit an operational aeroplane performance calculation by the flight crew. Procedures for the determination of the runway condition code are described in the AMC CAR-139 Part 1.

CAR OPS-1.490 Take-off

(See IEM OPS-1.490(c)(3) & IEM OPS-1.490(c)(6))

(a) An operator shall ensure that the take-off mass does not exceed the maximum take-off mass specified in the Aeroplane Flight Manual for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made.

(b) An operator must meet the following requirements when determining the maximum permitted take-off mass:
 (1) The accelerate-stop distance must not exceed the accelerate-stop distance available;
 (2) The take-off distance must not exceed the take-off distance available, with a clearway distance not exceeding half of the take-off run available;
 (3) The take-off run must not exceed the take-off run available;
 (4) Compliance with this paragraph must be shown using a single value of V1 for the rejected and continued take-off; and
 (5) On a wet or contaminated runway, the take-off mass must not exceed that permitted for a take-off on a dry runway under the same conditions.

(c) When showing compliance with sub-paragraph (b) above, an operator must take account of the following:
 (1) The pressure altitude at the aerodrome;
 (2) The ambient temperature at the aerodrome; and

(3) The runway surface condition and the type of runway surface (See IEM CAR OPS-1.490(c)(3));
(4) The runway slope in the direction of take-off;
(5) Not more than 50% of the reported head-wind component or not less than 150% of the reported tailwind component; and
(6) The loss, if any, of runway length due to alignment of the aeroplane prior to take off. (See IEM CAR OPS-1.490(c)(6).)

CAR OPS-1.495 Take-off obstacle clearance

(See Appendix 1 to CAR OPS-1.490(c)(3), AMC OPS-1.495(c)(4), AMC OPS-1.495(d)(1) & (e)(1))
(See IEM OPS-1.495(a) IEM OPS-1.495(f))

(a) An operator shall ensure that the net take-off flight path clears all obstacles by a vertical distance of at least 35 ft or by a horizontal distance of at least 90 m plus 0·125 x D, where D is the horizontal distance, the aeroplane has travelled from the end of the take-off distance available or the end of the take-off distance if a turn is scheduled before the end of the take-off distance available. For aeroplanes with a wingspan of less than 60 m a horizontal obstacle clearance of half the aeroplane wingspan plus 60 m, plus 0·125 x D may be used. (See IEM CAR OPS-1.495(a).)
(b) When showing compliance with sub-paragraph (a) above, an operator must take account of the following:
    (1) The mass of the aeroplane at the commencement of the take-off run;
    (2) The pressure altitude at the aerodrome;
    (3) The ambient temperature at the aerodrome; and
    (4) Not more than 50% of the reported head-wind component or not less than 150% of the reported tailwind component.
(c) When showing compliance with sub-paragraph (a) above:
    (1) Track changes shall not be allowed up to the point at which the net take-off flight path has achieved a height equal to one half the wingspan but not less than 50 ft above the elevation of the end of the take-off run available. Thereafter, up to a height of 400 ft it is assumed that the aeroplane is banked by no more than 15°. Above 400 ft height bank angles greater than 15°, but not more than 25° may be scheduled;
    (2) Any part of the net take-off flight path in which the aeroplane is banked by more than 15° must clear all obstacles within the horizontal distances specified in sub-paragraphs (a), (d) and (e) of this paragraph by a vertical distance of at least 50 ft; and
    (3) An operator must use special procedures, subject to the approval of the Authority, to apply increased bank angles of not more than 20^0 (degrees) between 200 ft and 400 ft, or not more than 30^0 (degrees) above 400 ft (See Appendix 1 to CAR OPS-1.495(c)(3)).
    (4) Adequate allowance must be made for the effect of bank angle on operating speeds and flight path including the distance increments resulting from increased operating speeds. (See AMC OPS-1.495(c)(4)).
(d) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does not require track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:
    (1) 300 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS-1.495(d)(1) & (e)(1); or
    (2) 600 m, for flights under all other conditions.
(e) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does require track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:
    (1) 600 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS-1.495 (d)(1) & (e)(1)); or
    (2) 900 m for flights under all other conditions.

(f) An operator shall establish contingency procedures to satisfy the requirements of CAR OPS1.495 and to provide a safe route, avoiding obstacles, to enable the aeroplane to either comply with the en-route requirements of CAR OPS-1.500, or land at either the aerodrome of departure or at a take-off alternate aerodrome (See IEM OPS-1.495(f)).

CAR OPS-1.500 En-route – One Engine Inoperative

(See AMC OPS-1.500)

(a) An operator shall ensure that the one engine inoperative en-route net flight path data shown in the Aeroplane Flight Manual, appropriate to the meteorological conditions expected for the flight, complies with either sub-paragraph (b) or (c) at all points along the route. The net flight path must have a positive gradient at 1 500 ft above the aerodrome where the landing is assumed to be made after engine failure. In meteorological conditions requiring the operation of ice protection systems, the effect of their use on the net flight path must be taken into account.

(b) The gradient of the net flight path must be positive at least 1,000 ft above all terrain and obstructions along the route within 9·3 km (5 nm) on either side of the intended track.

(c) The net flight path must permit the aeroplane to continue flight from the cruising altitude to an aerodrome where a landing can be made in accordance with CAR OPS-1.515 or 1.520 as appropriate, the net flight path clearing vertically, by at least 2,000 ft, all terrain and obstructions along the route within 9·3 km (5 nm) on either side of the intended track in accordance with sub- paragraphs (1) to (4) below:

(1) The engine is assumed to fail at the most critical point along the route;

(2) Account is taken of the effects of winds on the flight path;

(3) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used; and

(4) The aerodrome where the aeroplane is assumed to land after engine failure must meet the following criteria:

i. The performance requirements at the expected landing mass are met; and

ii. Weather reports or forecasts, or any combination thereof, and field condition reports indicate that a safe landing can be accomplished at the estimated time of landing.

(d) When showing compliance with CAR OPS-1.500, an operator must increase the width margins of subparagraphs (b) and (c) above to 18·5 km (10 nm) if the navigational accuracy does not meet the ninety five percent (95%) containment level.

CAR OPS-1.505 En-route – Aeroplanes with Three Or More Engines, Two Engines Inoperative

(a) An operator shall ensure that at no point along the intended track will an aeroplane having three or more engines be more than 90 minutes, at the all-engines long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met unless it complies with sub-paragraphs (b) to (f) below.

(b) The two engines inoperative en-route net flight path data must permit the aeroplane to continue the flight, in the expected meteorological conditions, from the point where two engines are assumed to fail simultaneously, to an aerodrome at which it is possible to land and come to a complete stop when using the prescribed procedure for a landing with two engines inoperative. The net flight path must clear vertically, by at least 2,000 ft all terrain and obstructions along the route within 9·3 km (5 nm) on either side of the intended track. At altitudes and in meteorological conditions requiring ice protection systems to be operable, the effect of their use on the net flight path data must be taken into account. If the navigational accuracy does not meet the 95% containment level, an operator must increase the width margin given above to 18·5 km (10 nm).

(c) The two engines are assumed to fail at the most critical point of that portion of the route where the aeroplane is more than 90 minutes, at the all-engines long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met.

(d) The net flight path must have a positive gradient at 1,500 ft above the aerodrome where the landing is assumed to be made after the failure of two engines.

(e) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.

(f) The expected mass of the aeroplane at the point where the two engines are assumed to fail must not be less than that which would include sufficient fuel to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at least 1,500 ft directly over the landing area and thereafter to fly level for 15 minutes.

CAR OPS-1.510 Landing – Destination and Alternate Aerodromes

(See AMC OPS-1.510, AMC OPS-1.515 & IEM OPS-1.510(b) & (c))

(a) An approach to land shall not be continued below 300 m (1 000 ft) above aerodrome elevation unless the pilot-in-command is satisfied that, with the runway surface condition information available, the aeroplane performance information indicates that a safe landing can be made.

Note: The procedures used by aerodromes to assess and report runway surface conditions are contained in the PANS-Aerodromes (Doc 9981) and those for using runway surface condition information on board aircraft are in the Aeroplane Performance Manual (Doc 10064).

(b) An operator shall ensure that the landing mass of the aeroplane determined in accordance with CAR OPS-1.475(a) and 1.475(f) does not exceed the maximum landing mass specified for the altitude, the runway condition report (RCR) and the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome.

(c) For instrument approaches with a missed approach gradient greater than 2.5% an operator shall verify that the expected landing mass of the aeroplane allows a missed approach with a climb gradient equal to or greater than the applicable missed approach gradient in the one- engine inoperative missed approach configuration and speed (see CS-25 or an equivalent accepted by the CAA for additional guidance). The use of an alternative method must be approved by the Authority (see IEM CAR OPS-1.510(b) & (c)).

(d) For instrument approaches with decision heights below 200 ft an operator must verify that the expected landing mass of the aeroplane allows a missed approach gradient of climb, with the critical engine failed and with the speed and configuration used for go-around of at least 2.5%, or the published gradient, whichever is the greater. The use of an alternative method must be approved by the Authority (see IEM CAR OPS-1.510(b) and (c)).

CAR OPS-1.515 Landing – Dry Runways

(See AMC OPS 1.510 and 1.515)

(a) An operator shall ensure that the landing mass of the aeroplane determined in accordance with CAR OPS-1.475(a) for the estimated time of landing at the destination aerodrome and at any alternate aerodrome allows a full stop landing from 50 ft above the threshold:

(1) For turbo-jet powered aeroplanes, within 60% of the landing distance available; or

(2) For turbo-propeller powered aeroplanes, within 70% of the landing distance available;

(3) For Steep Approach procedures the Authority may approve the use of landing distance Data factored in accordance with sub-paragraphs (a)(1) and (a)(2) above as appropriate, based on a screen height of less than 50 ft, but not less than 35 ft. (See Appendix 1 to CAR OPS-1.515(a)(3).)

(4) When showing compliance with sub-paragraphs (a)(1) and (a)(2) above, the Authority may exceptionally approve, when satisfied that there is a need (see Appendix 1 CAR OPS-1.515(a)(4)), the use of Short Landing Operations in accordance with Appendices 1 and 2 together with any other supplementary conditions that the

Authority considers necessary in order to ensure an acceptable level of safety in the particular case.

(b) When showing compliance with sub-paragraph (a) above, an operator must take account of the following:

(1) The altitude at the aerodrome;

(2) Not more than 50% of the head-wind component or not less than 150% of the tailwind component; and

(3) The runway slope in the direction of landing if greater than +/-2%.

(c) When showing compliance with sub-paragraph (a) above, it must be assumed that:

(1) The aeroplane will land on the most favorable runway, in still air; and

(2) The aeroplane will land on the runway most likely to be assigned considering the probable wind speed and direction and the ground handling characteristics of the aeroplane, and considering other conditions such as landing aids and terrain. (See IEM OPS-1.515(c).)

(d) If an operator is unable to comply with sub-paragraph (c)(1) above for a destination aerodrome having a single runway where a landing depends upon a specified wind component, an aeroplane may be dispatched if two (2) alternate aerodromes are designated which permit full compliance with sub-paragraphs (a), (b) and (c).

(e) Before commencing an approach to land at the destination aerodrome the commander must satisfy himself that a landing can be made in full compliance with CAR OPS-1.510 and subparagraphs (a) and (b) above.

(f) If an operator is unable to comply with sub-paragraph (c)(2) above for the destination aerodrome, the aeroplane may be dispatched if an alternate aerodrome is designated which permits full compliance with sub-paragraphs (a), (b) and (c).

CAR OPS-1.520 Landing – Wet and contaminated runways

(a) An operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is at least 115% of the required landing distance, determined in accordance with CAR OPS-1.515.

(b) An operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be contaminated (Runway Condition Report – RCR), the landing distance available must be at least the landing distance determined in accordance with sub-paragraph (a) above, or at least 115% of the landing distance determined (Landing distance at time of arrival – LDTA) in accordance with approved contaminated landing distance data or equivalent, accepted by the Authority, whichever is greater.

(c) A landing distance on a wet runway shorter than required by sub-paragraph (a) above, but not less than that required by CAR OPS-1.515(a), may be used if the Aeroplane Flight Manual includes specific additional information about landing distances on wet runways.

(d) A landing distance on a specially prepared contaminated runway shorter than that required by sub-paragraph (b) above, but not less than that required by CAR OPS-1.515(a), may be used if the Aeroplane Flight Manual includes specific additional information about landing distances on contaminated runways (runway condition code – RWYCC). (See AMC OPS-1.520(d) & GM-1 & GM-2 OPS-1.520(d))

(e) When showing compliance with sub-paragraphs (b), (c) and (d) above, the criteria of CAR OPS1.515 shall be applied accordingly except that CAR OPS-1.515(a)(1) and (2) shall not be applied to sub-paragraph (b) above.

(f) The Runway Condition Reports (RCR) shall be prepared and transmitted to pilots in the form of a SNOWTAM which will cover all contaminants that will affect the operation of aircraft during the final landing stage. (See GM-3 OPS-1.520(f))

Note: Further information and example of a SNOWTAM maybe found in the AMC to CAR-175, Appendix 4.

SECTION 2 – SUBPART G – AMC/IEM– PERFORMANCE CLASS – A AIRCRAFT

IEM OPS-1.490(c)(3) Take-off – Runway surface condition

(See CAR OPS-1.490(c)(3))

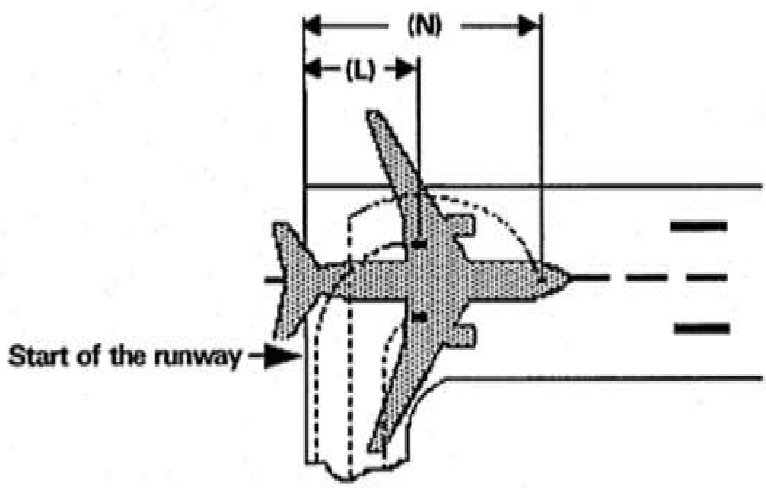
(1) Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aeroplane during take-off, since the actual conditions may not completely match the assumptions on which the performance information is based. In the case of a contaminated runway, the first option for the commander is to wait until the runway is cleared. If this is impracticable, he may consider a take-off, provided that he has applied the applicable performance adjustments, and any further safety measures he considers justified under the prevailing conditions.

(2) An adequate overall level of safety will only be maintained if operations in accordance with CS25 are limited to rare occasions. Where the frequency of such operations on contaminated runways is not limited to rare occasions, operators should provide additional measures ensuring an equivalent level of safety. Such measures could include special crew training, additional distance factoring and more restrictive wind limitations.

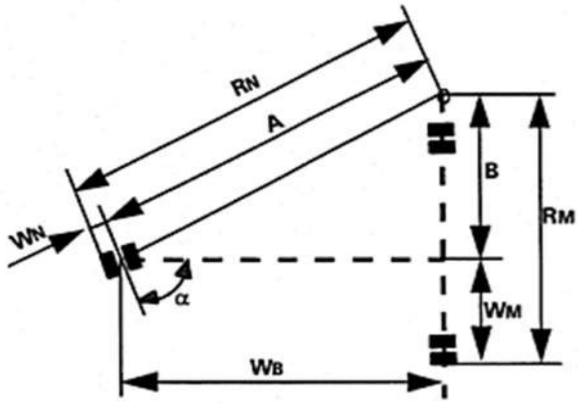
IEM OPS-1.490(c)(6) Loss of runway length due to alignment

(See CAR OPS-1.490(c)(6))

(1) Introduction
   (a) The length of the runway which is declared for the calculation of TODA, ASDA and TORA, does no account for line-up of the aeroplane in the direction of take-off on the runway in use. This alignment distance depends on the aeroplane geometry and access possibility to the runway in use. Accountability is usually required for a 90° taxiway entry to the runway and 180° turnaround on the runway. There are two distances to be considered:
      i. The minimum distance of the mainwheels from the start of the runway for determining TODA and TORA,”L”; and
      ii. The minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA,”N”.



(b) Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in paragraph (2) may be used to determine the alignment distance.



(2) Alignment Distance Calculation

	90° ENTRY	180° TURNAROUND
L=	$R_M + X$	$R_N + Y$
N=	$R_M + X + W_B$	$R_N + Y + W_B$

The distances mentioned in (a) and (b) of paragraph 1 above are:

$$R_N = A + W_N = \frac{W_B}{\cos(90^o\text{-}\alpha)} + W_B$$

And $$R_M = B + W_M = W_B \tan(90^o\text{-}\alpha) + W_M$$

X = Safety distance of outer main wheel during turn to the edge of the runway
Y = Safety distance of outer nose wheel during turn to the edge of the runway

NOTE: Minimum edge safety distances for X and Y are specified in FAA AC 150/5300-13 and ICAO Annex 14 paragraph 3.8.3

RN = Radius of turn of outer nose wheel RM
= Radius of turn of outer main wheel
WN = Distance from aeroplane centre-line to outer nose wheel
WM = Distance from aeroplane centre-line to outer main wheel
WB = Wheel base
α = Steering angle

Appendix 1 to CAR OPS-1.495(c)(3) Approval of increased bank angles

(a) For the use of increased bank angles requiring special approval, the following criteria shall be met:

(1) The Aeroplane Flight Manual must contain approved data for the required increase of operating speed and data to allow the construction of the flight path considering the increased bank angles and speeds.
(2) Visual guidance must be available for navigation accuracy.
(3) Weather minima and wind limitations must be specified for each runway and approved by the Authority.
(4) Training in accordance with CAR OPS-1.975.

AMC OPS-1.495(c)(4) Take-off obstacle clearance

(See CAR OPS-1.495(c))

(1) The Aeroplane Flight Manual generally provides a climb gradient decrement for a 15° bank turn. For bank angles of less than 15°, a proportionate amount should be applied, unless the manufacturer or Aeroplane Flight Manual has provided other data.

Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturer, acceptable adjustments toassure adequate stall margins and gradient corrections are provided by the following:

BANK	SPEED	GRADIENT CORRECTION
15°	V_2	1 x Aeroplane Flight Manual 15° Gradient Loss
20°	V_2 + 5 kt	2 x Aeroplane Flight Manual 15° Gradient Loss
25°	V_2 + 10 kt	3 x Aeroplane Flight Manual 15° Gradient Loss

AMC OPS-1.495(d)(1) & (e)(1) Required Navigational Accuracy

(See CAR OPS-1.495(d)(1) & (e)(1))

(1) ***Flight-deck systems***. The obstacle accountability semi-widths of 300 m (see CAR OPS-1.495(d)(1)) and 600 m (see CAR OPS-1.495(e)(1)) may be used if the navigation system under one engine-inoperative conditions provides a two-standard deviation (2 s) accuracy of 150 m and 300 m respectively.

(2) ***Visual Course Guidance***

(a) The obstacle accountability semi-widths of 300 m (see CAR OPS-1.495(d)(1)) and 600 m (see CAR OPS-1.495(e)(1)) may be used where navigational accuracy is ensured at all relevant points on the flight path by use of external references. These references may be considered visible from the flight deck if they are situated more than 45° either side of the intended track and with a depression of not greater than 20° from the horizontal.

(b) For visual course guidance navigation, an operator should ensure that the weather conditions prevailing at the time of operation, including ceiling and visibility, are such that the obstacle and/or ground reference points can be seen and identified. The Operations Manual should specify, for the aerodrome(s) concerned, the minimum weather conditions which enable the flight crew to continuously determine and maintain the correct flight path with respect to ground reference points, so as to provide a safe clearance with respect to obstructions and terrain as follows:

i. The procedure should be well defined with respect to ground reference points so that the track to be flown can be analysed for obstacle clearance requirements;

ii. The procedure should be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;

iii. A written and/or pictorial description of the procedure should be provided for crew use;

iv. The limiting environmental conditions (such as wind, the lowest cloud base, ceiling, visibility, day/night, ambient lighting, obstruction lighting) should be specified.

IEM OPS-1.495(a) Take-off obstacle clearance

(See CAR OPS-1.495(a))

(1) In accordance with the definitions used in preparing the take-off distance and take-off flight path Data provided in the Aeroplane Flight Manual:

(a) The net take-off flight path is considered to begin at a height of 35 ft above the runway or clearway at the end of the take-off distance determined for the aeroplane in accordance with sub-paragraph (b) below.

(b) The take-off distance is the longest of the following distances:

i. 115% of the distance with all engines operating from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway; or

ii. The distance from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed (V1) for a dry runway; or

iii. If the runway is wet or contaminated, the distance from the start of the take-off to the point at which the aeroplane is 15 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed (V1) for a wet or contaminated runway.

(c) CAR OPS-1.495(a) specifies that the net take-off flight path, determined from the data provided in the Aeroplane Flight Manual in accordance with sub-paragraphs 1(a) and 1(b) above, must clear all relevant obstacles by a vertical distance of 35 ft. When taking off on a wet or contaminated runway and an engine failure occurs at the point corresponding to the decision speed (V1) for a wet or contaminated runway, this implies that the aeroplane can initially be as much as 20 ft below the net take-off flight path in accordance with sub-paragraph (1) above and, therefore, may clear close-in obstacles by only 15 ft. When taking off on wet or contaminated runways, the operator should exercise special care with respect to obstacle assessment, especially if a take-off is obstacle limited and the obstacle density is high.

IEM OPS-1.495(f) Engine failure procedures

(See CAR OPS-1.495(f))

If compliance with CAR OPS-1.495(f) is based on an engine failure route that differs from the all-engine departure route or SID normal departure, a “deviation point” can be identified where the engine failure route deviates from the normal departure route. Adequate obstacle clearance along the normal departure with failure of the critical engine at the deviation point will normally be available. However, in certain situations the obstacle clearance along the normal departure route may be marginal and should be checked to ensure that, in case of an engine failure after the deviation point, a flight can safely proceed along the normal departure.

AMC OPS-1.500 En-Route – One Engine Inoperative

(See CAR OPS-1.500)

(1) The high terrain or obstacle analysis required for showing compliance with CAR OPS-1.500 may be carried out in one of two ways, as explained in the following three paragraphs.

(2) A detailed analysis of the route should be made using contour maps of the high terrain and plotting the highest points within the prescribed corridor’s width along the route. The next step is to determine whether it is possible to maintain level flight with one engine inoperative 1,000 ft above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a drift-down procedure should be worked out, based on engine failure at the most critical point and clearing critical obstacles during the drift-down by at least 2,000 ft. The minimum cruise altitude is determined by the intersection of the two

drift-down paths, taking into account allowances for decision making (see Figure 1). This method is time consuming and requires the availability of detailed terrain maps.

(3) Alternatively, the published minimum flight altitudes (Minimum En-route Altitude, MEA, or Minimum Off Route Altitude, MORA) may be used for determining whether one engine inoperative level flight is feasible at the minimum flight altitude or if it is necessary to use the published minimum flight altitudes as the basis for the drift-down construction (see Figure 1). This procedure avoids a detailed high terrain contour analysis but may be more penalising than taking the actual terrain profile into account as in paragraph (2).

(4) In order to comply with CAR OPS-1.500(c), one means of compliance is the use of MORA and, with CAR OPS-1.500(d), MEA provided that the aeroplane meets the navigational equipment standard assumed in the definition of MEA.

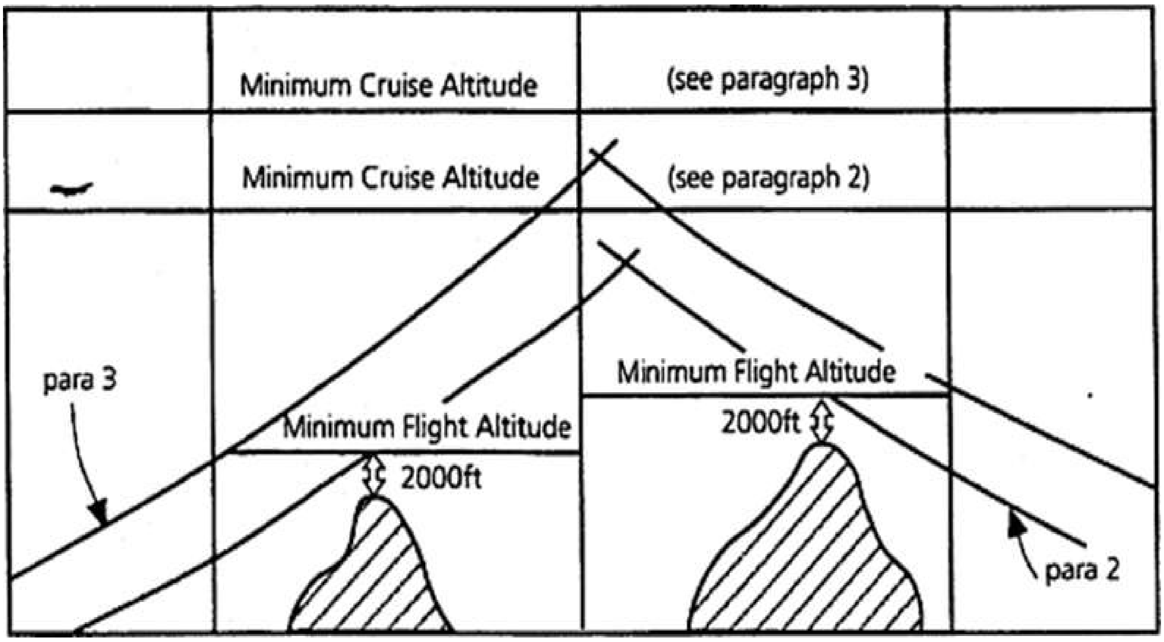


FIGURE 1

NOTE: MEA or MORA normally provide the required 2000 ft obstacle clearance for drift- down. However, at and below 6000 ft altitude, MEA and MORA cannot be used directly as only 1000 ft. clearance is ensured.

AMC OPS-1.510 & 1.515 Landing – Destination and Alternate Aerodromes

(See CAR OPS-1.510 & 1.515)

In showing compliance with CAR OPS-1.510 and CAR OPS-1.515, the operator should use either pressure altitude or geometric altitude for his operation and this should be reflected in the Operations Manual.

IEM OPS-1.510(b) and (c) Landing – Destination and Alternate Aerodromes

(See CAR OPS-1.510(b) and (c))

The required missed approach gradient may not be achieved by all aeroplanes when operating at or near maximum certificated landing mass and in engine-out conditions. Operators of such aeroplanes should consider mass, altitude and temperature limitations and wind for the missed approach. As an alternative method, an increase in the decision altitude/height or minimum descent altitude/height and/or a contingency procedure (see CAR OPS-1.495(f)) providing a safe route and avoiding obstacles, can be approved.

Appendix 1 to CAR OPS-1.515(a) (3) Steep Approach Procedures

(a) The Authority may approve the application of Steep Approach procedures using glideslope angles of 4.5° or more and with screen heights of less than 50 ft but not less than 35 ft, provided that the following criteria are met:

(1) The Aeroplane Flight Manual must state the maximum approved glideslope angle, any other limitations, normal, abnormal or emergency procedures for the steep approach as well as amendments to the field length data when using steep approach criteria;

(2) A suitable glide-path reference system comprising at least a visual glide-path indicating system must be available at each aerodrome at which steep approach procedures are to be conducted; and

(3) Weather minima must be specified and approved for each runway to be used with a steep approach. Consideration must be given to the following:

i. The obstacle situation;

ii. The type of glide-path reference and runway guidance such as visual aids, MLS, 3D–NAV, ILS, LLZ, VOR, ND B;

iii. The minimum visual reference to be required at DH and MDA;

iv. Available airborne equipment;

v. Pilot qualification and special aerodrome familiarisation;

vi. Aeroplane Flight Manual limitations and procedures; and

vii. Missed approach criteria.

Appendix 1 to CAR OPS-1.515(a)(4) Short Landing Operations

(a) For the purpose of CAR OPS-1.515(a)(4) the distance used for the calculation of the permitted landing mass may consist of the usable length of the declared safe area plus the declared landing distance available. The Authority may approve such operations in accordance with the following criteria:

(1) Demonstration of the need for Short Landing Operations. There must be a clear public interest and operational necessity for the operation, either due to the remoteness of the airport or to physical limitations relating to extending the runway.

(2) Aeroplane and Operational Criteria.

i. Short landing operation will only be approved for aeroplanes where the vertical distance between the path of the pilot's eye and the path of the lowest part of the wheels, with the aeroplane established on the normal glide path, does not exceed 3 metres;

ii. When establishing aerodrome operating minima, the visibility/RVR must not be less than 1·5 km. In addition, wind limitations must be specified in the Operation Manual; and

iii. Minimum pilot experience, training requirements and special aerodrome familiarisation must be specified for such operations in the Operations Manual.

(3) It is assumed that the crossing height over the beginning of the usable length of the declared safe area is 50 ft.

(4) Additional criteria. The Authority may impose such additional conditions as are deemed necessary for a safe operation taking into account the aeroplane type characteristics, orographic characteristics in the approach area, available approach aids and missed approach/baulked landing considerations. Such additional conditions may be, for instance, the requirement for VASI/PAPI – type visual slope indicator system.

Appendix 2 to CAR OPS-1.515(a)(4) Airfield Criteria for Short Landing Operations

(a) The use of the safe area must be approved by the airport Authority.
(b) The useable length of the declared safe area under the provisions of CAR OPS-1.515(a)(4), and this Appendix, must not exceed ninety (90) metres.
(c) The width of the declared safe area shall not be less than twice the runway width or twice the wing span, whichever is the greater, centred on the extended runway centreline.
(d) The declared safe area must be clear of obstructions or depressions which would endanger an aeroplane undershooting the runway and no mobile object shall be permitted on the declared safety area while the runway is being used for short landing operations.
(e) The slope of the declared safe area must not exceed 5% upward nor 2% downward in the direction of landing.
(f) For the purpose of this operation, the bearing strength requirement of CAR OPS-1.480(a)(5) need not apply to the declared safe area.

IEM OPS-1.515(c) Landing – Dry runway

(See CAR OPS-1.515(c))

(1) CAR OPS-1.515(c) establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.
(2) Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 60% or 70% (as applicable) of the landing distance available on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome, cannot be exceeded.
(3) Secondly, consideration should be given to anticipated conditions and circumstances. The expected wind, or ATC and noise abatement procedures, may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under paragraph (2) above, in which case, to show compliance with CAR OPS-1.515(a), dispatch should be based on this lesser mass.
(4) The expected wind referred to in paragraph (3) is the wind expected to exist at the time of arrival.

AMC OPS-1.520(d) Landing Distance at Time of Arrival (LDTA)

(a) The required landing distance for dry runways, determined in accordance with CAR OPS-1.515, contains adequate margin to fulfil the intent of the assessment of the landing distance at time of arrival (LDTA) on a dry runway, as it includes allowance for the additional parameters considered in that calculation.
(b) The required landing distance for wet runways also contains adequate margin to fulfil the intent of the assessment of the LDTA on such runways with specific friction-improving characteristics, as it includes allowance for the additional parameters considered in that calculation.
(c) When at the time of arrival, the runway is dry or is a wet runway with specific friction- improving characteristics and the overall conditions, including weather at the aerodrome and runway condition, have been confirmed as not changed significantly compared to those assumed at the time of dispatch, the assessment of the LDTA may be carried out by confirming that the assumptions made at the time of dispatch are still valid.
(d) Before taking any performance credit for the assessment of the LDTA for runways with friction improving characteristics, the operator should verify that the runways intended to be operated on are maintained to the extent necessary to ensure the expected improved friction characteristics.

GM-1 OPS-1.520(d) Assessment of LDTA

(1) The assessment of the LDTA begins with the acquisition of the latest available weather information and the RCR. The information provided in the RCR is divided in two sections:
   (a) The ***'aircraft performance'*** section which contains information that is directly relevant in a performance computation.
   (b) The ***'situational awareness'*** section which contains information that the flight crew should be aware of for a safe operation, but which does not have a direct impact on the performance assessment.

(2) The 'aircraft performance' section of the RCR includes a ***'runway condition code' (RWYCC),*** the contaminant type, depth and coverage for each third of the runway.

(3) The determination of the RWYCC is based on the use of the ***'runway condition assessment matrix' (RCAM)***; however, the presentation of the information in the RCAM is appropriate for use by aerodrome personnel trained and competent in assessing the runway condition in a way that is relevant to aircraft performance.

(4) It is the task of the aerodrome personnel to report the appropriate RWYCC in order to allow the flight crew to assess the landing performance characteristics of the runway in use. When no RWYCC is available in winter conditions, the RCAM provides the flight crew with a combination of the relevant information (runway surface conditions: state and/or contaminant or pilot report of braking action (AIREP)) in order to determine the RWYCC.

(5) Table 1 below is an excerpt of the RCAM and permits to carry out the primary assessment based on the reported contaminant type and depth, as well as on the OAT.

Table 1: The RWYCC is based upon the RCAM, which is assessed on the reported contaminant type and depth and on the OAT

<table>
<tr><th>Runway surface conditions</th><th>Surface condition descriptor</th><th>Depth</th><th>Notes</th><th>RWYCC</th></tr>
<tr><td>Dry</td><td></td><td>N/A</td><td></td><td>6</td></tr>
<tr><td rowspan="2">Wet</td><td>Damp (any visible dampness)</td><td rowspan="2">3mm or less</td><td>Including contaminated and wet runways below 25% coverage in each runway third</td><td rowspan="2">5</td></tr>
<tr><td>Wet</td><td></td></tr>
<tr><td>Slippery Wet</td><td></td><td></td><td></td><td>3</td></tr>
<tr><td rowspan="17">Contaminated</td><td rowspan="2">Compacted Snow</td><td rowspan="2">Any</td><td>At or below OAT -15C Note 1</td><td>4</td></tr>
<tr><td>Above OAT -15C Note 1</td><td>3</td></tr>
<tr><td rowspan="3">Dry Snow</td><td>3mm or less</td><td></td><td>5</td></tr>
<tr><td>3mm – 100mm</td><td>Including when any depth occurs on top of compacted snow</td><td>3</td></tr>
<tr><td>Any</td><td>On top of ice</td><td>0 Note2</td></tr>
<tr><td>Frost Note 3</td><td>Any</td><td></td><td>5</td></tr>
<tr><td>Ice</td><td>Any</td><td>In cold and dry conditions</td><td>1</td></tr>
<tr><td rowspan="2">Slush</td><td>Less than 3mm</td><td></td><td>5</td></tr>
<tr><td>3 – 15mm</td><td></td><td>2</td></tr>
<tr><td rowspan="3">Standing water</td><td>Less than 3mm</td><td></td><td>5</td></tr>
<tr><td>3 – 15mm</td><td></td><td>2</td></tr>
<tr><td>Any</td><td>On top of ice</td><td>0 Note 2</td></tr>
<tr><td>Wet ice</td><td>Any</td><td></td><td>0 Note 2</td></tr>
<tr><td>Wet snow</td><td>Less than 3mm</td><td></td><td>5</td></tr>
</table>

Runway surface conditions	Surface condition descriptor	Depth	Notes	RWYCC
		3 – 30mm	Including when any depth occurs on top of compacted snow	3
		Any	On top of ice	0 Note2

Note 1: The runway surface temperature should preferably be used where available.

Note 2: Operations in conditions where less-than-poor braking action prevails are prohibited

Note 3: Under certain conditions, frost may cause the surface to become very slippery.

(6) primary assessment may have to be downgraded by the aerodrome operator based on an AIREP of lower braking action than the one typically associated with the type and depth of contaminant on the runway or any other observation.

(7) The upgrading of a RWYCC 5, 4, 3 or 2 assessment is determined by the aerodrome operator from the observed contaminant type.

(8) A RWYCC of 1 or 0 maybe be upgraded by the aerodrome operator to a maximum of RWYCC 3. The reason for the upgrade will be specified in the 'situational awareness' section of the RCR.

(9) When the aerodrome operator is approved for operations on specially prepared winter runways, the RWYCC of a runway that is contaminated with compacted snow or ice, may be reported as RWYCC 4 depending upon a specific treatment of the runway. In such cases, the reason for the upgrade will be specified in the 'situational awareness' section of the RCR. (See Note 4)

(10) When the aerodrome operator is approved for specially prepared winter runways, a runway that is contaminated with compacted snow or ice and has been treated according to specific procedures, will normally be reported as a maximum of RWYCC 4 SPECIALLY PREPARED WINTER RUNWAY. (See Note 5)

(11) If the aerodrome operator is in doubt about the quality of the surface, it will be reported with a lower RWYCC, but the runway descriptor will still be SPECIALLY PREPARED WINTER RUNWAY. The term DOWNGRADED will be used in the 'situational awareness' section of the RCR.

(12) A SPECIALLY PREPARED WINTER RUNWAY has no loose contaminant; hence no contaminant drag on acceleration, and stopping performance corresponding to the reported RWYCC.

(13) Performance information for the assessment of the LDTA correlates the aircraft performance with the RWYCC contained in the RCR, hence the calculation will be based on the RWYCC of the intended runway of landing.

Note 4: RCAM is only applicable:
- *(1) on paved runways;*
- *(2) RWYCC's are not generated for taxiways, ramps, heliports etc.;*
- *(3) Codes are only generated when the total runway surface (or cleared width) is contaminated by more than 25% (For GRF 25% of any given 1/3 of the runway)*

Note 5: Background information and further guidance on the in-flight check of the LDTA may be found in ICAO Doc 10064 'Aeroplane Performance Manual'.

Note 6: A detailed description of the RCR format and content, the RWYCC and the RCAM may be found in the following documents:
- *(a) ICAO Doc 9981 'PANS Aerodromes';*
- *(b) ICAO Doc 4444 'PANS ATM';*
- *(c) ICAO Doc 10064 'Aeroplane Performance Manual'; and*
- *(d) ICAO Circular 355 'Assessment, Measurement and Reporting of Runway Surface Conditions'.*

GM-2 OPS-1.520(d) Runway Condition Considerations

When available for the portion of the runway that will be used for landing, the following elements are relevant for consideration:

(a) RWYCC;
(b) expected runway conditions (contaminant type and depth);
(c) other information contained in the RCR related to the following elements:
    (1) width of the runway to which the RWYCC applies if less than the published runway width;
    (2) reduced runway length;
    (3) drifting snow on the runway;
    (4) loose sand on the runway;
    (5) chemical treatment on the runway;
    (6) snowbanks on the runway;
    (7) snowbanks on taxiways;
    (8) snowbanks adjacent to the runway;
    (9) taxiway conditions;
    (10) apron conditions;
    (11) State approved and published use of measured friction coefficient;
    (12) plain language remarks;
(d) AIREP of braking action.

AIRCRAFT PERFORMANCE CONSIDERATIONS

The following elements may impact landing distance calculations:

(a) runway slope;
(b) aerodrome elevation;
(c) wind;
(d) temperature;
(e) aeroplane mass and configuration;
(f) approach speed at threshold;
(g) eventual adjustments to the landing distance, such as autoland; and
(h) planned use of available and operative aeroplane ground deceleration devices.

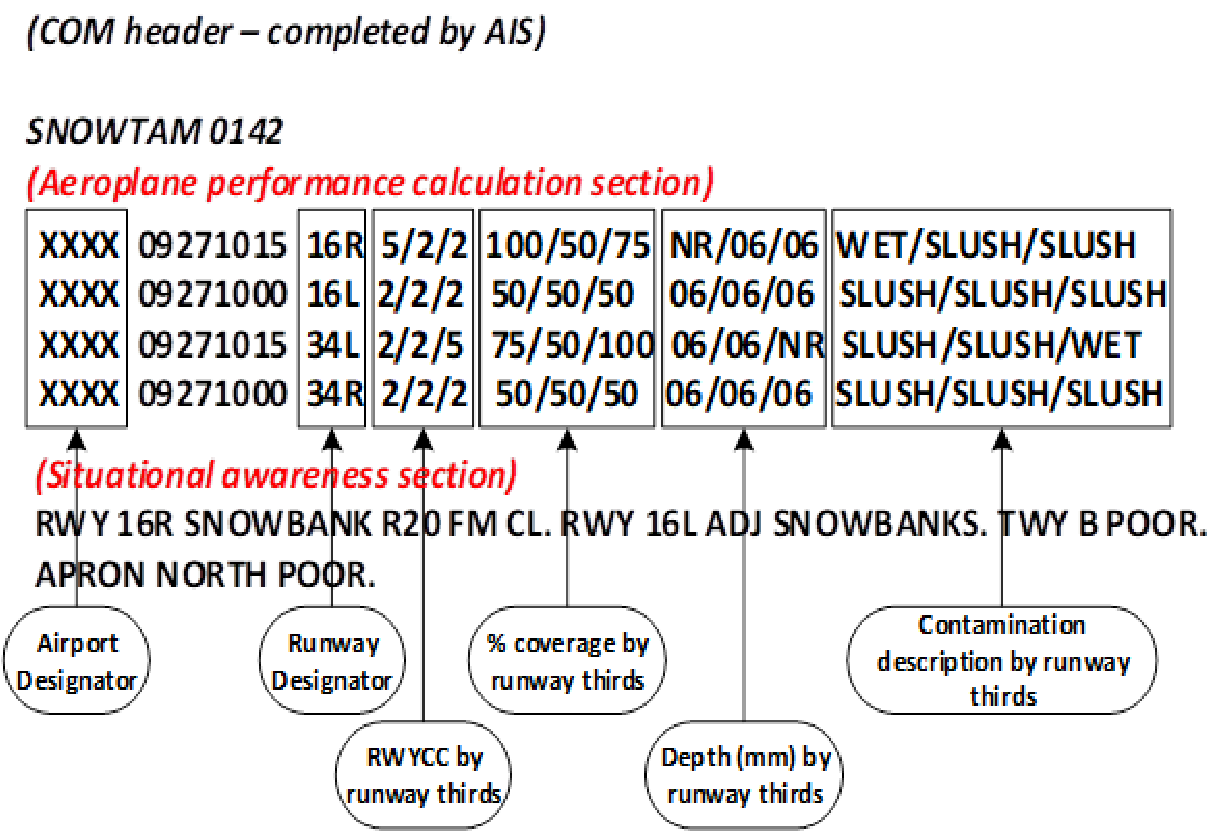
AUTOBRAKE USAGE

While autobrakes are a part of the aeroplane’s landing configuration, the landing distance assessment at the time of arrival is not intended to force a higher-than-necessary autobrake selection. For operations where the RWYCC is 6 or 5, if the manual braking distance provides at least 15% safety margin, then the braking technique may include a combination of autobrakes and manual braking even if the selected autobrake landing data does not provide a 15% safety margin.

GM-3 OPS-1.520(f) Runway Condition Reporting

(a) The runway condition coding is assessed from the runway condition assessment matrix (See Table 1 in GM-1 OPS-1.520(d)) and using the Global Reporting Format is relayed to the pilot using a SNOWTAM. The SNOWTAM is divided into the following parts and is written in the manner illustrated;
    (1) Airport designator;
    (2) Time of observation;
    (3) Runway direction;
    (4) RWYCC by runway thirds;
    (5) Percentage (5) coverage by runway thirds;
    (6) Depth of contaminant by runway thirds; (7) Description of contaminant by runway thirds.

Note: See example of SNOWTAM as follows:



The contaminants are not limited to conditions associated with snow but includes others as listed in Table 2 below:

Table 2: Contaminants reported in a SNOWTAM

Contaminant Types	
Water * (greater than 3mm)	Dry Snow * Over Ice
Frost	Compacted Snow
Slush *	Water * Over Compacted Snow
Slush * Over Ice	Wet Snow * Over Compacted Snow
Ice	Dry Snow * Over Compacted Snow
Wet Ice	Ash
Water * Over Ice	Mud *
Wet Snow	Rubber
Wet Snow * Over Ice	Oil
Dry Snow *	Sand

Note: Contaminants marked by asterisk (*) are accompanied by a depth (mm)

(c) Contaminant hierarchy are listed as follows and includes other factors that may be reported within a SNOWTAM.

Table 3: Contaminant Hierarchy

<table>
<tr><th colspan="2">Contaminant Hierarchy</th></tr>
<tr><td>Wet Ice</td><td>Wet snow</td></tr>
<tr><td>Water over compacted snow</td><td>Dry snow</td></tr>
<tr><td>Slush over ice</td><td rowspan="2">Slippery when wet (Wet Runway) (This will not be reported in combination with any contaminant.) [This is a stand-alone condition NOTAM]</td></tr>
<tr><td>Wet snow over Ice</td></tr>
<tr><td>Dry snow over ice</td><td>Compacted snow -15^{0}C & colder OAT</td></tr>
<tr><td>Ice</td><td>Wet snow – 3mm depth or less</td></tr>
<tr><td>Water: Greater than 3mm depth</td><td>Dry snow – 3mm depth or less</td></tr>
<tr><td>Slush</td><td>Slush – 3mm depth or less</td></tr>
<tr><td>Compacted snow: Warmer than -15^{0}C - OAT</td><td>Frost</td></tr>
<tr><td>Dry snow over compacted snow</td><td rowspan="2">Wet: Include damp and equal to or less than 3mm depth of water</td></tr>
<tr><td>Wet snow over compacted snow</td></tr>
<tr><td>Compacted snow (not temperature specific)</td><td>Dry</td></tr>
</table>

SUBPART H – PERFORMANCE CLASS – B AIRCRAFT

CAR OPS-1.525 General

(See Appendix 1 to CAR OPS-1.525)

(a) An operator shall not operate a single-engine aeroplane:
    (1) At night; or
    (2) In Instrument Meteorological Conditions except under Special Visual Flight Rules.

Note: Limitations on the operation of single-engine aeroplanes are covered by CAR OPS1.240(a)(6).

(b) An operator shall treat two-engine aeroplanes which do not meet the climb requirements of Appendix 1 to CAR OPS-1.525(b) as single-engine aeroplanes.

CAR OPS-1.530 Take-off

(See AMC OPS-1.530(c)(4) & IEM OPS-1.530(c)(4))

(a) An operator shall ensure that the take-off mass does not exceed the maximum take-off mass specified in the Aeroplane Flight Manual for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made.
(b) An operator shall ensure that the un-factored take-off distance, as specified in the Aeroplane Flight Manual does not exceed:
    (1) When multiplied by a factor of 1.25, the take-off run available; or
    (2) When stopway and/or clearway is available, the following:
        i. The take-off run available;
        ii. When multiplied by a factor of 1.15, the take-off distance available; and
        iii. When multiplied by a factor of 1.3, the accelerate-stop distance available.
(c) When showing compliance with sub-paragraph (b) above, an operator shall take account of the following:
    (1) The mass of the aeroplane at the commencement of the take-off run;
    (2) The pressure altitude at the aerodrome;
    (3) The ambient temperature at the aerodrome;
    (4) The runway surface condition and the type of runway surface (See AMC OPS-1.530(c)(4) & IEM OPS-1.530(c)(4));
    (5) The runway slope in the direction of take-off (See AMC CAR OPS-1.530(c)(5)); and
    (6) Not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.

CAR OPS-1.535 Take-off Obstacle Clearance – Multi-Engine Aeroplanes

(See AMC OPS-1.535(a), IEM OPS-1.535 & Appendix 1 CAR OPS-1.535(b)(1))

(a) An operator shall ensure that the take-off flight path of aeroplanes with two or more engines, determined in accordance with this sub-paragraph, clears all obstacles by a vertical margin of at least 50 ft, or by a horizontal distance of at least 90 m plus 0.125 x D, where D is the horizontal distance travelled by the aeroplane from the end of the take-off distance available or the end of the take-off distance if a turn is scheduled before the end of the take-off distance available except as provided in sub-paragraphs (b) and (c) below. For aeroplanes with a wingspan of less than 60 m a horizontal obstacle clearance of half the aeroplane wingspan plus 60 m, plus 0.125 x D may be used. When showing compliance with this sub-paragraph (see AMC CAR OPS1.535(a) & IEM OPS-1.535(a)) it must be assumed that:

(1) The take-off flight path begins at a height of 50 ft above the surface at the end of the take-off distance required by CAR OPS-1.530(b) and ends at a height of 1,500 ft above the surface;
(2) The aeroplane is not banked before the aeroplane has reached a height of 50 ft above the surface, and that thereafter the angle of bank does not exceed 15°;
(3) Failure of the critical engine occurs at the point on the all-engine take-off flight path where visual reference for the purpose of avoiding obstacles is expected to be lost;
(4) The gradient of the take-off flight path from 50 ft to the assumed engine failure height is equal to the average all-engine gradient during climb and transition to the en-route configuration, multiplied by a factor of 0.77; and
(5) The gradient of the take-off flight path from the height reached in accordance with sub- paragraph (4) above to the end of the take-off flight path is equal to the one engine inoperative en-route climb gradient shown in the Aeroplane Flight Manual.

(b) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does not require track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:
(1) 300 m, if the flight is conducted under conditions allowing visual course guidance navigation, or if navigational aids are available enabling the pilot to maintain the intended flight path with the same accuracy (See Appendix 1 to CAR OPS-1.535(b)(1) & (c)(1)); or
(2) 600 m, for flights under all other conditions.

(c) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path requires track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:
(1) 600 m for flights under conditions allowing visual course guidance navigation (See Appendix 1 to CAR OPS-1.535(b)(1) &(c)(1));
(2) 900 m for flights under all other conditions.

(d) When showing compliance with sub-paragraphs (a), (b) and (c) above, an operator must take account of the following:
(1) The mass of the aeroplane at the commencement of the take-off run;
(2) The pressure altitude at the aerodrome;
(3) The ambient temperature at the aerodrome; and
(4) Not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.

CAR OPS-1.540 En-Route – Multi-engine aeroplanes

(See IEM OPS-1.540)

(a) An operator shall ensure that the aeroplane, in the meteorological conditions expected for the flight, and in the event of the failure of one engine, with the remaining engines operating within the maximum continuous power conditions specified, is capable of continuing flight at or above the relevant minimum altitudes for safe flight stated in the Operations Manual to a point 1000 ft above an aerodrome at which the performance requirements can be met.

(b) When showing compliance with sub-paragraph (a) above:
(1) The aeroplane must not be assumed to be flying at an altitude exceeding that at which the rate of climb equals 300 ft per minute with all engines operating within the maximum continuous power conditions specified; and
(2) The assumed en-route gradient with one engine inoperative shall be the gross gradient of descent or climb, as appropriate, respectively increased by a gradient of 0.5%, or decreased by a gradient of 0.5%.

CAR OPS-1.542 En-Route – Single-engine aeroplanes

(See IEM OPS-1.542)

(a) An operator shall ensure that the aeroplane, in the meteorological conditions expected for the flight, and in the event of engine failure, is capable of reaching a place at which a safe forced landing can be made. For landplanes, a place on land is required, unless otherwise approved by the Authority. (See AMC CAR OPS-1.542(a).)

(b) When showing compliance with sub-paragraph (a) above:
  (1) The aeroplane must not be assumed to be flying, with the engine operating within the maximum continuous power conditions specified, at an altitude exceeding that at which the rate of climb equals 300 ft per minute; and
  (2) The assumed en-route gradient shall be the gross gradient of descent increased by a gradient of 0.5%.

CAR OPS-1.545 Landing – Destination and Alternate Aerodromes

(See AMC OPS-1.545 & 1.550)

An operator shall ensure that the landing mass of the aeroplane determined in accordance with CAR OPS-1.475(a) does not exceed the maximum landing mass specified for the altitude and the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome.

CAR OPS-1.550 Landing – Dry runway

(See AMC OPS-1.545 & 1.550)
(See AMC OPS-1.550(b)(3) & 1.550(b)(4)
(See IEM OPS-1.550(c) & Appendices 1 & 2 to CAR OPS-1.550(a))

(a) An operator shall ensure that the landing mass of the aeroplane determined in accordance with CAR OPS-1.475(a) for the estimated time of landing allows a full stop landing from 50 ft above the threshold within 70% of the landing distance available at the destination aerodrome and at any alternate aerodrome.
  (1) The Authority may approve the use of landing distance data factored in accordance with this paragraph based on a screen height of less than 50 ft, but not less than 35 ft. (See Appendix 1 to CAR OPS-1.550(a).)
  (2) The Authority may approve Short Landing Operations in accordance with the criteria in Appendix 2 to CAR OPS-1.550(a).

(b) When showing compliance with sub-paragraph (a) above, an operator shall take account of the following:
  (1) The altitude at the aerodrome;
  (2) Not more than 50% of the head-wind component or not less than 150% of the tailwind component.
  (3) The runway surface condition and the type of runway surface (See AMC OPS 1.550(b)(3)); and
  (4) The runway slope in the direction of landing (See AMC CAR OPS-1.550(b)(4));

(c) For dispatching an aeroplane in accordance with sub-paragraph (a) above, it must be assumed that:
  (1) The aeroplane will land on the most favourable runway, in still air; and
  (2) The aeroplane will land on the runway most likely to be assigned considering the probable wind speed and direction and the ground handling characteristics of the aeroplane, and considering other conditions such as landing aids and terrain. (See IEM OPS-1.550(c).)

(d) If an operator is unable to comply with sub-paragraph (c)(2) above for the destination aerodrome, the aeroplane may be dispatched if an alternate aerodrome is designated which permits full compliance with sub-paragraphs (a), (b) and (c) above.

CAR OPS-1.555 Landing – Wet and Contaminated Runways

(See IEM OPS-1.555(a))

(a) An operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is equal to or exceeds the required landing distance, determined in accordance with CAR OPS-1.550, multiplied by a factor of 1.15. (See IEM OPS- 1.555(a).)

(b) An operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be contaminated, the landing distance, determined by using data acceptable to the AUTHORITY for these conditions, does not exceed the landing distance available.

(c) A landing distance on a wet runway shorter than that required by sub-paragraph (a) above, but not less than that required by CAR OPS-1.550(a), may be used if the Aeroplane Flight Manual includes specific additional information about landing distances on wet runways.

SECTION 2 – SUBPART H – AMC/IEM— PERFORMANCE CLASS – B AIRCRAFT

Appendix 1 to CAR OPS-1.525(b) General – Take-off and Landing Climb

The requirements of this Appendix are based on EASA CS-23.

(a) Take-off Climb
- (1) All Engines Operating
  - i. The steady gradient of climb after take-off must be at least 4% with:
    - A. Take-off power on each engine;
    - B. The landing gear extended except that if the landing gear can be retracted in not more than 7 seconds, it may be assumed to be retracted;
    - C. The wing flaps in the take-off position(s); and
    - D. A climb speed not less than the greater of 1.1 $V_{MC}$and 1.2 V_{S1}.
    - E. One Engine Inoperative
- (2) One Engine Inoperative
  - i. The steady gradient of climb at an altitude of 400 ft above the take-off surface must be measurably positive with:
    - A. The critical engine inoperative and its propeller in the minimum drag position;
    - B. The remaining engine at take-off power;
    - C. The landing gear retracted;
    - D. The wing flaps in the take-off position(s); and
    - E. A climb speed equal to that achieved at 50 ft.
  - ii. The steady gradient of climb must be not less than 0.75% at an altitude of 1,500 ft above the take-off surface with:
    - A. The critical engine inoperative and its propeller in the minimum drag position;
    - B. The remaining engine at not more than maximum continuous power;
    - C. The landing gear retracted;
    - D. The wing flaps retracted; and
    - E. A climb speed not less than 1.2 V_{S1}.

(b) Landing Climb
- (1) All Engines Operating
  - i. The steady gradient of climb must be at least 2.5% with:
    - A. Not more than the power or thrust that is available 8 seconds after initiation of movement of the power controls from the minimum flight idle position;
    - B. The landing gear extended;
    - C. The wing flaps in the landing position; and
    - D. A climb speed equal to V_{REF}.
- (2) One engine Inoperative
  - i. The steady gradient of climb must be not less than 0.75% at an altitude of 1,500 ft above the landing surface with:
    - A. The critical engine inoperative and its propeller in the minimum drag position;
    - B. The remaining engine at not more than maximum continuous power;
    - C. The landing gear retracted;
    - D. The wing flaps retracted; and
    - E. A climb speed not less than 1.2 V_{S1}.

AMC OPS-1.530(c)(4) Take-Off Performance Correction Factors

(See CAR OPS-1.530(c)(4))

Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturers, the variables affecting the take-off performance and the associated factors that should be applied to the Aeroplane Flight Manual data are shown in the table below. They should be applied in addition to the operational factors as prescribed in CAR OPS-1.530(b).

SURFACE TYPE	Condition	FACTOR
Grass (on firm soil)	Wet	1·20
Up to 20 cm long	Wet	1·30
Paved	Wet	1·00

Notes: 1. The soil is firm when there are wheel impressions but no rutting.

2. When taking off on grass with a single engine aeroplane, care should be taken to assess the rate of acceleration and consequent distance increase.

3. When making a rejected take-off on very short grass which is wet, and with a firm subsoil, the surface may be slippery, in which case the distances may increase significantly.

IEM OPS-1.530(c)(4) Take-Off Performance Correction Factors

(See CAR OPS-1.530(c)(4))

Due to the inherent risks, operations from contaminated runways are inadvisable, and should be avoided whenever possible. Therefore, it is advisable to delay the take-off until the runway is cleared. Where this is impracticable, the commander should also consider the excess runway length available including the criticality of the overrun area.

AMC OPS-1.535(a) Take-off Flight Path Construction

(See CAR OPS-1.535(a))

(1) ***Introduction.*** For demonstrating that an aeroplane clears all obstacles vertically, a flight path should be constructed consisting of an all-engine segment to the assumed engine failure height, followed by an engine-out segment. Where the Aeroplane Flight Manual does not contain the appropriate data, the approximation given in paragraph (2) below may be used for the all-engine segment for an assumed engine failure height of 200 ft, 300 ft, or higher.

(2) ***Flight Path Construction***

(a) All-Engines Segment (50 ft to 300 ft). The average all-engines gradient for the all- engines flight path segment starting at an altitude of 50 ft at the end of the take-off distance ending at or passing through the 300 ft point is given by the following formula:

$$Y300 = \frac{0.57(Y_{ERC})}{1 + (V_{ERC}^2 - V_2^2) / 5647}$$

Note: The factor of 0.77 as required by CAR OPS-1.535(a)(4) is already included where:

Y300 = Average all-engines gradient from 50 ft to 300 ft
YERC = Scheduled all engines en-route gross climb gradient
VERC = En-route climb speed, all engines knots (TAS)
V2 = Take-off speed at 50 ft, knots TAS

Note: (See IEM OPS-1.535(a), Figure 1a for graphical presentation)

(b) All-Engines Segment (50 ft to 200 ft). (May be used as an alternative to paragraph (2)(a) where weather minima permits). The average all-engine gradient for the all-engine flight path segment starting at an altitude of 50 ft at the end of the take-off distance ending at or passing through the 200 ft point is given by the following formula:

$$Y200 = \frac{0.51\ (Y_{ERC})}{1 + (V_{ERC}^2 - V_2^2) / 3388}$$

Note: The factor of 0.77 as required by CAR OPS-1.535(a)(4) is already included where:

Y200 = Average all-engines gradient from 50 ft to 200 ft
YERC = Scheduled all engines en-route gross climb gradient
VERC = En-route climb speed, all engines, knots TAS
V2 = Take-off speed at 50 ft, knots TAS

Note: (See IEM OPS-1.535(a), Figure 1b for graphical presentation)

(c) All-Engines Segment (above 300 ft). The all-engines flight path segment continuing from an altitude of 300 ft is given by the AFM en-route gross climb gradient, multiplied by a factor of 0.77.

(d) The One Engine Inoperative Flight Path. The one engine inoperative flight path is given by the one engine inoperative gradient chart contained in the AFM.

(1) Worked examples of the method given above are contained in IEM OPS-1.535(a).

IEM OPS-1.535(a) Take-off flight path construction

(See CAR OPS 1.535(a))

(1) This IEM provides examples to illustrate the method of take-off flight path construction given in AMC OPS 1.535(a). The examples shown below are based on an aeroplane for which the Aeroplane Flight Manual shows, at a given mass, altitude, temperature and wind component the following performance data:

Factored take-off distance	–	1000 m
Take-off speed, V2	–	90 kt
En-route climb speed, VERC	–	120 kt En-route all-engine climb gradient,
YERC	–	0·200

En-route one engine inoperative climb gradient, YERC-1 0·032

(a) Assumed Engine Failure Height 300 ft. The average all-engine gradient from 50 ft to 300 ft may be read from Figure 1a or calculated with the following formula:

$$Y300 = \frac{0.57(Y_{ERC})}{1 + (V_{ERC}^2 - V_2^2) / 5647}$$

Note: The factor of 0.77 as required by CAR OPS-1.535(a)(4) is already included where:

Y300 = Average all-engines gradient from 50 ft to 300 ft
YERC = Scheduled all engines en-route gross climb gradient
VERC = En-route climb speed, all engines knots TAS
V2 = Take-off speed at 50 ft, knots TAS

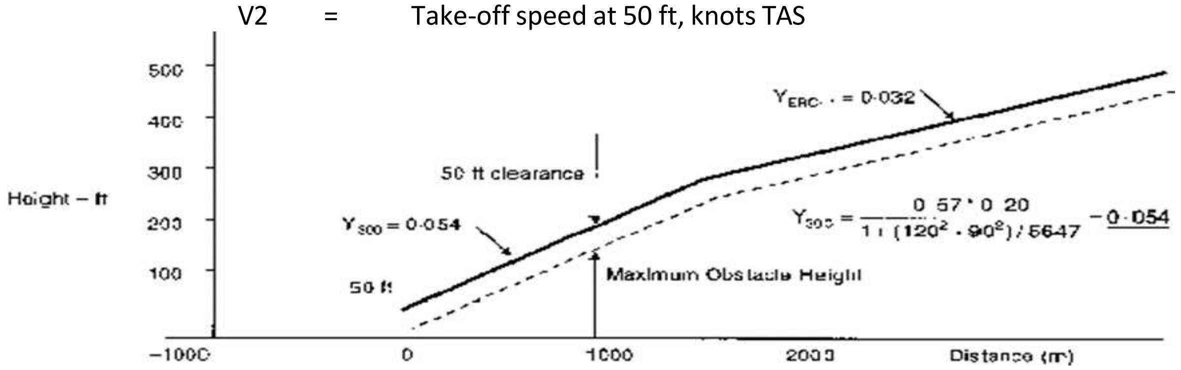


Figure 1(a)

(b) Assumed engine failure height 200 ft. The average all-engine gradient from 50 ft to 200 ft may be read from Figure 1(b) or calculated with the following formula:

$$Y200 = \frac{0.51\,(Y_{ERC})}{1 + (V_{ERC}^2 - V_2^2) / 3388}$$

Note: The factor of 0.77 as required by CAR OPS 1.535(a)(4) is already included where:

Y200	=	Average all-engines gradient from 50 ft to 200 ft
YERC	=	Scheduled all engines en-route gross gradient
VERC	=	En-route climb speed, all engines, knots TAS
V2	=	Take-off speed at 50 ft, knots TAS

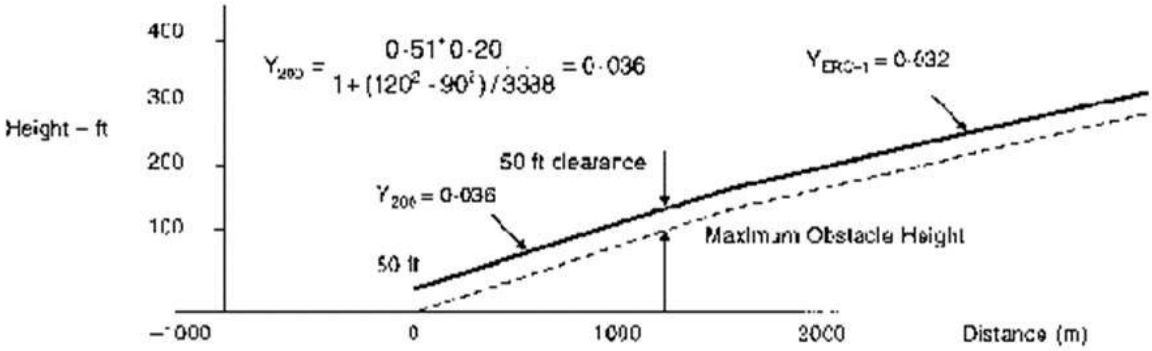


Figure 1(b)

(c) Assumed engine failure height less than 200 ft. Construction of a take-off flight path is only possible if the AFM contains the required flight path data.

(d) Assumed engine failure height more than 300 ft. The construction of a take-off flight path for an assumed engine failure height of 400 ft is illustrated below.

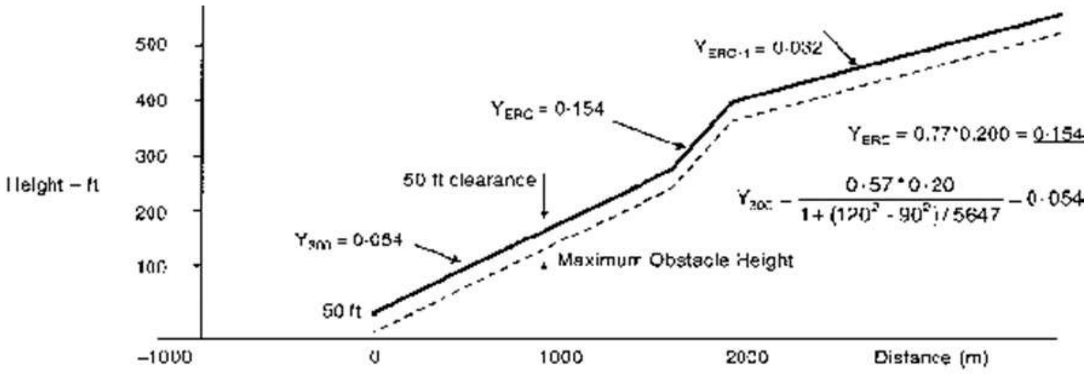


Figure 1(c)

IEM OPS-1.535 Obstacle Clearance in Limited Visibility

(See CAR OPS-1.535)

(2) The intent of the complementary requirements CAR OPS-1.535 and Appendix 1 to CAR OPS1.430 sub-paragraph (a)(3)(ii) is to enhance safe operation with Performance Class B aeroplanes in conditions of limited visibility. Unlike the Performance Class-A Airworthiness requirements, those for Performance Class-B do not necessarily provide for engine failure in all phases of flight. It is accepted that performance accountability for engine failure need not be considered until a height of 300 ft is reached.

(3) The weather minima given in Appendix 1 to CAR OPS-1.430 sub-paragraph (a)(3)(ii) up to and including 300 ft imply that if a take-off is undertaken with minima below 300 ft a one engine

inoperative flight path must be plotted starting on the all-engine take-off flight path at the assumed engine failure height. This path must meet the vertical and lateral obstacle clearance specified in CAR OPS-1.535. Should engine failure occur below this height, the associated visibility is taken as being the minimum which would enable the pilot to make, if necessary, a forced landing broadly in the direction of the take-off. At or below 300 ft, a circle and land procedure is extremely inadvisable. Appendix 1 to CAR OPS-1.430 sub-paragraph (a)(3)(ii) specifies that, if the assumed engine failure height is more than 300 ft, the visibility must be at least 1,500 m and, to allow for manoeuvring, the same minimum visibility should apply whenever the obstacle clearance criteria for a continued take-off cannot be met.

Appendix 1 to CAR OPS-1.535(b)(1) & (c)(1) Take-off Flight Path – Visual Course Guidance Navigation

In order to allow visual course guidance navigation, an operator must ensure that the weather conditions prevailing at the time of operation including ceiling and visibility, are such that the obstacle and/or ground reference points can be seen and identified. The Operations Manual must specify, for the aerodrome(s) concerned, the minimum weather conditions which enable the flight crew to continuously determine and maintain the correct flight path with respect to ground reference points, so as to provide a safe clearance with respect to obstructions and terrain as follows:

(a) The procedure must be well defined with respect to ground reference points so that the track to be flown can be analysed for obstacle clearance requirements;
(b) The procedure must be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;
(c) A written and/or pictorial description of the procedure must be provided for crew use; and
(d) The limiting environmental conditions must be specified (e.g. wind, cloud, visibility, day/night, ambient lighting, obstruction lighting).

IEM OPS-1.540 En-Route

(See CAR OPS-1.540)

(1) The altitude at which the rate of climb equals 300 ft per minute is not a restriction on the maximum cruising altitude at which the aeroplane can fly in practice, it is merely the maximum altitude from which the drift-down procedure can be planned to start.
(2) Aeroplanes may be planned to clear en-route obstacles assuming a drift-down procedure, having first increased the scheduled en-route one engine inoperative descent data by 0·5% gradient.

IEM OPS-1.542 En-route – Single-engine Aeroplanes

(See CAR OPS-1.542)

(1) In the event of an engine failure, single-engine aeroplanes have to rely on gliding to a point suitable for a safe forced landing. Such a procedure is clearly incompatible with flight above a cloud layer which extends below the relevant minimum safe altitude.
(2) Operators should first increase the scheduled engine-inoperative gliding performance data by 0.5% gradient when verifying the en-route clearance of obstacles and the ability to reach a suitable place for a forced landing.
(3) The altitude at which the rate of climb equals 300 ft per minute is not a restriction on the maximum cruising altitude at which the aeroplane can fly in practice, it is merely the maximum altitude from which the engine-inoperative procedure can be planned to start.

AMC OPS-1.542(a) En-Route – Single-engine aeroplanes

(See CAR OPS-1.542(a))

CAR OPS-1.542(a) requires an operator to ensure that in the event of an engine failure, the aeroplane should be capable of reaching a point from which a successful forced landing can be made. Unless otherwise specified by the Authority, this point should be 1,000ft above the intended landing area.

AMC OPS-1.545 & 1.550 Landing Destination and Alternate Aerodromes Landing – Dry runway

(See CAR OPS-1.545 & 1.550)

In showing compliance with CAR OPS-1.545 & CAR OPS-1.550, the operator should use either pressure altitude or geometric altitude for his operation and this should be reflected in the Operations Manual.

AMC OPS-1.550(b)(3) Landing Distance Correction Factors

(See CAR OPS-1.550(b)(3))

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturers, the variable affecting the landing performance and the associated factor that should be applied to the Aeroplane Flight Manual data is shown in the table below. It should be applied in addition to the operational factors as prescribed in CAR OPS- 1.550(a).

SURFACE TYPE	FACTOR
Grass (on firm soil up to 20cm long)	1.15

Note: The soil is firm when there are wheel impressions but no rutting

AMC OPS-1.550(b)(4) Runway Slope

(See CAR OPS-1.550(b)(4))

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturer, the landing distances required should be increased by 5% for each 1% of downslope except that correction factors for runways with slopes in excess of 2% need the acceptance of the Authority.

IEM OPS-1.550(c) Landing – Dry Runway

(See CAR OPS-1.550(c))

(1) CAR OPS-1.550(c) establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

(2) Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 70% of the landing distance available on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome, cannot be exceeded.

(3) Secondly, consideration should be given to anticipated conditions and circumstances. The expected wind, or ATC and noise abatement procedures, may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under paragraph 2 above, in which case, to show compliance with CAR OPS-1.550(a), dispatch should be based on this lesser mass.

(4) The expected wind referred to in paragraph (3) is the wind expected to exist at the time of arrival.

Appendix 1 to CAR OPS-1.550(a) Steep Approach Procedures

(a) The Authority may approve the application of Steep Approach procedures using glideslope angles of 4.5° or more, and with screen heights of less than 50 ft but not less than 35 ft, provided that the following criteria are met:

(1) The Aeroplane Flight Manual must state the maximum approved glideslope angle, any other limitations, normal, abnormal or emergency procedures for the steep approach as well as amendments to the field length data when using steep approach criteria;

(2) A suitable glide path reference system, comprising at least a visual glide-path indicating system, must be available at each aerodrome at which steep approach procedures are to be conducted; and

(3) Weather minima must be specified and approved for each runway to be used with a steep approach. Consideration must be given to the following:

i. The obstacle situation;

ii. The type of glide-path reference and runway guidance such as visual aids, MLS, 3D–NAV, ILS, LLZ, VOR, NDB;

iii. The minimum visual reference to be required at DH and MDA;

iv. Available airborne equipment;

v. Pilot qualification and special aerodrome familiarisation;

vi. Aeroplane Flight Manual limitations and procedures; and

vii. Missed approach criteria.

Appendix 2 to CAR OPS-1.550(a) Short Landing Operations

(a) For the purpose of CAR OPS-1.550(a)(2), the distance used for the calculation of the permitted landing mass may consist of the usable length of the declared safe area plus the declared landing distance available. The Authority may approve such operations in accordance with the following criteria:

(1) The use of the declared safe area must be approved by the aerodrome Authority;

(2) The declared safe area must be clear of obstructions or depressions which would endanger an aeroplane undershooting the runway, and no mobile object shall be permitted on the declared safe area while the runway is being used for short landing operations;

(3) The slope of the declared safe area must not exceed 5% upward slope nor 2%;

(4) The useable length of the declared safe area under the provisions of this Appendix shall not exceed ninety (90) metres;

(5) The width of the declared safe area shall not be less than twice the runway width, centred on the extended runway centreline;

(6) It is assumed that the crossing height over the beginning of the usable length of the declared safe area shall not be less than fifty (50) ft;

(7) For the purpose of this operation, the bearing strength requirement of CAR OPS-1.480(a)(5) need not apply to the declared safe area;

(8) Weather minima must be specified and approved for each runway to be used and shall not be less than the greater of VFR or non-precision approach minima;

(9) Pilot requirements must be specified (CAR OPS-1.975(a) refers);

(10) The Authority may impose such additional conditions as are necessary for safe operation taking into account the aeroplane type characteristics, approach aids and missed approach/balked landing considerations.

IEM OPS-1.555(a) Landing on Wet Grass Runways

(See CAR OPS-1.555(a))

(1) When landing on very short grass which is wet, and with a firm subsoil, the surface may be slippery, in which case the distances may increase by as much as 60% (1.60 factor).

(2) As it may not be possible for a pilot to determine accurately the degree of wetness of the grass, particularly when airborne, in cases of doubt, the use of the wet factor (1.15) is recommended.

SUBPART I – PERFORMANCE CLASS – C AIRCRAFT

CAR OPS-1.560 General

An operator shall ensure that, for determining compliance with the requirements of this Subpart, the approved performance Data in the Aeroplane Flight Manual is supplemented, as necessary, with other Data acceptable to the Authority if the approved performance Data in the Aeroplane Flight Manual is insufficient.

CAR OPS-1.565 Take-off

(See IEM OPS-1.565(d)(3) & 1.565(d)(6))
(See AMC OPS-1.565(d) & 1.565(d)(4))

(a) An operator shall ensure that the take-off mass does not exceed the maximum take-off mass specified in the Aeroplane Flight Manual for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made.
(b) An operator shall ensure that, for aeroplanes which have take-off field length data contained in their Aeroplane Flight Manuals that do not include engine failure accountability, the distance from the start of the take-off roll required by the aeroplane to reach a height of 50 ft above the surface with all engines operating within the maximum take-off power conditions specified, when multiplied by a factor of either:
    (1) 1.33 for aeroplanes having two engines; or
    (2) 1.25 for aeroplanes having three engines; or
    (3) 1.18 for aeroplanes having four engines, does not exceed the take-off run available at the aerodrome at which the take-off is to be made.
(c) An operator shall ensure that, for aeroplanes which have take-off field length data contained in their Aeroplane Flight Manuals which accounts for engine failure, the following requirements are met in accordance with the specifications in the Aeroplane Flight Manual:
    (1) The accelerate-stop distance must not exceed the accelerate-stop distance available;
    (2) The take-off distance must not exceed the take-off distance available, with a clearway distance not exceeding half of the take-off run available;
    (3) The take-off run must not exceed the take-off run available;
    (4) Compliance with this paragraph must be shown using a single value of V_1 for the rejected and continued take-off; and
    (5) On a wet or contaminated runway, the take-off mass must not exceed that permitted for a take-off on a dry runway under the same conditions.
(d) When showing compliance with sub-paragraphs (b) and (c) above, an operator must take account of the following:
    (1) The pressure altitude at the aerodrome;
    (2) The ambient temperature at the aerodrome;
    (3) The runway surface condition and the type of runway surface (see IEM OPS 1.565(d)(3));
    (4) The runway slope in the direction of take-off (see AMC CAR OPS-1.565(d)(4))
    (5) Not more that 50% of the reported head-wind component or not less than 150% of the reported tail-wind component; and
    (6) The loss, if any, of runway length due to alignment of the aeroplane prior to take-off. (See IEM OPS 1.565(d)(6)).

CAR OPS-1.570 Take-off Obstacle Clearance

(See AMC OPS-1.570(d), AMC OPS-1.570(e)(1) & (f)(1))

(a) An operator shall ensure that the take-off flight path with one engine inoperative clears all obstacles by a vertical distance of at least fifty (50) ft plus 0·01 x D, or by a horizontal distance of at least ninety (90) m plus 0.125 x D, where D is the horizontal distance, the aeroplane has travelled from the end of the take-off distance available. For aeroplanes with a wingspan of less than 60 m a horizontal obstacle clearance of half the aeroplane wingspan plus sixty (60) m, plus 0.125 x D may be used.

(b) The take-off flight path must begin at a height of fifty (50) ft above the surface at the end of the takeoff distance required by CAR OPS-1.565 paras (b) or (c) as applicable, and end at a height of 1500 ft above the surface.

(c) When showing compliance with sub-paragraph (a) above, an operator must take account of the following:
   (1) The mass of the aeroplane at the commencement of the take-off run;
   (2) The pressure altitude at the aerodrome;
   (3) The ambient temperature at the aerodrome; and
   (4) Not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.

(d) When showing compliance with sub-paragraph (a) above, track changes shall not be allowed up to that point of the take-off flight path where a height of fifty (50) ft above the surface has been achieved. Thereafter, up to a height of 400 ft it is assumed that the aeroplane is banked by no more than 15°. Above 400 ft height bank angles greater than 15°, but not more than 25° may be scheduled. Adequate allowance must be made for the effect of bank angle on operating speeds and flight path including the distance increments resulting from increased operating speeds. (See AMC OPS-1.570(d).)

(e) When showing compliance with sub-paragraph (a) above for those cases which do not require track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:
   (1) 300 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS-1.570(e)(1) & (f)(1)); or
   (2) 600 m, for flights under all other conditions.

(f) When showing compliance with sub-paragraph (a) above for those cases which do require track changes of more than 15°, an operator need not consider those obstacles which have a lateral distance greater than:
   (1) 600 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS-1.570(e)(1) & (f)(1)); or
   (2) 900 m for flights under all other conditions.

(g) An operator shall establish contingency procedures to satisfy the requirements of CAR OPS1.570 and to provide a safe route, avoiding obstacles, to enable the aeroplane to either comply with the en-route requirements of CAR OPS-1.580, or land at either the aerodrome of departure or at a take-off alternate aerodrome.

CAR OPS-1.575 En-Route – All Engines Operating

(a) An operator shall ensure that the aeroplane will, in the meteorological conditions expected for the flight, at any point on its route or on any planned diversion therefrom, be capable of a rate of climb of at least 300 ft per minute with all engines operating within the maximum continuous power conditions specified at:
   (1) The minimum altitudes for safe flight on each stage of the route to be flown or of any planned diversion there from specified in, or calculated from the information contained in, the Operations Manual relating to the aeroplane; and
   (2) The minimum altitudes necessary for compliance with the conditions prescribed in CAR OPS-1.580 and 1.585, as appropriate.

CAR OPS-1.580 En-Route – One Engine Inoperative

(See AMC OPS- 1.580)

(a) An operator shall ensure that the aeroplane will, in the meteorological conditions expected for the flight, in the event of any one engine becoming inoperative at any point on its route or on any planned diversion there from and with the other engine or engines operating within the maximum continuous power conditions specified, be capable of continuing the flight from the cruising altitude to an aerodrome where a landing can be made in accordance with CAR OPS-1.595 or CAR OPS-1.600 as appropriate, clearing obstacles within 9.3 km (5 nm) either side of the intended track by a vertical interval of at least:

(1) 1000 ft when the rate of climb is zero or greater; or
(2) 2000 ft when the rate of climb is less than zero.

(b) The flight path shall have a positive slope at an altitude of 450 m (1500 ft) above the aerodrome where the landing is assumed to be made after the failure of one engine.

(c) For the purpose of this sub-paragraph the available rate of climb of the aeroplane shall be taken to be 150 ft per minute less than the gross rate of climb specified.

(d) When showing compliance with this paragraph, an operator must increase the width margins of sub-paragraph (a) above to 18.5 km (10 nm) if the navigational accuracy does not meet the 95% containment level.

(e) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.

CAR OPS-1.585 En-Route – Aeroplanes with Three Or More Engines, Two Engines Inoperative

(a) An operator shall ensure that, at no point along the intended track, will an aeroplane having three or more engines be more than ninety (90) minutes at the all-engine long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met unless it complies with sub-paragraphs (b) to (e) below.

(b) The two-engines inoperative flight path shown must permit the aeroplane to continue the flight, in the expected meteorological conditions, clearing all obstacles within 9.3 km (5 nm) either side of the intended track by a vertical interval of at least 2000 ft, to an aerodrome at which the performance requirements applicable at the expected landing mass are met.

(c) The two engines are assumed to fail at the most critical point of that portion of the route where the aeroplane is more than ninety (90) minutes, at the all-engines long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met.

(d) The expected mass of the aeroplane at the point where the two engines are assumed to fail must not be less than that which would include sufficient fuel to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at an altitude of a least 450 m (1500 ft) directly over the landing area and thereafter to fly level for 15 minutes.

(e) For the purpose of this sub-paragraph the available rate of climb of the aeroplane shall be taken to be 150 ft per minute less than that specified.

(f) When showing compliance with this paragraph, an operator must increase the width margins of sub-paragraph (a) above to 18.5 km (10 nm) if the navigational accuracy does not meet the 95% containment level.

(g) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.

CAR OPS-1.590 Landing – Destination and Alternate Aerodromes

(See AMC OPS-1.590 and 1.595)

An operator shall ensure that the landing mass of the aeroplane determined in accordance with CAR OPS-1.475(a) does not exceed the maximum landing mass specified in the Aeroplane Flight Manual for the altitude and, if accounted for in the Aeroplane Flight Manual, the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome.

CAR OPS-1.595 Landing – Dry Runways

(See AMC OPS-1.590 and 1.595, AMC OPS-1.590(b)(3) and 1.595(b)(4) & IEM OPS-1.595(c))

(a) An operator shall ensure that the landing mass of the aeroplane determined in accordance with CAR OPS-1.475(a) for the estimated time of landing allows a full stop landing from fifty (50) ft above the threshold within 70% of the landing distance available at the destination and any alternate aerodrome.

(b) When showing compliance with sub-paragraph (a) above, an operator must take account of the following:
   (1) The altitude at the aerodrome;
   (2) Not more than 50% of the head-wind component or not less than 150% of the tailwind component;
   (3) The type of runway surface (see AMC OPS-1.595(b)(3)); and
   (4) The slope of the runway in the direction of landing (See AMC OPS-1.595(b)(4)).

(c) For dispatching an aeroplane in accordance with sub-paragraph (a) above it must be assumed that:
   (1) The aeroplane will land on the most favourable runway in still air; and
   (2) The aeroplane will land on the runway most likely to be assigned considering the probable wind speed and direction and the ground handling characteristics of the aeroplane, and considering other conditions such as landing aids and terrain. (See IEM OPS-1.595(c).)

(d) If an operator is unable to comply with sub-paragraph (c)(2) above for the destination aerodrome, the aeroplane may be dispatched if an alternate aerodrome is designated which permits full compliance with sub-paragraphs (a), (b) and (c).

CAR OPS-1.600 Landing – Wet and Contaminated Runways

(a) An operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is equal to or exceeds the required landing distance, determined in accordance with CAR OPS-1.595, multiplied by a factor of 1.15.

(b) An operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be contaminated, the landing distance determined by using data acceptable to the Authority for these conditions, does not exceed the landing distance available. (See CAR OPS-1.520 paras (d) & (f))

SECTION 2 – SUBPART I – AMC/IEM – PERFORMANCE CLASS-C AIRCRAFT

IEM OPS-1.565(d)(3) Take-off

(See CAR OPS-1.565(d)(3))

Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aeroplane during take-off, since the actual conditions may not completely match the assumptions on which the performance information is based. An adequate overall level of safety can, therefore, only be maintained if such operations are limited to rare occasions. In case of a contaminated runway the first option for the commander is to wait until the runway is cleared. If this is impracticable, he may consider a take-off, provided that he has applied the applicable performance adjustments, and any further safety measures he considers justified under the prevailing conditions.

AMC OPS-1.570(d) Take-off Flight Path

(See CAR OPS-1.570(d))

(1) The Aeroplane Flight Manual generally provides a climb gradient decrement for a 15° bank turn. Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturer, acceptable adjustments to assure adequate stall margins and gradient corrections are provided by the following:

BANK	SPEED	GRADIENT CORRECTION
15°	V2	1 x Aeroplane Flight Manual 15° Gradient Loss
20°	V2 + 5 kt	2x Aeroplane Flight Manual 15° Gradient Loss
25°	V2 + 10 kt	3 x Aeroplane Flight Manual 15° Gradient Loss

(2) For bank angles of less than 15°, a proportionate amount may be applied, unless the manufacturer or the Aeroplane Flight Manual has provided other data.

AMC OPS-1.565(d)(4) Runway Slope

(See CAR OPS-1.565(d)(4))

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturers, the take-off distance should be increased by 5% for each 1% of upslope except that correction factors for runways with slopes in excess of 2% need the acceptance of the Authority.

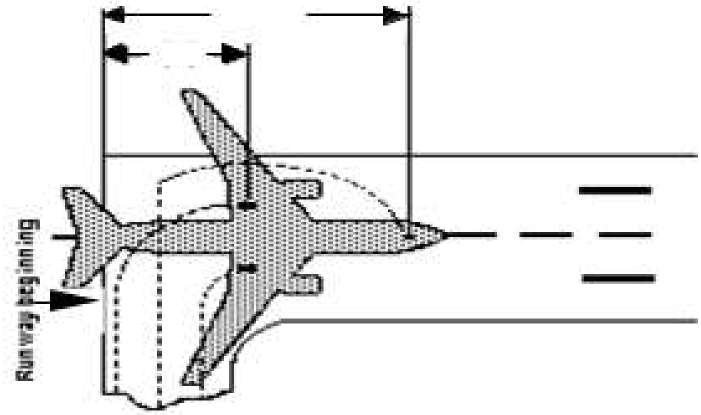
IEM OPS-1.565(d)(6) Loss of runway length due to alignment

(See CAR OPS-1.565(d)(6))

(1) Introduction

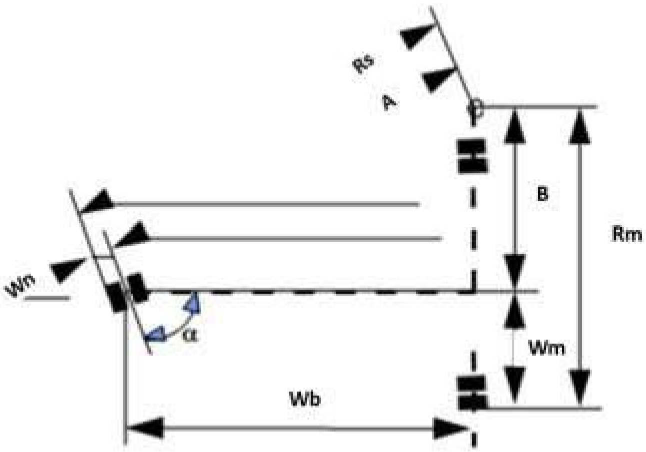
(a) The length of the runway which is declared for the calculation of TODA, ASDA and TORA, does not account for line-up of the aeroplane in the direction of take-off on the runway in use. This alignment distance depends on the aeroplane geometry and access possibility to the runway in use. Accountability is usually required for a 90° taxiway entry to the runway and 180° turnaround on the runway. There are two distances to be considered:

i. The minimum distance of the mainwheels from the start of the runway for determining TODA and TORA, "L"; and
ii. The minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA, "N".



ii. Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in paragraph (2) may be used to determine the alignment distance.

(2) Alignment Distance Calculation



The distance mentioned in (a) and (b) of paragraph (1) above are:

TURNAROUND	90° ENTRY	180°
L =	$R_M + X$	$R_N + Y$
N =	$R_M + X + W_B$	$R_N + Y + W_B$

where:

$$R_N = A + W_N = \frac{W_B}{\cos(90^o-\alpha)} + W_B$$

And $$R_M = B + W_M = W_B \tan(90^o-\alpha) + W_M$$

X = Safety distance of outer main wheels during turn to the edge of the runway

Y = Safety distance of outer nose wheel during turn to the edge of the runway

RN	=	Radius of turn of outer nose wheel
RM	=	Radius of turn of outer main wheel
WN	=	Distance from aeroplane centre-line to outer nose wheel
WM	=	Distance from aeroplane centre-line to outer main wheel
WB	=	Wheel base
α	=	Steering angle

AMC OPS-1.570(e)(1) & (f)(1) Required navigational accuracy

(See CAR OPS-1.570(e)(1) & (f)(1))

(1) ***Flight-deck systems***. The obstacle accountability semi-widths of 300m (see CAR OPS1.570(e)(1)) and 600 m (see CAR OPS-1.570(f)(1)) may be used if the navigation system under one-engine- inoperative conditions provides a two-standard deviation (2 s) accuracy of 150m and 300 m respectively.

(2) ***Visual Course Guidance***

(a) The obstacle accountability semi-widths of 300 m (see CAR OPS-1.570(e)(1)) and 600 m (see CAR OPS-1.570(f)(1)) may be used where navigational accuracy is ensured at all relevant points on the flight path by use of external references. These references may be considered visible from the flight deck if they are situated more than 45° either side of the intended track and with a depression of not greater than 20° from the horizontal.

(b) For visual course guidance navigation, an operator should ensure that the weather conditions prevailing at the time of operation, including ceiling and visibility, are such that the obstacle and/or ground reference points can be seen and identified. The Operations Manual should specify, for the aerodrome(s) concerned, the minimum weather conditions which enable the flight crew to continuously determine and maintain the correct flight path with respect to ground reference points, so as to provide a safe clearance with respect to obstructions and terrain as follows:

i. The procedure should be well defined with respect to ground reference points so that the track to be flown can be analysed for obstacle clearance requirements;
ii. The procedure should be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;
iii. A written and/or pictorial description of the procedure should be provided for crew use;
iv. The limiting environmental conditions (such as wind, the lowest cloud base, ceiling, visibility, day/night, ambient lighting, obstruction lighting) should be specified.

AMC OPS-1.580 En-Route – One Engine Inoperative

(See CAR OPS-1.580)

The high terrain or obstacle analysis required for showing compliance with CAR OPS 1.580 can be carried out by making a detailed analysis of the route using contour maps of the high terrain, and plotting the highest points within the prescribed corridor width along the route. The next step is to determine whether it is possible to maintain level flight with one engine inoperative 1,000 ft above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a drift-down procedure must be evaluated, based on engine failure at the most critical point, and must show obstacle clearance during the drift-down by at least 2000 ft. The minimum cruise altitude is determined from the drift-down path, taking into account allowances for decision making, and the reduction in the scheduled rate of climb (See Figure 1).

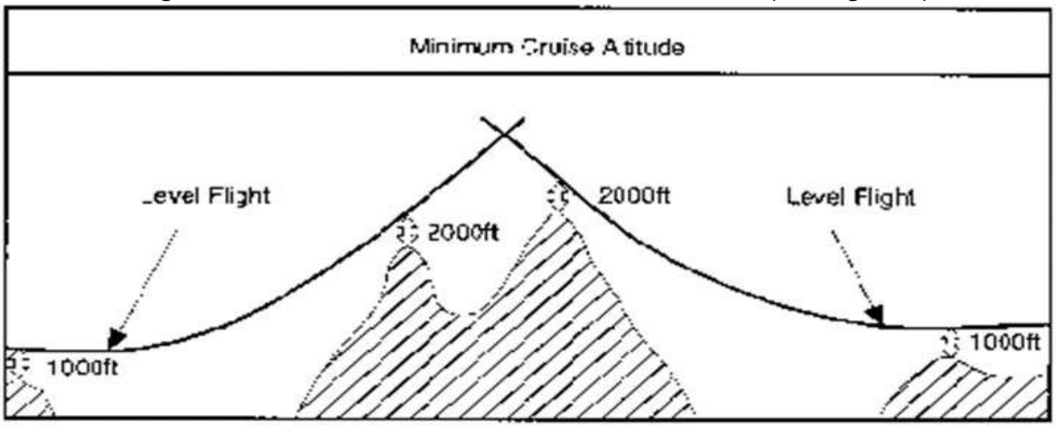


Figure 1.

AMC OPS-1.590 & 1.595 Landing – Destination and Alternate Aerodromes Landing – Dry Runways

(See CAR OPS-1.590 & 1.595)

In showing compliance with CAR OPS-1.590 and CAR OPS-1.595, the operator should use either pressure altitude or geometric altitude for his operation and this should be reflected in the Operations Manual.

AMC OPS 1.595(b)(3) Landing Distance Correction Factors

(See CAR OPS-1.595(b)(3))

Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturers, the variables affecting the landing performance and the associated factors to be applied to the Aeroplane Flight Manual data are shown in the table below. It should be applied in addition to the factor specified in CAR OPS-1.595(a).

SURFACE TYPE	FACTOR
Grass (on firm soil up to 13 cm long)	1.20

Note: The soil is firm when there are wheel impressions but no rutting.

AMC OPS-1.595(b)(4) Runway Slope

(See CAR OPS-1.595(b)(4))

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturer, the landing distances required should be increased by 5% for each 1% of downslope.

IEM OPS-1.595(c) Landing Runway

(See CAR OPS-1.595(c))

(1) CAR OPS-1.595(c) establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

(2) Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 70% of the landing distance available on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome, cannot be exceeded.

(3) Secondly, consideration should be given to anticipated conditions and circumstances. The expected wind, or ATC and noise abatement procedures, may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under paragraph 2 above, in which case, to show compliance with CAR OPS-1.595(a), dispatch should be based on this lesser mass.

(4) The expected wind referred to in paragraph (3) is the wind expected to exist at the time of arrival.

SUBPART J – MASS and BALANCE

CAR OPS-1.605 General

(See Appendix 1 to CAR OPS-1.605)(AMC to Appendix 1 to CAR OPS-1.605(a)(4)(iii))
(See IEM to Appendix 1 CAR OPS-1.605) (See IEM OPS-1.605(e))
(See AC OPS-1.605)
(See IEM OPS-1.620(g)) (See Appendix 1 to CAR OPS-1.625)

(a) An operator shall ensure that during any phase of operation, the loading, mass and centre of gravity of the aeroplane complies with the limitations specified in the approved Aeroplane Flight Manual, or the Operations Manual if more restrictive.
(b) An operator must establish the mass and the centre of gravity of any aeroplane by actual weighing prior to initial entry into service and thereafter at intervals of four (4) years if individual aeroplane masses are used and nine (9) years if fleet masses are used. The accumulated effects of modifications and repairs on the mass and balance must be accounted for and properly documented. Furthermore, aeroplanes must be reweighed if the effect of modifications on the mass and balance is not accurately known.
(c) An operator must determine the mass of all operating items and crew members included in the aeroplane dry operating mass by weighing or by using standard masses. The influence of their position on the aeroplane centre of gravity must be determined.
(d) An operator must establish the mass of the traffic load, including any ballast, by actual weighing or determine the mass of the traffic load in accordance with standard passenger and baggage masses as specified in CAR OPS-1.620.
(e) An operator must determine the mass of the fuel load by using the actual density or, if not known, the density calculated in accordance with a method specified in the Operations Manual. (See IEM OPS-1.605(e)).

CAR OPS-1.607 Terminology

(a) ***Dry Operating Mass.*** The total mass of the aeroplane ready for a specific type of operation excluding all usable fuel and traffic load. This mass includes items such as:
    (1) Crew and crew baggage;
    (2) Catering and removable passenger service equipment; and
    (3) Potable water and lavatory chemicals.
(b) ***Maximum Zero Fuel Mass.*** The maximum permissible mass of an aeroplane with no usable fuel. The mass of the fuel contained in particular tanks must be included in the zero fuel mass when it is explicitly mentioned in the Aeroplane Flight Manual limitations.
(c) ***Maximum Structural Landing Mass.*** The maximum permissible total aeroplane mass upon landing under normal circumstances.
(d) ***Maximum Structural Take Off Mass.*** The maximum permissible total aeroplane mass at the start of the take-off run.
(e) ***Passenger classification.***
    (1) Adults, male and female, are defined as persons of an age of 12 years and above.
    (2) Children are defined as persons of an age of two years and above but who are less than 12 years of age.
    (3) Infants are defined as persons who are less than 2 years of age.
(f) ***Traffic Load.*** The total mass of passengers, baggage and cargo, including any non-revenue load.

CAR OPS-1.610 Loading, mass and balance

An operator shall specify, in the Operations Manual, the principles and methods involved in the loading and in the mass and balance system that meet the requirements of CAR OPS-1.605. This system must cover all types of intended operations.

CAR OPS-1.615 Mass values for crew

(a) An operator shall use the following mass values to determine the dry operating mass:
  (1) Actual masses including any crew baggage; or
  (2) Standard masses, including hand baggage, of 85 kg for flight crewmembers and 75 kg for cabin crewmembers; or
  (3) Other standard masses acceptable to the Authority.

(b) An operator must correct the dry operating mass to account for any additional baggage. The position of this additional baggage must be accounted for when establishing the centre of gravity of the aeroplane.

CAR OPS-1.620 Mass values for passengers and baggage

(See AMC OPS-1.620(a), IEM OPS-1.620(d)(2) & IEM OPS-1.620(g))
(See IEM OPS-1.620(h) & (i))
(See Appendix 1 to CAR OPS-1.620(g))
(See AMC to Appendix 1 CAR OPS-1.620(g))
(See IEM to Appendix 1 CAR OPS-1.620(g))

An operator shall compute the mass of passengers and checked baggage using either the actual weighed mass of each person and the actual weighed mass of baggage or the standard mass values specified in Tables 1 to 3 below except where the number of passenger seats available is less than 10. In such cases passenger mass may be established by use of a verbal statement by or on behalf of each passenger and adding to it a pre-determined constant to account for hand baggage and clothing (See AMC OPS-1.620(a)). The procedure specifying when to select actual or standard masses and the procedure to be followed when using verbal statements must be included in the Operations Manual.

(a) If determining the actual mass by weighing, an operator must ensure that passengers' personal belongings and hand baggage are included. Such weighing must be conducted immediately prior to boarding and at an adjacent location.

(b) If determining the mass of passengers using standard mass values, the standard mass values in Tables 1 and 2 below must be used. The standard masses include hand baggage and the mass of any infant below 2 years of age carried by an adult on one passenger seat. Infants occupying separate passenger seats must be considered as children for the purpose of this sub-paragraph.

(c) Mass values for passengers – 20 passenger seats or more
  (1) Where the total number of passenger seats available on an aeroplane is 20 or more, the standard masses of male and female in Table 1 are applicable. As an alternative, in cases where the total number of passenger seats available is 30 or more, the 'All Adult' mass values in Table 1 are applicable.
  (2) For the purpose of Table 1, holiday charter means a charter flight solely intended as an element of a holiday travel package. The holiday charter mass values apply provided that not more than 5% of passenger seats installed in the aeroplane are used for the non-revenue carriage of certain categories of passengers (See IEM OPS-1.620(d)(2)).
  (3)

Table 1.

Passenger seats:	20 and more		30 and more
	Male	Female	All adult
All flights except holiday charters	88 kg	70 kg	84 kg
Holiday charters	83 kg	69 kg	76 kg
Children	35 kg	35 kg	35 kg

(d) Mass values for passengers – nineteen (19) passenger seats or less

(1) Where the total number of passenger seats available on an aeroplane is nineteen (19) or less, the standard masses in Table 2 are applicable.

(2) On flights where no hand baggage is carried in the cabin or where hand baggage is accounted for separately, 6 kg may be deducted from the above male and female masses. Articles such as an overcoat, an umbrella, a small handbag or purse, reading material or a small camera are not considered as hand baggage for the purpose of this sub-paragraph.

Table 2.

Passenger seats	1 – 5	6 – 9	10 – 19
Male	104 kg	96 kg	92 kg
Female	86 kg	78 kg	74 kg
Children	35 kg	35 kg	35 kg

(e) Mass values for baggage

(1) Where the total number of passenger seats available on the aeroplane is 20 or more the standard mass values given in Table 3 are applicable for each piece of checked baggage. For aeroplanes with 19 passenger seats or less, the actual mass of checked baggage, determined by weighing, must be used.

Table 3. – 20 or more passengers

Type of flight	Baggage standard mass
Domestic	11 kg
Intercontinental	15 kg
All other	13 kg

(g) If an operator wishes to use standard mass values other than those contained in Tables 1 to 3 above, he must advise the Authority of his reasons and gain its approval in advance. He must also submit for approval a detailed weighing survey plan and apply the statistical analysis method given in Appendix 1 to CAR OPS-1.620(g). After verification and approval by the Authority of the results of the weighing survey, the revised standard mass values are only applicable to that operator. The revised standard mass values can only be used in circumstances consistent with those under which the survey was conducted. Where revised standard masses exceed those in Tables 1–3, then such higher values must be used. (See IEM OPS-1.620(g)).

(h) On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, an operator must determine the actual mass of such passengers by weighing or by adding an adequate mass increment. (See IEM OPS-1.620(h) & (i)).

(i) If standard mass values for checked baggage are used and a significant number of passengers check in baggage that is expected to exceed the standard baggage mass, an operator must determine the actual mass of such baggage by weighing or by adding an adequate mass increment. (See IEM OPS-1.620(h) & (i)).

(j) An operator shall ensure that a commander is advised when a non-standard method has been used for determining the mass of the load and that this method is stated in the mass and balance documentation.

CAR OPS-1.625 Mass and balance documentation

(See Appendix 1 to CAR OPS-1.625, AMC to Appendix 1 to CAR OPS-1.625(a) & GM Appendix 1 to CAR OPS-1.625(a))

(a) An operator shall establish mass and balance documentation prior to each flight specifying the load and its distribution. The mass and balance documentation must enable the commander to determine that the load and its distribution is such that the mass and balance limits of the aeroplane are not exceeded. The person preparing the mass and balance documentation must be named on the document. The person supervising the loading of the aeroplane must confirm by signature that the load and its distribution are in accordance with the mass and balance documentation. This document must be acceptable to the commander; his acceptance being indicated by countersignature or equivalent. (See also CAR OPS-1.1055(a)(12)).

(b) An operator must specify procedures for Last Minute Changes to the load.

(c) Subject to the approval of the Authority, an operator may use an alternative to the procedures required by paragraphs (a) and (b) above.

SECTION 2 – SUBPART J – AC/AMC/IEM – MASS & BALANCE

Appendix 1 to CAR OPS-1.605 Mass and Balance – General

(See AC to Appendix 1 to CAR OPS-1.605) (See IEM to Appendix 1 to CAR OPS-1.605)

(a) Determination of the dry operating mass of an aeroplane

(1) Weighing of an aeroplane

i. New aeroplanes are normally weighed at the factory and are eligible to be placed into operation without reweighing if the mass and balance records have been adjusted for alterations or modifications to the aeroplane.

ii. The individual mass and centre of gravity (CG) position of each aeroplane shall be re-established periodically. The maximum interval between any two weighing's must be defined by the operator and must meet the requirements of CAR OPS-1.605(b). In addition, the mass and the CG of each aeroplane shall be re-established either by:

A. Weighing; or

B. Calculation, if the operator is able to provide the necessary justification to prove the validity of the method of calculation chosen, whenever the cumulative changes to the dry operating mass exceed ± 0.5% of the maximum landing mass or the cumulative change in CG position exceeds 0.5% of the mean aerodynamic chord.

(2) Fleet mass and CG position

i. For a fleet or group of aeroplanes of the same model and configuration, an average dry operating mass and CG position may be used as the fleet mass and CG position, provided that the dry operating masses and CG positions of the individual aeroplanes meet the tolerances specified in sub-paragraph (ii) below. Furthermore, the criteria specified in sub-paragraphs (iii), (iv) and (a)(3) below are applicable.

ii. Tolerances

A. If the dry operating mass of any aeroplane weighed, or the calculated dry operating mass of any aeroplane of a fleet, varies by more than ±0.5% of the maximum structural landing mass from the established dry operating fleet mass or the CG position varies by more than ±0.5% of the mean aerodynamic chord from the fleet CG, that aeroplane shall be omitted from that fleet. Separate fleets may be established, each with differing fleet mean masses.

B. In cases where the aeroplane mass is within the dry operating fleet mass tolerance but its CG position falls outside the permitted fleet tolerance, the aeroplane may still be operated under the applicable dry operating fleet mass but with an individual CG position.

C. If an individual aeroplane has, when compared with other aeroplanes of the fleet, a physical, accurately accountable difference (e.g. galley or seat configuration), that causes exceedance of the fleet tolerances, this aeroplane may be maintained in the fleet provided that appropriate corrections are applied to the mass and/or CG position for that aeroplane.

D. Aeroplanes for which no mean aerodynamic chord has been published must be operated with their individual mass and CG position values or must be subjected to a special study and approval.

iii. Use of fleet values

A. After the weighing of an aeroplane, or if any change occurs in the aeroplane equipment or configuration, the operator must verify that this aeroplane falls within the tolerances specified in sub-paragraph (2)(ii) above.

B. Aeroplanes which have not been weighed since the last fleet mass evaluation can still be kept in a fleet operated with fleet values, provided that the individual values are revised by computation and stay within the tolerances defined in sub-paragraph (2)(ii) above. If these individual values no longer fall within the permitted tolerances, the operator must either determine new fleet values fulfilling the conditions of subparagraphs (2)(i) and (2)(ii) above, or operate the aeroplanes not falling within the limits with their individual values.

C. To add an aeroplane to a fleet operated with fleet values, the operator must verify by weighing or computation that its actual values fall within the tolerances specified in sub- paragraph (2)(ii) above.

iv. To comply with sub-paragraph (2)(i) above, the fleet values must be updated at least at the end of each fleet mass evaluation.

(3) Number of aeroplanes to be weighed to obtain fleet values

i. If ‘n’ is the number of aeroplanes in the fleet using fleet values, the operator must at least weigh, in the period between two fleet mass evaluations, a certain number of aeroplanes defined in the Table below:

Number of aeroplanes in the fleet	Minimum number of weighings
2 or 3	n
4 to 9	$\frac{n+3}{2}$
10 or more	$\frac{n+51}{10}$

iii. In choosing the aeroplanes to be weighed, aeroplanes in the fleet which have not been weighed for the longest time shall be selected.

iv. The interval between 2 fleet mass evaluations must not exceed 48 months.

(4) Weighing procedure

i. The weighing must be accomplished either by the manufacturer or by an approved maintenance organisation.

ii. Normal precautions must be taken consistent with good practices such as:

A. Checking for completeness of the aeroplane and equipment;

B. Determining that fluids are properly accounted for;

C. Ensuring that the aeroplane is clean; and

D. Ensuring that weighing is accomplished in an enclosed building.

iii. Any equipment used for weighing must be properly calibrated, zeroed, and used in accordance with the manufacturer’s instructions. Each scale must be calibrated either by the manufacturer, by a civil department of weights and measures or by an appropriately authorised organisation within 2 years or within a time period defined by the manufacturer of the weighing equipment, whichever is less. The equipment must enable the mass of the aeroplane to be established accurately. (See AMC to Appendix 1 to CAR OPS-1.605 para (a)(4)(iii)).

(b) Special standard masses for the traffic load. In addition to standard masses for passengers and checked baggage, an operator can submit for approval to the AUTHORITY standard masses for other load items.

(c) Aeroplane loading

(1) An operator must ensure that the loading of its aeroplanes is performed under the supervision of qualified personnel.

(2) An operator must ensure that the loading of the freight is consistent with the data used for the calculation of the aeroplane mass and balance.

(3) An operator must comply with additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment, and/or the maximum seating limits.

(d) Centre of gravity limits

(1) Operational CG envelope. Unless seat allocation is applied and the effects of the number of passengers per seat row, of cargo in individual cargo compartments and of fuel in individual tanks is accounted for accurately in the balance calculation, operational margins must be applied to the certificated centre of gravity envelope. In determining the CG margins, possible deviations from the assumed load distribution must be considered. If free seating is applied, the operator must introduce procedures to ensure corrective action by flight or cabin crew if extreme longitudinal seat selection occurs. The CG margins and associated operational procedures, including assumptions with regard to passenger seating, must be acceptable to the Authority. (See IEM to Appendix 1 to CAR OPS-1.605 subparagraph (d).)

(2) In-flight centre of gravity. Further to sub-paragraph (d)(1) above, the operator must show that the procedures fully account for the extreme variation in CG travel during flight caused by passenger/crew movement and fuel consumption/transfer.

AMC to Appendix 1 to CAR OPS-1.605(a)(4)(iii) Accuracy of weighing equipment

(See Appendix 1 to CAR OPS-1.605, paragraph (a)(4)(iii))

(1) The mass of the aeroplane as used in establishing the dry operating mass and the centre of gravity must be established accurately. Since a certain model of weighing equipment is used for initial and periodic weighing of aeroplanes of widely different mass classes, one single accuracy criterion for weighing equipment cannot be given. However, the weighing accuracy is considered satisfactory if the following accuracy criteria are met by the individual scales/cells of the weighing equipment used:

(a)	For a scale/cell load below 2 000 kg	–	an accuracy of ± 1%;
(b)	For a scale/cell load from 2 000 kg to 20 000 kg	–	an accuracy of ± 20 kg; and
(c)	(c) For a scale/cell load above 20 000 kg	–	an accuracy of ± 0·1%.

IEM to Appendix 1 to CAR OPS-1.605 Centre of gravity limits

(See Appendix 1 to CAR OPS-1.605, sub-paragraph (d))

(1) In the Certificate Limitations section of the Aeroplane Flight Manual, forward and aft centre of gravity (CG) limits are specified. These limits ensure that the certification stability and control criteria are met throughout the whole flight and allow the proper trim setting for take-off. An operator should ensure that these limits are observed by defining operational procedures or a CG envelope which compensates for deviations and errors as listed below:

(a) Deviations of actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations.

(b) Deviations in fuel distribution in tanks from the applicable schedule.

(c) Deviations in the distribution of baggage and cargo in the various compartments as compared with the assumed load distribution as well as inaccuracies in the actual mass of baggage and cargo.

(d) Deviations in actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation. (See Note)

(e) Deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position.

(f) Deviations of the CG caused by gear and flap positions and by application of the prescribed fuel usage procedure (unless already covered by the certified limits).

(g) Deviations caused by in-flight movement of cabin crew, galley equipment and passengers.

Note: Large CG errors may occur when 'free seating' (freedom of passengers to select any seat when entering the aeroplane) is permitted. Although in most cases reasonably even longitudinal passenger seating can be expected, there is a risk of an extreme forward or aft seat selection causing very large and unacceptable CG errors (assuming that the balance calculation is done on the basis of an assumed even distribution). The largest errors may occur at a load factor of approximately 50% if all passengers are seated in either the forward or aft half of the cabin. Statistical analysis indicates that the risk of such extreme seating adversely affecting the CG is greatest on small aeroplanes.

IEM OPS-1.605(e) Fuel density

(See CAR OPS-1.605(e))

(1) If the actual fuel density is not known, the operator may use the standard fuel density values specified in the Operations Manual for determining the mass of the fuel load. Such standard values should be based on current fuel density measurements for the airports or areas concerned. Typical fuel density values are:

(a)	Gasoline (piston engine fuel)	–	0·71
(b)	Jet fuel JP 1	–	0·79
(c)	Jet fuel JP 4	–	0·76
(d)	Oil	–	0·88

AC OPS-1.605 Mass values

(See CAR OPS-1.605)

In accordance with ICAO Annex 5 and the International System of Units (SI), the actual and limiting masses of aeroplanes, the payload and its constituent elements, the fuel load etc., are expressed in CAR OPS-1 in units of mass (kg). However, in most approved Flight Manuals and other operational documentation, these quantities are published as weights in accordance with the common language. In the SI system, a weight is a force rather than a mass. Since the use of the term 'weight' does not cause any problem in the day-to-day handling of aeroplanes, its continued use in operational applications and publications is acceptable.

AMC OPS-1.620(a) Passenger mass established by use of a verbal statement

(See CAR OPS-1.620(a))

(1) When asking each passenger on aeroplanes with less than ten (10) passenger seats for his/her mass (weight), specific constants should be added to account for hand baggage and clothing. These constants should be determined by the operator on the basis of studies relevant to his particular routes, etc. and should not be less than:
   (a) For clothing – 4 kg; and
   (b) For hand baggage – 6 kg.

(2) Personnel boarding passengers on this basis should assess the passenger's stated mass and the mass of passengers' clothing and hand baggage to check that they are reasonable. Such personnel should have received instruction on assessing these mass values. Where necessary, the stated mass and the specific constants should be increased so as to avoid gross inaccuracies.

IEM OPS 1.620(d)(2) Holiday Charter

(See CAR OPS-1.620(d)(2))

A "charter flight solely intended as an element of a holiday travel package" is a flight where the entire passenger capacity is hired by one or more Charterer(s) for the carriage of passengers who are travelling, all or in part by air, on a round- or circle-trip basis for holiday purposes. Categories of passengers such as company personnel, tour operators' staff, representatives of the press, Authority officials etc. can be included thin the 5% alleviation without negating the use of holiday charter mass values.

IEM OPS-1.620(g) Statistical evaluation of passenger and baggage mass data

See CAR OPS-1.620(g)

(1) Sample size (see also Appendix 1 to CAR OPS-1.620(g)).

(a) For calculating the required sample size, it is necessary to make an estimate of the standard deviation on the basis of standard deviations calculated for similar populations or for preliminary surveys. The precision of a sample estimate is calculated for 95% reliability or 'significance', i.e. there is a 95% probability that the true value falls within the specified confidence interval around the estimated value. This standard deviation value is also used for calculating the standard passenger mass.

(b) As a consequence, for the parameters of mass distribution, i.e. mean and standard deviation, three cases have to be distinguished:

i. μ, σ = the true values of the average passenger mass and standard deviation, which are unknown and which are to be estimated by weighing passenger samples.

ii. μ', σ = the 'a prior' estimates of the average passenger mass and the standard deviation, i.e. values resulting from an earlier survey, which are needed to determine the current sample size.

iii. x, s = the estimates for the current true values of m and s, calculated from the sample.

The sample size can then be calculated using the following formula:

$$n \geq \frac{(1{\cdot}96 * \sigma' * 100)^2}{(e' * \mu')^2}$$

where:

n = number of passengers to be weighed (sample size)

e'_r = allowed relative confidence range (accuracy) for the estimate of μ by x (see also equation in paragraph 3).

Note: The allowed relative confidence range specifies the accuracy to be achieved when estimating the true mean. For example, if it is proposed to estimate the true mean to within ± 1%, then e'r will be 1 in the above formula.

1·96 = value from the Gaussian distribution for 95% significance level of the resulting confidence interval.

(2) Calculation of average mass and standard deviation. If the sample of passengers weighed is drawn at random, then the arithmetic mean of the sample (x) is an unbiased estimate of the true average mass (µ) of the population.

(a) Arithmetic means of sample, where:

x_j = mass values of individual passengers

$$x = \frac{\sum_{j=1}^{n} x_j}{n}$$

(b) Standard deviation

$$S = \sqrt{\frac{\sum_{j=1}(x_j - x)^2}{n-1}}$$

(3) Checking the accuracy of the sample mean. The accuracy (confidence range) which can be ascribed to the sample mean as an indicator of the true mean is a function of the standard deviation of the sample which has to be checked after the sample has been evaluated. This is done using the formula:

$$e_r = \frac{1 \cdot 96 * s * 100}{\sqrt{n} * \bar{x}} (\%)$$

whereby er should not exceed 1% for an al adult average mass and not exceed 2% for an average male and/or female mass. The result of this calculation gives the relative accuracy of the estimate of μ at the 95% significance level. This means that with 95% probability, the true average mass μ lies within the interval:

(4) Example of the determination of the required sample size and average passenger mass

$$\bar{x} \pm \frac{1 \cdot 96 * s}{\sqrt{n}}$$

(a) Introduction. Standard passenger mass values for mass and balance purposes require passenger weighing programs be carried out. The following example shows the various steps required for establishing the sample size and evaluating the sample data. It is provided primarily for those who are not well versed in statistical computations. All mass figures used throughout the example are entirely fictitious.

(b) Determination of required sample size. For calculating the required sample size, estimates of the standard (average) passenger mass and the standard deviation are needed. The prior estimates from an earlier survey may be used for this purpose. If such estimates are not available, a small representative sample of about 100 passengers has to be weighed so that the required values can be calculated. The latter has been assumed for the example.

Step 1: estimated average passenger mass.

Step2: estimated standard deviation.

Step 3: required sample size.

The required number of passengers to be weighed should be such that the confidence range, e'r, does not exceed 1% as specified in paragraph (3).

n	x_j (kg)
1	79·9
2	68·1
3	77·9
4	74·5
5	54·1
6	$\bar{x}$ 62·2
7	89·3
8	108·7
.	.
85	63·2
86	75·4
$\sum_{j=1}^{86}$	6 071·6

n	x_j	$(x_j - x)$	$(xj - x)^2$
1	79·9	+9·3	86·49
2	68·1	–2·5	6·25
3	77·9	+7·3	53·29
4	74·5	+3·9	15·21
5	54·1	–16·5	272·25
6	62·2	–8·4	70·56
7	89·3	+18·7	349·69
8	108·7	+38·1	1 451·61
.	.	.	.
85	63·2	–7·4	54·76
86	75·4	–4·8	23·04
$\sum_{j=1}^{86}$	6 071·6		34 683·40

$$\mu' = \tilde{x} = \frac{\sum x_j}{n} = \frac{6071{\cdot}6}{86}$$

$$= 70{\cdot}6 \text{ kg}$$

$$\sigma' = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}$$

$$\sigma' = \sqrt{\frac{34\,683{\cdot}40}{86-1}}$$

$$\sigma' = 20{\cdot}20 \text{ kg}$$

Step 3: required sample size.

The required number of passengers to be weighed should be such that the confidence range, e'r, does not exceed 1% as specified in paragraph (3).

$$n \geq \frac{(1{\cdot}96 * \sigma' * 100)^2}{(e'_r * \mu')^2}$$

$$n \geq \frac{(1{\cdot}96 * 20{\cdot}20 * 100)^2}{(1 * 70{\cdot}6)^2}$$

$$n \geq 3145$$

The result shows that at least 3,145 passengers have to be weighed to achieve the required accuracy. If e’r is chosen as 2% the result would be n ≥ 786.

Step 4:

After having established the required sample size a plan for weighing the passengers is to be worked out, as specified in Appendix 1 to CAR OPS-1.620(g).

(c) Determination of the passenger average mass.

Step 1:

Having collected the required number of passenger mass values, the average passenger mass can be calculated. For the purpose of this example, it has been assumed that 3,180 passengers were weighed. The sum of the individual masses amounts to 231 186·2 kg.

$$n = 3180$$

$$\sum_{j=1}^{3180} x_j = 231186 \cdot 2 \quad kg$$

$$\bar{x} = \frac{\sum x_j}{n} = \frac{231186 \cdot 2}{3180} \quad kg$$

$$\bar{x} = 72 \cdot 7 \quad kg$$

Step 2: calculation of the standard deviation.

$$\sum (x_j - \bar{x})^2 = 745\,145 \cdot 20$$

$$s = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}$$

$$s = \sqrt{\frac{745\,145 \cdot 20}{3180 - 1}}$$

$$s = 15 \cdot 31 \text{ kg}$$

For calculating the standard deviation, the method shown in paragraph (4)(e) step 2 should be applied.

Step 4: calculation of the confidence range of the sample mean.

$$\bar{x} \pm \frac{1 \cdot 96 * s}{\sqrt{n}}$$

$$\bar{x} \pm \frac{1 \cdot 96 * 15 \cdot 31}{\sqrt{3180}} \quad kg$$

$$72 \cdot 7 \pm 0 \cdot 5 \text{ kg}$$

The result of this calculation shows that there is a 95% probability of the actual mean for all passengers laying within the range 72.2kg to 73.2kg.

Appendix 1 to CAR OPS-1.620(g) Procedure for establishing revised standard mass values for passengers and baggage

(See IEM to Appendix 1 to CAR–OPS 1.620 (g))

(a) Passengers

(1) *Weight sampling method.* The average mass of passengers and their hand baggage must be determined by weighing, taking random samples. The selection of random samples must by nature and extent be representative of the passenger volume,

considering the type of operation, the frequency of flights on various routes, in/outbound flights, applicable season and seat capacity of the aeroplane.

(2) *Sample size.* The survey plan must cover the weighing of at least the greatest of:

i. A number of passengers calculated from a pilot sample, using normal statistical procedures and based on a relative confidence range (accuracy) of 1% for all adult and 2% for separate male and female average masses (the statistical procedure, complemented with a worked example for determining the minimum required sample size and the average mass, is included in IEM OPS-1.620(g)); and

ii. For aeroplanes:

A. With a passenger seating capacity of 40 or more, a total of 2000 passengers; or

B. With a passenger seating capacity of less than 40, a total number of 50 x (the passenger seating capacity).

(3) *Passenger masses.* Passenger masses must include the mass of the passengers' belongings which are carried when entering the aeroplane. When taking random samples of passenger masses, infants shall be weighed together with the accompanying adult. (See also CAR OPS-1.620(c), (d) and (e).)

(4) *Weighing location.* The location for the weighing of passengers shall be selected as close as possible to the aeroplane, at a point where a change in the passenger mass by disposing of or by acquiring more personal belongings is unlikely to occur before the passengers aboard the aeroplane.

(5) *Weighing machine.* The weighing machine to be used for passenger weighing shall have a capacity of at least 150 kg. The mass shall be displayed at minimum graduations of 500 g. The weighing machine must be accurate to within 0.5% or 200 g whichever is the greater.

(6) *Recording of mass values.* For each flight included in the survey, the mass of the passengers, the corresponding passenger category (i.e. male/female/children) and the flight number must be recorded.

(b) *Checked baggage.* The statistical procedure for determining revised standard baggage mass values based on average baggage masses of the minimum required sample size is basically the same as for passengers and as specified in sub-paragraph (a)(1) (See also IEM OPS- 1.620(g)). For baggage, the relative confidence range (accuracy) amounts to 1%. A minimum of 2000 pieces of checked baggage must be weighed.

(c) *Determination of revised standard mass values for passengers and checked baggage:*

(1) To ensure that, in preference to the use of actual masses determined by weighing, the use of revised standard mass values for passengers and checked baggage does not adversely affect operational safety, a statistical analysis (See IEM OPS-1.620(g)) must be carried out. Such an analysis will generate average mass values for passengers and baggage as well as other data.

(2) On aeroplanes with twenty (20) or more passenger seats, these averages apply as revised standard male and female mass values.

(3) On smaller aeroplanes, the following increments must be added to the average passenger mass to obtain the revised standard mass values:

Number of passenger seats	Required mass increment
1 – 5 incl.	16 kg
6 – 9 incl.	8 kg
10 – 19 incl.	4 kg

(d) Alternatively, all adult revised standard (average) mass values may be applied on aeroplanes with 30 or more passenger seats. Revised standard (average) checked baggage mass values are applicable to aeroplanes with 20 or more passenger seats.
  (1) Operators have the option to submit a detailed survey plan to the Authority for approval and subsequently a deviation from the revised standard mass value provided this deviating value is determined by use of the procedure explained in this Appendix. Such deviations must be reviewed at intervals not exceeding five (5) years. (See AMC to Appendix 1 to CAR OPS-1.620(g), sub-paragraph (c)(4).)
  (2) All adult revised standard mass values must be based on a male/female ratio of 80/20 in respect of all flights except holiday charters which are 50/50. If an operator wishes to obtain approval for use of a different ratio on specific routes or flights then data must be submitted to the Authority showing that the alternative male/female ratio is conservative and covers at least 84% of the actual male/female ratios on a sample of at least 100 representative flights.
  (3) The average mass values found are rounded to the nearest whole number in kg. Checked baggage mass values are rounded to the nearest 0.5 kg figure, as appropriate.

AMC to Appendix 1 to CAR OPS-1.620(g) Guidance on passenger weighing surveys

(See Appendix 1 to CAR OPS-1.620(g), sub-paragraph (c)(4))

(1) Operators seeking approval to use standard passenger masses differing from those prescribed in CAR OPS 1.620, Tables 1 and 2, on similar routes or networks may pool their weighing surveys provided that:
  (a) The Authority has given prior approval for a joint survey;
  (b) The survey procedures and the subsequent statistical analysis meet the criteria of Appendix 1 to CAR OPS-1.620(g); and
  (c) In addition to the joint weighing survey results, results from individual operators participating in the joint survey should be separately indicated in order to validate the joint survey results.

IEM to Appendix 1 to CAR OPS-1.620(g) Guidance on passenger weighing surveys

(See Appendix 1 to CAR OPS-1.620(g))

(1) This IEM summarises several elements of passenger weighing surveys and provides explanatory and interpretative information.
(2) Information to the Authority. An operator should advise the Authority about the intent of the passenger weighing survey, explain the survey plan in general terms and obtain prior approval to proceed (CAR OPS-1.620(g) refers).
(3) Detailed survey plan
  (a) An operator should establish and submit for approval to the Authority a detailed weighing survey plan that is fully representative of the operation, i.e. the network or route under consideration and the survey should involve the weighing of an adequate number of passengers (CAR OPS-1.620(g)).
  (b) A representative survey plan means a weighing plan specified in terms of weighing locations, dates and flight numbers giving a reasonable reflection of the operator's timetable and/or area of operation (See Appendix 1 to CAR OPS 1.620(g), sub-paragraph (a)(1)).
  (c) The minimum number of passengers to be weighed is the highest of the following (See Appendix 1 to CAR OPS-1.620(g) sub-paragraph (a)):
    i. The number that follows from the general requirement that the sample should be representative of the total operation to which the results will be applied; this will often prove to be the overriding requirement; or

ii. The number that follows from the statistical requirement specifying the accuracy of the resulting mean values which should be at least 2% for male and female standard masses and 1% for all adult standard masses, where applicable. The required sample size can be estimated on the basis of a pilot sample (at least 100 passengers) or from previous surveys. If analysis of the results of the survey indicates that the requirements on the accuracy of the mean values for male or female standard masses or all adult standard masses, as applicable, are not met, an additional number of representative passengers should be weighed in order to satisfy the statistical requirements.

(d) To avoid unrealistically small samples a minimum sample size of 2,000 passengers (males + females) is also required, except for small aeroplanes where in view of the burden of the large number of flights to be weighed to cover 2,000 passengers, a lesser number is considered acceptable.

(4) Execution of weighing programme

(a) At the beginning of the weighing programme it is important to note, and to account for, the data requirements of the weighing survey report (See paragraph (7) below).

(b) As far as is practicable, the weighing programme should be conducted in accordance with the specified survey plan.

(c) Passengers and all their personal belongings should be weighed as close as possible to the boarding point and the mass, as well as the associated passenger category (male/female/child), should be recorded.

(5) Analysis of results of weighing survey

(a) The data of the weighing survey should be analysed as explained in IEM OPS 1.620(g). To obtain an insight to variations per flight, per route etc. this analysis should be carried out in several stages, i.e. by flight, by route, by area, inbound/outbound, etc. Significant deviations from the weighing survey plan should be explained as well as their possible effect(s) on the results.

(6) Results of the weighing survey

(a) The results of the weighing survey should be summarised. Conclusions and any proposed deviations from published standard mass values should be justified. The results of a passenger weighing survey are average masses for passengers, including hand baggage, which may lead to proposals to adjust the standard mass values given in CAR OPS-1.620 Tables 1 and 2. As stated in Appendix 1 to CAR OPS- 1.620(g), sub-paragraph (c), these averages, rounded to the nearest whole number may, in principle, be applied as standard mass values for males and females on aeroplanes with 20 and more passenger seats. Because of variations in actual passenger masses, the total passenger load also varies and statistical analysis indicates that the risk of a significant overload becomes unacceptable for aeroplanes with less than 20 seats. This is the reason for passenger mass increments on small aeroplanes.

(b) The average masses of males and females differ by some 15 kg or more and because of uncertainties in the male/female ratio the variation of the total passenger load is greater if all adult standard masses are used than when using separate male and female standard masses. Statistical analysis indicates that the use of all adult standard mass values should be limited to aeroplanes with 30 passenger seats or more.

(c) As indicated in Appendix 1 to CAR OP-1.620(g), standard mass values for all adults must be based on the averages for males and females found in the sample, taking into account a reference male/female ratio of 80/20 for all flights except holiday charters where a ratio of 50/50 applies. An operator may, based on the data from his weighing programme, or by proving a different male/female ratio, apply for approval of a different ratio on specific routes or flights.

(7) Weighing survey report
   (a) The weighing survey report, reflecting the content of paragraphs 1–6 above, should be prepared in a standard format as follows:

Weighing Survey Report

1 Introduction

–Objective and brief description of the weighing survey

2 Weighing survey plan

– Discussion of the selected flight number, airports, dates, etc.
– Determination of the minimum number of passengers to be weighed. – Survey plan.

3 Analysis and discussion of weighing survey results

– Significant deviations from survey plan (if any).
– Variations in means and standard deviations in the network.
– Discussion of the (summary of) results.

4 Summary of results and conclusions

– Main results and conclusions.
– Proposed deviations from published standard mass values.

Attachment 1

Applicable summer and/or winter timetables or flight programmes.

Attachment 2

Weighing results per flight (showing individual passenger masses and sex); means and standard deviations per flight, per route, per area and for the total network.

IEM OPS-1.620(h) & (i) Adjustment of standard masses

(See CAR OPS-1.620(h) & (i))

(1) When standard mass values are used, CAR OPS 1.620 (h) and 1.620(i) require the operator to identify and adjust the passenger and checked baggage masses in cases where significant numbers of passengers or quantities of baggage are suspected of exceeding the standard values. This requirement implies that the Operations Manual should contain appropriate directives to ensure that:
   (a) Check-in, operations and cabin staff and loading personnel report or take appropriate action when a flight is identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, and/or groups of passengers carrying exceptionally heavy baggage (e.g. military personnel or sports teams); and
   (b) On small aeroplanes, where the risks of overload and/or CG errors are the greatest, commanders pay special attention to the load and its distribution and make proper adjustments.

Appendix 1 to CAR OPS-1.625 Mass and Balance Documentation

(See IEM to Appendix 1 to CAR–OPS 1.625)

(a)Mass and balance documentation
   (1) *Contents:*
      i. The mass and balance documentation must contain the following information:

A. The aeroplane registration and type;
B. The flight identification number and date;
C. The identity of the Commander;
D. The identity of the person who prepared the document;
E. The dry operating mass and the corresponding CG of the aeroplane;
F. The mass of the fuel at take-off and the mass of trip fuel;
G. The mass of consumables other than fuel;
H. The components of the load including passengers, baggage, freight and ballast;
I. The Take-off Mass, Landing Mass and Zero Fuel Mass;
J. The load distribution;
K. The applicable aeroplane CG positions; and
L. The limiting mass and CG values.

ii. Subject to the approval of the AUTHORITY, an operator may omit some of this Data from the mass and balance documentation.

(2) Last Minute Change. If any last-minute change occurs after the completion of the mass and balance documentation, this must be brought to the attention of the commander and the last-minute change must be entered on the mass and balance documentation. The maximum allowed change in the number of passengers or hold load acceptable as a last-minute change must be specified in the Operations Manual. If this number is exceeded, new mass and balance documentation must be prepared.

(b) *Computerised systems.* Where mass and balance documentation is generated by a computerised mass and balance system, the operator must verify the integrity of the output data. He must establish a system to check that amendments of his input data are incorporated properly in the system and that the system is operating correctly on a continuous basis by verifying the output data at intervals not exceeding six (6) months.

(c) *Onboard mass and balance systems*. An operator must obtain the approval of the AUTHORITY if he wishes to use an onboard mass and balance computer system as a primary source for dispatch.

(d) *Datalink.* When mass and balance documentation is sent to aeroplanes via datalink, a copy of the final mass and balance documentation as accepted by the commander must be available on the ground.

AMC to Appendix 1 to CAR-OPS 1.625 (a) Mass and balance documentation

(See Appendix 1 to CAR-OPS 1.625)

(a) The Authority may permit the information detailed in the Appendix 1 to CAR-OPS 1.625 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.

(b) Compliance with ICAO Document 10020, Manual on Electronic Flight Bags (EFBs) is considered an acceptable means to comply with paragraph (a) above.

GM to Appendix 1 to CAR-OPS 1.625 (a) Mass and balance documentation

(See Appendix 1 to CAR-OPS 1.625)

For Performance Class B aeroplanes, the CG position need not be mentioned on the mass and balance documentation if, for example, the load distribution is in accordance with a pre- calculated balance table or if it can be shown that for the planned operations a correct balance can be ensured, whatever the real load is.

SUBPART K – INSTRUMENTS and EQUIPMENT

CAR OPS-1.630 General introduction

(See IEM OPS-1.630)

(a) An aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural manoeuvres and observe the operating limitations of the aeroplane in the expected operating conditions.

(b) An operator shall ensure that a flight does not commence unless the instruments and equipment required under this Subpart are:

(1) Approved, except as specified in sub-paragraph (c), and installed in accordance with the requirements applicable to them, including the minimum performance standard and the operational and airworthiness requirements; and

(2) In operable condition for the kind of operation being conducted except as provided in the MEL (CAR OPS-1.030 refers).

(3) Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed by the certificating authority of the State of Registry acceptable to the CAA for visual presentation, are displayed in the aeroplane.

(4) Safety and survival equipment, required by the operating rules, must be reliable, readily accessible, easily identifiable, and clearly marked to identify its method of operation.

(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 on the date of CAR OPS implementation may remain in service, or be installed, unless additional requirements are prescribed in this Subpart. Instruments and equipment that have already been approved do not need to comply with a revised TSO or a revised specification, other than TSO, unless a retroactive requirement is prescribed.

(c) The following items shall not be required to have an equipment approval:

(1) Fuses referred to in CAR OPS-1.635;
(2) Electric torches referred to in CAR OPS-1.640(a)(4);
(3) An accurate time piece referred to in CAR OPS-1.650(b) & 1.652(b);
(4) Chart holder referred to in CAR OPS-1.652(n).
(5) First-aid kits referred to in CAR OPS-1.745;
(6) Emergency medical kit referred to in CAR OPS-1.755;
(7) Megaphones referred to in CAR OPS-1.810;
(8) Survival and pyrotechnic signalling equipment referred to in CAR OPS-1.835(a) and (c); and
(9) Sea anchors and equipment for mooring, anchoring or manoeuvring seaplanes and amphibians on water referred to in CAR OPS-1.1410.
(10) Child restraint devices referred to in CAR OPS-1.730(a)(3).

(d) If equipment is to be used by one flight crew member at his station during flight, it must be readily operable from his station. When a single item of equipment is required to be operated by more than one flight crew member it must be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.

(e) Those instruments that are used by any one flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his station, with the minimum practicable deviation from the position and line of vision which he normally assumes when looking forward along the flight path. Whenever a single instrument is required in an aeroplane operated by more than one (1) flight crew member, it must be installed so that the instrument is visible from each applicable flight crew station.

(f) An operator shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless;

(1) Approved, ensuring that the procedures including process applied and the products delivered have met acceptable standards of integrity; and

(2) That the products are compatible with the intended function of the equipment that will use them.

(3) Ensure continues monitoring for both process and products.

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

(h) An operator shall not operate a pressurized aeroplane for which the individual certificate of airworthiness was first issued on or after 1 January 1990 intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa (25 000 ft) unless, it is equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization. (See CAR OPS-1.770)

CAR OPS-1.635 Circuit protection devices

An operator shall not operate an aeroplane in which fuses are used unless there are spare fuses available for use in flight equal to at least 10% of the number of fuses of each rating or three of each rating whichever is the greater.

CAR OPS-1.640 Aeroplane operating lights

An operator shall not operate an aeroplane unless it is equipped with:

(a) For flight by day:

(1) Anti-collision light system;

(2) Lighting supplied from the aeroplane’s electrical system to provide adequate illumination for all instruments and equipment essential to the safe operation of the aeroplane;

(3) Lighting supplied from the aeroplane’s electrical system to provide illumination in all passenger compartments; and

(4) An electric torch for each required crew member readily accessible to crew members when seated at their designated station.

(b) For flight by night, in addition to equipment specified in paragraph (a) above:

(1) Navigation/position lights; and

(2) Two landing lights or a single light having two separately energised filaments; and

(3) Lights to conform with the International regulations for preventing collisions at sea if the aeroplane is a Seaplane or an Amphibian.

CAR OPS-1.645 Windshield wipers

An operator shall not operate an aeroplane with a maximum certificated take-off mass of more than 5 700 kg unless it is equipped at each pilot station with a windshield wiper or equivalent means to maintain a clear portion of the windshield during precipitation.

CAR OPS-1.650 Day VFR operations – Flight and navigational instruments and associated equipment

(See AMC OPS 1.650/1.652) (See IEM OPS-1.650/1.652)

An operator shall not operate an aeroplane by day in accordance with Visual Flight Rules (VFR) unless it is equipped with the flight and navigational instruments and associated equipment and, where applicable, under the conditions stated in the following sub-paragraphs:

(a) A magnetic compass;

(b) An accurate timepiece showing the time in hours, minutes, and seconds;

(c) A sensitive pressure altimeter calibrated in feet with a sub-scale setting, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight;

(d) An airspeed indicator calibrated in knots;
(e) A vertical speed indicator;
(f) A turn and slip indicator, or a turn co-ordinator incorporating a slip indicator;
(g) An attitude indicator;
(h) A stabilised direction indicator; and
(i) A means of indicating in the flight crew compartment the outside air temperature calibrated in degrees Celsius (See AMC OPS-1.650(i) & 1.652(i)).
(j) For flights which do not exceed 60 minutes' duration, which take off and land at the same aerodrome, and which remain within fifty (50) nm of that aerodrome, the instruments prescribed in sub- paragraphs (f), (g) and (h) above, and sub-paragraphs (k)(4), (k)(5) and (k)(6) below, may all be replaced by either a turn and slip indicator, or a turn coordinator incorporating a slip indicator, or both an attitude indicator and a slip indicator.
(k) Whenever two pilots are required the second pilot's station shall have separate instruments as follows:
  (1) A sensitive pressure altimeter calibrated in feet with a sub-scale setting calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight;
  (2) An airspeed indicator calibrated in knots;
  (3) A vertical speed indicator;
  (4) A turn and slip indicator, or a turn coordinator incorporating a slip indicator;
  (5) An attitude indicator; and
  (6) A stabilised direction indicator.
(l) Each airspeed indicating system must be equipped with a heated pitot tube or equivalent means for preventing malfunction due to either condensation or icing for:
  (1) Aeroplanes with a maximum certificated take-off mass in excess of 5700 kg or having a maximum approved passenger seating configuration of more than nine (9);
  (2) Aeroplanes first issued with an individual certificate of airworthiness on or after 1 April 1999.
(m) Whenever duplicate instruments are required, the requirement embraces separate displays for each pilot and separate selectors or other associated equipment where appropriate.
(n) All aeroplanes must be equipped with means for indicating when power is not adequately supplied to the required flight instruments; and
(o) All aeroplanes with compressibility limitations not otherwise indicated by the required airspeed indicators shall be equipped with a Mach number indicator at each pilot's station.
(p) An operator shall not conduct Day VFR operations unless the aeroplane is equipped with a headset with boom or throat microphone or equivalent for each flight crew member on flight deck duty (See IEM OPS 1.650(p)/1.652(s)).

CAR OPS-1.652 IFR or night operations – Flight and navigational instruments and associated equipment

(See AMC OPS-1.650/1.652) (See IEM OPS-1.650/1.652)

An operator shall not operate an aeroplane in accordance with Instrument Flight Rules (IFR) or by night in accordance with Visual Flight Rules (VFR) (CAR-180.101) unless it is equipped with the flight and navigational instruments and associated equipment and, where applicable, under the conditions stated in the following sub-paragraphs:

(a) A magnetic compass;
(b) An accurate time-piece showing the time in hours, minutes and seconds;
(c) Two sensitive pressure altimeters calibrated in feet with sub-scale settings, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight. These altimeters must have counter drum-pointer or equivalent presentation.
(d) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to either condensation or icing including a warning indication of pitot

heater failure. The pitot heater failure warning indication requirement does not apply to those aeroplanes with a maximum approved passenger seating configuration of nine (9) or less or a maximum certificated take-off mass of 5700 kg or less and issued with an individual Certificate of Airworthiness prior to 1 April 1998 (See AMC OPS-1.652(d) & (k)(2));

(e) A vertical speed indicator;
(f) A turn and slip indicator;
(g) An attitude indicator;
(h) A stabilised direction indicator;
(i) A means of indicating in the flight crew compartment the outside air temperature calibrated in degrees Celsius (See AMC OPS-1.650 (i) & 1.652(i)); and
(j) Two independent static pressure systems, except that for propeller driven aeroplanes with maximum certificated take-off mass of 5700 kg or less, one static pressure system and one alternate source of static pressure is allowed.
(k) Whenever two pilots are required the second pilot's station shall have separate instruments as follows:
    (1) A sensitive pressure altimeter calibrated in feet with a sub-scale setting, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight and which may be one of the 2 altimeters required by sub-paragraph (c) above. These altimeters must have counter drum-pointer or equivalent presentation.
    (2) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to either condensation or icing including a warning indication of pitot heater failure. The pitot heater failure warning indication requirement does not apply to those aeroplanes with a maximum approved passenger seating configuration of nine (9) or less or a maximum certificated take-off mass of 5700 kg or less and issued with an individual Certificate of Airworthiness prior to 1 April 1998 (See AMC OPS-1.652(d) & (k)(2));

Note: Applicability Date 1 April 1999 (for the pitot heater failure warning indication).

    (3) A vertical speed indicator;
    (4) A turn and slip indicator;
    (5) An attitude indicator; and
    (6) A stabiliser direction indicator.
(l) Those aeroplanes with a maximum certificated take-off mass in excess of 5700 kg or having a maximum approved passenger seating configuration of more than nine (9) seats must be equipped with an additional, standby, attitude indicator (artificial horizon), capable of being used from either pilot's station, that:
    (1) Is powered continuously during normal operation and, after a total failure of the normal electrical generating system is powered from a source independent of the normal electrical generating system;
    (2) Provides reliable operation for a minimum of 30 minutes after total failure of the normal electrical generating system, taking into account other loads on the emergency power supply and operational procedures;
    (3) Operates independently of any other attitude indicating system;
    (4) Is operative automatically after total failure of the normal electrical generating system; and
    (5) Is appropriately illuminated during all phases of operation, except for aeroplanes with a maximum certificated take-off mass of 5700 kg or less, equipped with a standby attitude indicator in the left-hand instrument panel.
(m) In complying with sub-paragraph (l) above, it must be clearly evident to the flight crew when the standby attitude indicator, required by that sub-paragraph, is being operated by emergency power. Where the standby attitude indicator has its own dedicated power supply there shall be an associated indication, either on the instrument or on the instrument panel, when this supply is in use.
(n) A chart holder in an easily readable position which can be illuminated for night operations.

(o) If the standby attitude instrument system is certificated according to CS-25 or equivalent, the turn and slip indicators may be replaced by slip indicators.

(p) Whenever duplicate instruments are required, the requirement embraces separate displays for each pilot and separate selectors or other associated equipment where appropriate;

(q) All aeroplanes must be equipped with means for indicating when power is not adequately supplied to the required flight instruments; and

(r) All aeroplanes with compressibility limitations not otherwise indicated by the required airspeed indicators shall be equipped with a Mach number indicator at each pilot's station.

(s) An operator shall not conduct IFR or night operations unless the aeroplane is equipped with a headset with a boom or throat microphone or equivalent for each flight crew member on flight deck duty and a transmit button on the control wheel for each required pilot. (See IEM OPS1.650 (p) /1.652(s)).

CAR-OPS 1.653 GNSS

(See AMC OPS 1.653)

An operator shall not operate an aeroplane under IFR unless it is equipped with GNSS equipment having the capabilities set out in AMC OPS 1.653 GNSS.

CAR OPS-1.655 Additional equipment for single pilot operation under IFR

An operator shall not conduct single pilot IFR operations unless the aeroplane is equipped with an autopilot with at least altitude hold and heading mode.

CAR OPS-1.660 Altitude alerting system

(a) An operator shall not operate a turbine propeller powered aeroplane with a maximum certificated take-off mass in excess of 5700 kg or having a maximum approved passenger seating configuration of more than nine (9) seats or a turbojet powered aeroplane unless it is equipped with an altitude alerting system capable of:

(1) Alerting the flight crew upon approaching a preselected altitude; and

(2) Alerting the flight crew by at least an aural signal, when deviating from a preselected altitude, except for aeroplanes with a maximum certificated take-off mass of 5700 kg or less having a maximum approved passenger seating configuration of more than nine (9) and first issued with an individual certificate of airworthiness before 1 April 1972.

CAR OPS-1.665 Ground proximity warning system (GPWS) and terrain awareness warning system (TAWS)

(a) An operator shall not operate a turbine powered aeroplane having a maximum certificated take-off mass in excess of 5700 kg or a maximum approved passenger seating configuration of more than nine (9) unless it is equipped with a ground proximity warning system that includes a predictive terrain hazard warning function (terrain awareness and warning system — TAWS).

(b) The ground proximity warning system (GPWS) must automatically provide, by means of aural signals, which may be supplemented by visual signals, timely and distinctive warning to the flight crew of sink rate, ground proximity, altitude loss after take-off or go-around, incorrect landing configuration and downward glide slope deviation.

(c) The terrain awareness and warning system (TAWS) must automatically provide the flight crew, by means of visual and aural signals and a terrain awareness display, with sufficient alerting time to prevent controlled flight into terrain events, and provided a forward-looking capability and terrain clearance floor.

(d) The operator shall implement database management procedures that ensure the timely distribution and update of current terrain and obstacle data to the ground proximity warning system.

(e) All turbine-engine aeroplanes of a maximum certificated take-off mass of 5700 kg or less and authorized to carry more than five (5) but not more than nine (9) passengers for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a ground proximity warning system which has:
   (1) Warning on excessive descent rate;
   (2) Excessive terrain closure rate;
   (3) Warning on excessive altitude loss after take-off or go-around;
   (4) Warning of unsafe terrain clearance while not in the landing configuration;
      i. gear not locked down;
      ii. flaps not in the landing position;
   (5) excessive descent below the instrument glide path; and
   (6) Forward looking terrain avoidance function.

CAR OPS-1.668 Airborne Collision Avoidance System (ACAS)

(a) An operator shall not operate a turbine powered aeroplane having a maximum certificated takeoff mass in excess of 5700 kg or a maximum approved passenger seating configuration of more than nineteen (19) unless it is equipped with an airborne collision avoidance system with a minimum performance level of at least ACAS (version 7.1 or later).

(b) The minimum performance level for ACAS shall operate in accordance with ICAO Annex 10, Volume IV, Chapter 4.

Note: Compliance with this requirement can be achieved through the implementation of TCAS II version 7.1 or later equivalent.

(c) No Foreign Operator shall not operate a turbine powered aeroplane with a maximum certificated take-off mass in excess of 5,700 kg or with MAPSC more than 19 passengers involved in Commercial Air Transport operations, unless the aircraft is fitted with ACAS equipment (version 7.1 or later).

(d) All turbine engine aircraft of a maximum certificated take-off mass in excess of 15000 kg or authorised to carry more than 30 passengers, for which the individual airworthiness certificate is first issued after 1 January 2007, shall be equipped with an airborne collision avoidance system (ACAS).

(e) Traffic Alert and Collision Avoidance System (TCAS II or later equivalent) is accepted as a suitable ACAS system provided its installation is certificated by the State of Registry, and that its operation by flight crew is in accordance with instructions for the use of this equipment specified in the company operations manual.

(f) In the event of failure of ACAS equipment on aircraft that are away from their maintenance base, that aircraft may be dispatched with an unserviceable ACAS equipment if authorised by the State of Registry (i.e. approved MEL item) and if acceptable to the ATC unit (providing enroute or approach procedures do not require its use). Aircraft operating with unserviceable ACAS under this MEL dispensation shall indicate the unserviceability in Item 18 of the flight plan (Other information).

(g) The following conditions apply against this MEL dispensation to return the aircraft to base:
   (1) The aircraft navigation system shall be equipped with at least one GPS receiver
   (2) Where agreed Regulations and Procedures exist, these shall be maintained.
   (3) The application of an internal Rectification Interval Extension (RIE) by the operator as per CAR MEL.013(a), is not permissible with this equipment type failure.
   (4) An ICAO compliant altitude reporting transponder must be fitted and serviceable before departure.
   (5) An ACAS MEL dispensation will be valid for a period from the time of entry in the Technical log as an approved MEL item.
   (6) Conditions may be imposed by one or more States, which may include:
      i. operating within certain restrictive hours, or
      ii. via specific routes, or
      iii. at stated flight levels (for safety reasons or otherwise).

(7) The flight must be conducted along the most direct (or permissible) route to the delivery or maintenance destination airport.

(h) Aircraft operators are to ensure compliance with the above conditions, the MEL dispensation flight is in accordance with the operator's originally stated intentions, and that it must comply with any conditions laid down by the CAA and subsequently by the ATC authorities.

(i) Operators of aircraft intending to operate under the provisions of this MEL approved item must seek approval to conduct the flights through the airspace of other ATC units from the appropriate State authorities.

(j) In the event when ACAS is inoperative, any aircraft with an unserviceable transponder as well as an unserviceable TCAS will not be permitted within the Oman FIR for which mandatory carriage of a transponder is required.

CAR OPS-1.670 Airborne weather radar equipment

(a) An operator shall not operate:
   (1) A pressurised aeroplane; or
   (2) An unpressurised aeroplane which has a maximum certificated take-off mass of more than 5700 kg; or
   (3) An unpressurised aeroplane having a maximum approved passenger seating configuration of more than nine (9) seats after 1 April 1999, unless it is equipped with airborne weather radar equipment whenever such an aeroplane is being operated at night or in instrument meteorological conditions in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne weather radar, may be expected to exist along the route.

(b) For propeller driven pressurised aeroplanes having a maximum certificated take-off mass not exceeding 5700 kg with a maximum approved passenger seating configuration not exceeding nine (9) seats the airborne weather radar equipment may be replaced by other equipment capable of detecting thunderstorms and other potentially hazardous weather conditions, regarded as detectable with airborne weather radar equipment, subject to approval by the Authority.

(c) All turbo-jet aeroplanes of a maximum certificated take-off mass in excess of 5700 kg or authorized to carry more than nine (9) passengers should be equipped with a forward- looking wind shear warning system capable of;
   (1) Providing the pilot with a timely aural and visual warning of wind shear ahead of the aircraft, and the information required to permit the pilot to safely commence and continue a missed approach or go-around or to execute an escape manoeuvre if necessary.
   (2) Providing an indication to the pilot when the limits specified for the certification of automatic landing equipment are being approached, when such equipment is in use.

CAR OPS-1.671 Turbine Aeroplane – Runway Overrun Awareness and Alerting System (ROAAS)

All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a runway overrun awareness and alerting system (ROAAS).

Note. — *Guidance material for ROAAS design is contained in EUROCAE ED-250, Minimum Operation Performance Specification (MOPS) for Runway Overrun Awareness and Alerting System (ROAAS), or equivalent documents.*

CAR OPS-1.675 Equipment for operations in icing conditions

(a) An operator shall not operate an aeroplane in expected or actual icing conditions unless it is certificated and equipped to operate in icing conditions.

(b) An operator shall not operate an aeroplane in expected or actual icing conditions at night unless it is equipped with a means to illuminate or detect the formation of ice. Any illumination that is used must be of a type that will not cause glare or reflection that would handicap crew members in the performance of their duties.

CAR OPS-1.680 Cosmic radiation detection equipment

(See AC OPS 1.680(a)(2)).

(a) An operator shall not operate an aeroplane above 15,000 m (49,000 ft) unless:

(1) It is equipped with an instrument to measure and indicate continuously the dose rate of total cosmic radiation being received (i.e. the total of ionizing and neutron radiation of galactic and solar origin) and the cumulative dose on each flight, or

(2) A system of on-board quarterly radiation sampling acceptable to the Authority is established (See AC OPS-1.680(a)(2)).

(3) The operator shall maintain records of the total cosmic radiation received by each crew member over a period of twelve (12) months can be determined.

CAR OPS-1.685 Flight crew interphone system

An operator shall not operate an aeroplane on which a flight crew of more than one is required unless it is equipped with a flight crew interphone system, including headsets and microphones, not of a handheld type, for use by all members of the flight crew.

CAR OPS-1.690 Crew member interphone system

(See AMC OPS-1.690(b)(6) & IEM OPS-1.690(b)(7))

(a) An operator shall not operate an aeroplane with a maximum certificated take-off mass exceeding 15 000 kg or having a maximum approved passenger seating configuration of more than nineteen (19) unless it is equipped with a crew member interphone system.

(b) The crew member interphone system required by this paragraph must:

(1) Operate independently of the public address system except for handsets, headsets, microphones, selector switches and signalling devices;

(2) Provide a means of two-way communication between the flight crew compartment and:

i. Each passenger compartment;
ii. Each galley located other than on a passenger deck level; and
iii. Each remote crew compartment that is not on the passenger deck and is not easily accessible from a passenger compartment;

(3) Be readily accessible for use from each of the required flight crew stations in the flight crew compartment;

(4) Be readily accessible for use at required cabin crew member stations close to each separate or pair of floor level emergency exits;

(5) Have an alerting system incorporating aural or visual signals for use by flight crew members to alert the cabin crew and for use by cabin crew members to alert the flight crew;

(6) Have a means for the recipient of a call to determine whether it is a normal call or an emergency call (See AMC OPS-1.690(b)(6)); and

(7) Provide on the ground a means of two-way communication between ground personnel and at least two flight crew members. (See IEM OPS-1.690(b)(7))

CAR OPS-1.695 Public address system

(a) An operator shall not operate an aeroplane with a maximum approved passenger seating configuration of more than nineteen (19) unless a public address system is installed.

(b) The public address system required by this paragraph must:

(1) Operate independently of the interphone systems except for handsets, headsets, microphones, selector switches and signalling devices;

(2) Be readily accessible for immediate use from each required flight crew member station;
(3) For each required floor level passenger emergency exit which has an adjacent cabin crew seat, have a microphone which is readily accessible to the seated cabin crew member, except that one microphone may serve more than one exit, provided the proximity of the exits allows unassisted verbal communication between seated cabin crew members;
(4) Be capable of operation within ten (10) seconds by a cabin crew member at each of those stations in the compartment from which its use is accessible; and
(5) Be audible and intelligible at all passenger seats, toilets and cabin crew seats and work stations.

CAR OPS-1.699 Definitions – Flight recording Equipment

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.

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

General Aviation: An aircraft operation other than a commercial air transport operation or an aerial work operation.

CAR OPS-1.700 Cockpit voice recorders (CVR) – 1

(See AC OPS-1.700)

(a) An operator shall not operate an aeroplane first issued with an individual Certificate of Airworthiness on or after 1 April 1998, which:
   (1) Is multi-engine turbine powered and has a maximum approved passenger seating configuration of more than nine (9); or
   (2) Has a maximum certificated take-off mass over 5700 kg, unless it is equipped with a cockpit voice recorder which, with reference to a time scale, records:
      i. Voice communications transmitted from or received on the flight deck by radio;
      ii. The aural environment of the flight deck, including without interruption, the audio signals received from each boom and mask microphone in use;
      iii. Voice communications of flight crew members on the flight deck using the aeroplane's interphone system;
      iv. Voice or audio signals identifying navigation or approach aids introduced into a headset or speaker; and
      v. Voice communications of flight crew members on the flight deck using the public address system, if installed.

(b) The cockpit voice recorder shall be capable of retaining information recorded during at least the last two (2) hours of its operation except that, for those aeroplanes with a maximum certificated take-off mass of 5700 kg or less, this period may be reduced to thirty (30) minutes.

(c) The cockpit voice recorder must start automatically to record prior to the aeroplane moving under its own power and continue to record until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the cockpit voice recorder must 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.

(d) The cockpit voice recorder must have a device to assist in locating that recorder in water.

CAR OPS-1.705 Cockpit voice recorders (CVR) – 2

(See AC OPS-1.705)

(a) After 1 April 2000 an operator shall not operate any multi-engined turbine aeroplane first issued with an individual certificate of airworthiness on or after 1 January 1990 up to and including 31 March 1998 which has a maximum certificated take-off mass of 5700 kg or less and a maximum approved passenger seating configuration of more than nine (9), unless it is equipped with a cockpit voice recorder which records:
   (1) Voice communications transmitted from or received on the flight deck by radio;
   (2) The aural environment of the flight deck;
   (3) Voice communications of flight crew members on the flight deck using the aeroplane's interphone system;
   (4) Voice or audio signals identifying navigation or approach aids introduced into a headset or speaker; and
   (5) Voice communications of flight crew members on the flight deck using the public address system, if installed.

(b) An operator shall not operate any aeroplane with a maximum certificated take-off mass over 5700 kg first issued with an individual certificate of airworthiness, before 1 April 1998 unless it is equipped with a cockpit voice recorder which records the areas covered by (a)(1) to (a)(5) above.

(c) The cockpit voice recorder shall be capable of retaining information recorded during at least the last two (2) hours of its operation.

(d) The cockpit voice recorder must start to record prior to the aeroplane moving under its own power and continue to record until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the cockpit voice recorder must start to record as early as possible during the cockpit checks, prior to the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(e) The cockpit voice recorder must have a device to assist in locating that recorder in water.

CAR OPS-1.710 Cockpit voice recorders (CVR) – 3

(a) ***Cockpit voice recorder alternate power source:***
   (1) An alternate power source shall automatically engage and provide ten (10) minutes, plus or minus one (1) minute, of operation whenever aeroplane power to the recorder ceases, either by normal shutdown or by any other loss of power. The alternate power source shall power the CVR and its associated cockpit area microphone components. The CVR shall be located as close as practicable to the alternate power source.

   Note 1: "Alternate" means separate from the power source that normally provides power to the CVR. The use of aeroplane batteries or other power sources is acceptable provided that the requirements above are met and electrical power to essential and critical loads is not compromised.

   Note 2: When the CVR function is combined with other recording functions within the same unit, powering the other functions is allowed.

   (2) All aeroplanes of a maximum certificated take-off mass of over 27000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2018 shall be provided with an alternate power source, as defined in para (f)(1), that powers the forward CVR in the case of combination recorders.
   (3) All aeroplanes of a maximum certificated take-off mass of over 27000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2018 should be provided with an alternate power source, as defined in paragraph para (f)(1), that powers at least one CVR.

(b) ***CVR recording parameters:***
   (1) All turbine-engined aeroplanes of a maximum certificated take-off mass of over 2 250

kg, up to and including 5 700 kg, for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with either a CVR or a CARS.

(2) All aeroplanes of a maximum certificated take-off mass of over 27000kg for which the individual certificate of airworthiness is first issued on or after 1 January 2022 shall be equipped with a CVR which shall retain the information recorded during at least the last 25hrs of its operation.

(3) All helicopters of a maximum certificated take-off mass of over 3175 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 should be equipped with a CVR. For helicopters not equipped with an FDR, at least main rotor speed should be recorded on the CVR.

(4) Recording technology
CVRs and CARS shall not use magnetic tape or wire.

(5) Duration
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 two hours of its operation.

(c) ***Retention of FDR and CVR***
Retention of FDR and CVR recordings following an accident, or occurrence requiring immediate notification to the CAA, the operator of an aeroplane /Helicopter on which an CVR and/or FDR is carried shall, to the extent possible, preserve the original recorded data pertaining to that accident, as retained by the recorder for at least sixty (60) days or a longer period as requested by the CAA. (See CAR OPS-1.160)

CAR OPS-1.712 Flight Recorder Composition

(1) Flight recorders intended for installation in aeroplanes engaged in international air navigation. Crash protected flight recorders comprise one or more of the following: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR), a data link recorder (DLR).

(2) 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.

(3) Light weight flight recorders comprise one or more of the following: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS), a data link recording system (DLRS).

(4) 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.

Note 1: For aeroplanes / helicopters for which the application for type certification is submitted before 1 January 2016, specifications applicable to crash protected flight recorders may be found in EUROCAE ED-112, ED-56A, ED-55, Minimum Operational Performance Specifications (MOPS), or earlier equivalent documents.

Note 2: For aeroplanes / helicopters for which the application for type certification is submitted on or after 1 January 2016, specifications applicable to crash protected flight recorders may be found in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.

Note 3: Specifications applicable to lightweight flight recorders may be found in EUROCAE ED 155, Minimum Operational Performance Specification (MOPS), or equivalent documents.

Note 4: Detailed requirements on flight data recorders are contained in Appendix A.

Note 5: As of 7 November 2019, the below paragraph contains CAA requirements regarding the use of voice, image and/or data recordings and transcripts.

(5) As of 7 November 2019, CAA will not allow the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident

as per CAR 13 except where the recordings or transcripts are:

(a) related to a safety-related event identified in the context of a safety management system;
    i. are restricted to the relevant portions of a de-identified transcript of the recording; and
    ii. are subject to the protections accorded by ICAO Annex 19 as amended;

(b) sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to the protections accorded by CAR 13 and CAR OPS-1.160; or

(c) used for inspections of flight recorder systems as provided in CAR OPS-1.713.

Note 6: Provisions on the protection of safety data, safety information and related sources are contained in CAR 100 as amended. When an investigation under CAR 13 is instituted, investigation records are subject to the protections accorded by CAR 13 as amended.

(6) As of 7 November 2019, CAA shall not allow the use of recordings or transcripts of FDR, ADRS as well as Class B and Class C AIR and AIRS for purposes other than the investigation of an accident or incident as per CAR 13, except where the recordings or transcripts are subject to the protections accorded by CAA equivalent requirement to CAR 100 as amended and are:

(a) used by the operator for airworthiness or maintenance purposes;
(b) used by the operator in the operation of a flight data analysis programme required in this Annex;
(c) sought for use in proceedings not related to an event involving an accident or incident investigation;
(d) de-identified; or
(e) disclosed under secure procedures.

Note 7: Provisions on the protection of safety data, safety information and related sources are contained in CAR 100.

(7) As of 7 November 2019, the Omani operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system.

Note: Guidance on the development and organization of a flight safety documents system is provided in ICAO Annex 6 Volume 1 Attachment F.

CAR OPS-1.713 FDR/CVR Continued Serviceability

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

CAR OPS-1.715 Flight data recorders (FDR) – Commercial Air Transport

(See Appendix 1 to CAR OPS-1.715 & AC OPS-1.715)

(a) All turbine-engine aeroplanes of a maximum certificated take-off mass of 5700kg or less for which the application for type certification is submitted on or after 1 January 2016 shall be equipped with:

(1) an FDR which shall record at least the first 16 parameters listed in Table A1; or
(2) a Class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilot(s), as defined in Appendix 1 to CAR OPS-.715; or
(3) an ADRS which shall record at least the first 7 parameters defined listed in Table-A1.

Note 1: "The application for type certification is submitted refers to the date of application of the original "Type Certificate" for the aeroplane type, not the date of certification of particular aeroplane variants or derivative models.

Note 2: AIR or AIRS classification is defined in CAR OPS-1.725 para (f)

(b) All turbine-engine aeroplanes of a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 should be equipped with:

(1) an FDR which should record at least the first 16 parameters listed in Table 1 of Appendix 1 to AC OPS-1.715/1.720/1.725; or
(2) a Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot(s); or
(3) an ADRS which should record at least the first 7 parameters listed in Table 4 of Appendix A.

(c) All aeroplanes of a maximum certificated take-off mass of over 27000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with an FDR which shall record at least the first 32 parameters listed in Table 1 of Appendix 1 to AC OPS1.715/1.720/1.725.

(d) All aeroplanes of a maximum certificated take-off mass of over 5700kg, up to and including 27000kg, for which the individual certificate of Airworthiness is first issued on or after 1 January 1989, shall be equipped with an FDR which shall record at least the first 16 parameters listed in Table 1 of Appendix 1 to AC OPS-1.715/1.720/1.725.

(e) All multi-engine turbine powered aeroplanes of a maximum certificated take-off mass of 5700kg or less for which the individual Certificate of airworthiness is first issued on or after 1 January 1990, should be equipped with an FDR which should record at least the first 16 parameters listed in Table 1 of Appendix 1 to AC OPS-1.715/1.720/1.725.

(f) All turbine-engine aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 5700kg, except those in para (g) shall be equipped with an FDR which should record at least the first 9 parameters listed in Table 1 of Appendix 1 to AC OPS-1.715/1.720/1.725.

(g) All turbine-engine aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September, 1969 shall be equipped with an FDR which shall record at least first 16 parameters listed in Table 1 of Appendix 1 to AC OPS-1.715/1.720/1.725.

(h) All turbine–engine aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September, 1969 shall be equipped with an FDR which shall record, in addition to the first 5 parameters listed in Table 1 of Appendix 1 to AC OPS- 1.715/1.720/1.725, such additional parameters as are necessary to meet the objective of determining:

(1) the attitude of the aeroplane in achieving its flight path; and
(2) the basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.

(i) All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the individual certificate of airworthiness is first issued after 1 January 2005 shall be equipped with an FDR which shall record at least the first 78 parameters listed in Table1 of Appendix 1 to AC OPS1.715/1.720/1.725.

(j) All aeroplanes of a maximum certificated take-off mass of over 5700 kg for which the application for type certification is submitted on or after 1st January, 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table-1 of Appendix 1 to AC OPS1.715/1.720/1.725.

(k) All aeroplanes of a maximum certificated take-off mass of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1st January, 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table-1 of Appendix 1 to AC OPS1.715/1.720/1.725.

(l) For all aircraft and helicopter operations, FDRs and ADRs shall not use engraving metal foil, frequency modulation (FM), photographic film or magnetic tape.

(m) Duration of FDRs:

(1) All FDRs (Commercial air transport) shall retain the information recorded during at least the last twenty-five (25) hours of their operation with the exception of those installed on aeroplane referred in paragraph (e) for which the FDR shall retain the information recorded during at least the last thirty (30) minutes of its operations and in addition sufficient information from the preceding take off for calibration purpose.

(2) All FDRs (installed on helicopters) shall retain the information recorded during at least the last ten (10) hours of their operation.

(3) All FDRs (General aviation) shall retain the information recorded during at least the last twenty-five (25) hours of their operation.

(n) All aeroplanes of a maximum certificated take-off mass of over 27000 kg and authorized to carry more than nineteen passengers for which the application for type certification is submitted on or after 1 January 2021, shall be equipped with a means approved by the Authority, to recover flight recorder data and make it available in a timely manner.

(1) In approving the means to make flight recorder data available in a timely manner, the Authority will take into account the following:

i. the capabilities of the operator;

ii. overall capability of the aeroplane and its systems as certified by the State of Design;

iii. the reliability of the means to recover the appropriate CVR channels and appropriate FDR data; and

iv. specific mitigation measures.

Note: Guidance on approving the means to make flight recorder data available in a timely manner is contained in the Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery (ICAO Doc 10054).

CAR OPS-1.720 Flight data recorders (FDR) – General Aviation

(See Appendix 1 to CAR OPS-1.720 & AC OPS-1.720/1.725))

(a) All aeroplanes of a maximum certificated take-off mass of over 27000 kg for which the individual certificate of airworthiness is first issued on or after 1st January, 1989 shall be equipped with an FDR which shall record at least first 32 parameters listed in Table 1 of Appendix 1 to AC CAR OPS1.715/1.720/1.725.

(b) All aeroplanes of a maximum certificated take-off mass of over 5700 kg, up to and including 27000 kg, for which the individual certificate of airworthiness is first issued on or after 1st January, 1989, shall be equipped with an FDR which shall record at least first 16 parameters listed in Table 1 of Appendix 1 to AC CAR OPS-1.715/1.720/1.725.

(c) All turbine-engined aeroplanes with a seating configuration of more than five passenger seats and a maximum certificated take-off mass of 5700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 should be equipped with:

(1) an FDR which should record at least the first 16 parameters in Table-1; or

(2) a Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot(s), as defined in Appendix-I; or

(3) an ADRS which should record at least first 7 parameters listed in Table-4.

Note 1: AIR or AIRS classification is defined in CAR OPS-1.725para (f)(2).

Note 2: “The application for type certification that is submitted to a contracting state” refers to the date of application of the original “Type Certificate” for the aero plane type, not the date of certification of particular aeroplane variants or derivative models.

(d) All aeroplanes of a maximum certificated take-off mass of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1st January, 2005 shall be equipped with an FDR which shall record at least first 78 parameters listed in Table1.

(e) All aeroplanes of a maximum certificated take-off mass of over 5700 kg for which the application for type certification is submitted on or after 1st January, 2005 shall be equipped with an FDR which shall record at least first 78 parameters listed in Table1.

(f) All aeroplanes of a maximum certificated take-off mass of over 27,000 kg for which the application for type certification is submitted to the CAA on or after 1st January, 2022 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table-1.

(g) All aeroplanes of a maximum certificated take-off mass of over 27000 kg for which the individual certificate of airworthiness is first issued on or after 1st January, 2022 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table-1.

(h) All aeroplanes of a maximum certificated take-off mass of over 5700 – 27,000 kg for which the application for type certification is submitted to the CAA on or after 1st January, 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table-1.

(1) All aeroplanes of a maximum certificated take-off mass of over 5700 – 27,000 kg for which the individual certificate of airworthiness is first issued on or after 1st January, 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table-1.

CAR OPS-1.721 Flight Recorders General Requirements

(a) The flight recorder system manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems:

(1) manufacturer’s operating instructions, equipment limitations and installation procedures;

(2) parameter origin or source and equations which relate counts to units of measurement;

(3) manufacturer’s test reports; and

(4) detailed information to ensure the continued serviceability of the flight recorder system.

(b) The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the aeroplane to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

Note 1.— The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required as per Annex 6 Part1 Appendix 8.

Note 2.— Conditions related to the continued serviceability of a flight recorder system are defined in section 7 of this appendix. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.

(c) Inspection of Flight Recorder Systems: Calibration of the FDR system;

(1) for those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall determine any discrepancies in the engineering conversion routines for the mandatory parameters and ensure that parameters are being recorded within the calibration tolerances; and

(2) when the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two years.

CAR OPS-1.723 Flight Data Analysis Programme

The operator of an aeroplane of a certificated take-off mass greater than 15,000 kg should establish and maintain a flight data analysis programme as part of its safety management system.

(a) All aeroplanes of a certificated take-off mass greater than 15,000 kg with a passenger seating capacity greater than 30, with a certificate of airworthiness first issued on or after 1 January 2026, shall be equipped with a means to support a flight data analysis programme.

(b) With effect from 1 January 2026, the operator of an aeroplane equipped as described in para (a) shall establish and maintain a flight data analysis programme as part of its safety management system.

(c) With effect from 3 November 2022, the operator of an aeroplane of a maximum certificated takeoff mass greater than 27,000 kg shall establish and maintain a flight data analysis programme as part of its safety management system.

CAR–OPS 1.725 Flight Data Link Recorders

(See Appendix 1 to CAR OPS-1.725 Table)

(a) All aeroplanes /Helicopters for which the individual certificate of airworthiness is first issued on or after 1 January 2016, which use any of the data link communications applications referred in para (d)(2) below and are required to carry a CVR, shall record the data link communications messages on a crash protected flight recorder.

(b) All aeroplanes /Helicopters for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in para (d)(2), shall record the data link communications messages on a crash protected flight recorder, unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1 January 2016.

Note 1: Refer to Table C, Appendix 1 to CAR OPS-1.715/1.720/1.725 for examples of data link communication recording requirements.

Note2: A Class B AIR (Airborne Image Recorder) could be a means for recording data link communications applications messages to and from the aeroplanes /helicopters where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

Note 3: The "aircraft modifications" refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring).

(c) All aeroplanes / Helicopters for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1 January 2016 to use any of the data link communications applications referred to in para (d)(2) below, should record the data link communications messages on a crash-protected flight recorder, unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1 January 2016.

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

   (2) Correlation
   Data link recording shall be able to be correlated to the recorded cockpit audio.

(d) Applications to be recorded (Commercial air transport, General aviation and Helicopter)

   (1) Where the aircraft/helicopter flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft/helicopter) and downlinks (from the aircraft/helicopter), shall be recorded on the aircraft/helicopter. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note: Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft/helicopter.

(2) Messages applying to the applications listed at Table-C of Appendix 1 to CAR OPS- 1.725 shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

(e) Flight Crew-Machine Interface Recordings (only for commercial air transport)

(1) All aeroplanes of a maximum take-off mass of over 27000 kg for which the application for type certification is submitted on or after 1 January 2023 shall be equipped with a crashprotected flight recorder which shall record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew as defined in para (f) below.

(2) All aeroplanes of a maximum take-off mass of over 5700 kg, up to and including 27000 kg, for which the application for type certification is submitted on or after 1 January 2023 should be equipped with a crash-protected flight recorder which should record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew, as defined in para (f) below.

(3) Duration
The minimum flight crew-machine interface recording duration shall be at least for the last two (2) hours.

(4) Correlation
Flight crew-machine interface recordings shall be able to be correlated to the recorded cockpit audio.

(f) The Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS) Start and stop logic:

(1) The Airborne Image Recorder (AIR) and Airborne Image Recording System (AIRS) shall start to record prior to the aeroplane/helicopter moving under its own power and record continuously until the termination of the flight when the aeroplane/helicopter is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(2) Classes:

i. A Class “A” AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.
ii. A Class “B” AIR or AIRS captures data link message displays.
iii. A Class “C” AIR or AIRS captures instruments and control panels.

Note 1: There are no provisions for Class “A” AIRs or AIRS in this CAR.

Note 2: A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS or where an FDR s not required.

Note 3: To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

(g) Applications to be recorded

(1) The operation of switches and selectors and the information displayed to the flight crew from electronic displays shall be captured by sensors or other electronic means.

(2) The recording of operation of switches and selectors by the flight crew shall include the following:

i. any switch or selector that will affect the operation and the navigation of the aircraft; and

ii. selection of normal and alternate systems.

(3) The recording of the information displayed to the flight crew from electronic displays shall include the following:

i. primary flight and navigation displays;
ii. aircraft system monitoring displays;
iii. engine indication displays;
iv. traffic, terrain, and weather displays;
v. crew alerting systems displays;
vi. stand-by instruments; and
vii. installed EFB to the extent it is practical.

(4) If image sensors are used, the recording of such images shall not capture the head and shoulders of the flight crew members whilst seated in their normal operating position.

(h) Protection of recorded data and information

(1) It is prohibited to allow the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident as per Annex 13, except where the recordings or transcripts are:

i. related to a safety-related event identified in the context of a safety management system;
ii. are restricted to the relevant portions of a de-identified transcript of the recording; and
iii. are subject to the protections accorded by Annex 19;
iv. sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to the protections accorded by Annex 19; or
v. used for inspections of flight recorder systems as provided in Annex 6, Appendix 8, Section 7.

Note: Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19. When an investigation under Annex 13 is instituted, investigation records are subject to the protection accorded by Annex 13.

(2) It is prohibited to allow the use of recordings or transcripts of FDR, ADRS as well as Class B and Class C AIR and AIRS for purposes other than the investigation of an accident or incident as per CAR 13/ICAO Annex 13 as amended / CAA Equivalent requirements, except where the recordings or transcripts are subject to the protections accorded by CAA equivalent requirement to CAR100/ICAO Annex 19 as amended and are:

i. used by the operator for airworthiness or maintenance purposes;
ii. used by the operator in the operation of a flight date analysis programme required in Annex 6;
iii. sought for use in proceedings not related to an event involving an accident or incident investigation;
iv. de-identified; or
v. disclosed under secure procedures.

Note: Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19.

CAR OPS-1.727 Combination Recorder (Only for commercial air transport)

(See AC OPS-1.727)

(a) All aeroplanes of a maximum certificated take-off mass of over 5700kg, but less than 15000kg (included) for which the application for type certification is submitted on or after 1 January 2016, and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR).

(b) All aeroplanes of a maximum certificated take-off mass of over 15000kg for which the application for type certification is submitted on or after 1 January 2016, and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

(c) All aeroplanes of a maximum certificated take-off mass over 5700kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).

Note 1: The requirement of paragraphs (a), (b) and (c) may be satisfied by equipping the aeroplanes with two combination recorders (one forward and one aft) or separate devices.
Note 2: Para (c) above is only applicable to general aviation.

(d) All multi- engine turbine–powered aeroplanes of a maximum certificated take-off mass of 5700kg or less, required to be equipped with an FDR and a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).

(e) The following requirements shall apply to Automatic Deployable Flight Recorder (ADFR) (for commercial air transport only):
   (1) deployment shall take place when the aeroplane structure has been significantly deformed;
   (2) deployment shall take place when an aeroplane sinks in water;
   (3) ADFR shall not be capable of manual deployment;
   (4) the ADFR shall be able to float on water;
   (5) the ADFR deployment shall not compromise the safe continuation of the flight;
   (6) the ADFR deployment shall not significantly reduce the chance of survival of the recorder and of successful transmission by its ELT;
   (7) the ADFR deployment shall not release more than one piece;
   (8) an alert shall be made to the flight crew when the ADFR is no longer captive to the aircraft.
   (9) the flight crew shall have no means to disable ADFR deployment when the aircraft is airborne;

(f) The ADFR shall contain an integrated ELT, which shall activate automatically during the deployment sequence. Such ELT may be of a type that is activated in flight and provides information from which a position can be determined; and

(g) The integrated ELT of an ADFR shall satisfy the same requirements as an ELT required to be installed on an aeroplane. The integrated ELT shall at least have the same performance as the fixed ELT to maximize detection of the transmitted signal.

Note 1: Refer to the Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery ICAO (Doc 10054) for more information on ADFR.

Note 2: If an integrated ELT of a type that is activated in flight is used within an ADFR it could be a means to comply with requirements of ICAO Document Location of Aircraft in Distress (Doc 10054).

CAR OPS-1.730 Seats, seat safety belts, harnesses and child restraint devices

(See AC OPS-1.730(a)(3))

(a) An operator shall not operate an aeroplane unless it is equipped with:
   (1) A seat or berth for each person who is aged two years or more;
   (2) A safety belt, with or without a diagonal shoulder strap, or a safety harness for use in each passenger seat for each passenger aged two (2) years or more;
   (3) A child restraint device, acceptable to the Authority, for each infant (See AC OPS-1.730(a)(3));
   (4) Except as provided in sub-paragraph (b) below, a safety belt with shoulder harness for each flight crew seat and for any seat alongside a pilot's seat incorporating a device which will automatically restrain the occupant's torso in the event of rapid deceleration;

(5) Except as provided in sub-paragraph (b) below, a safety belt with shoulder harness for each cabin crew seat and observer's seats. However, this requirement does not preclude use of passenger seats by cabin crew members carried in excess of the required cabin crew complement; and

(6) Seats for cabin crew members located near required floor level emergency exits except that, if the emergency evacuation of passengers would be enhanced by seating cabin crew members elsewhere, other locations are acceptable. The seats shall be forward or rearward facing within fifteen degrees (15°) of the longitudinal axis of the aeroplane.

(b) All safety belts with shoulder harness must have a single point release.

(c) A safety belt with a diagonal shoulder strap for aeroplanes with a maximum certificated takeoff mass not exceeding 5700 kg or a safety belt for aeroplanes with a maximum certificated take-off mass not exceeding 2730 kg may be permitted in place of a safety belt with shoulder harness if it is not reasonably practicable to fit the latter.

CAR OPS-1.731 Fasten Seat belt and No Smoking signs

An operator shall not operate an aeroplane in which all passenger seats are not visible from the flight deck, unless it is equipped with a means of indicating to all passengers and cabin crew when seat belts shall be fastened and smoking is not allowed.

CAR OPS-1.735 Internal doors and curtains

An operator shall not operate an aeroplane unless the following equipment is installed:

(a) In an aeroplane with a maximum approved passenger seating configuration of more than nineteen (19) passengers, a door between the passenger compartment and the flight deck compartment with a placard 'crew only' and a locking means to prevent passengers from opening it without the permission of a member of the flight crew;

(b) A means for opening each door that separates a passenger compartment from another compartment that has emergency exit provisions. The means for opening must be readily accessible;

(c) If it is necessary to pass through a doorway or curtain separating the passenger cabin from other areas to reach any required emergency exit from any passenger seat, the door or curtain must have a means to secure it in the open position;

(d) A placard on each internal door or adjacent to a curtain that is the means of access to a passenger emergency exit, to indicate that it must be secured open during take-off and landing; and

(e) A means for any member of the crew to unlock any door that is normally accessible to passengers and that can be locked by passengers.

CAR OPS-1.740 Placards

(See IEM OPS-1.740)

An operator shall not operate an aeroplane unless the following placards are installed;

(a) Every exit from the aircraft shall be marked with the words "Exit" and "Emergency Exit" in both English, Arabic script and/or using pictorial placards.

(b) Every exit from the aircraft shall be marked with instructions in English, Arabic script and/or using pictorial placards to indicate the correct method of opening the exit.

(c) The markings shall be placed on or near the inside surface of the door or other closure of the exit and, if it is operable, from the outside of the aircraft on or near the exterior surface.

(d) The location instructions for all emergency equipment required to be located by a passenger shall be in English, Arabic script and/or using pictorial placards.

(e) The items depicted in the placard shall be available in the compartment indicated.

CAR OPS-1.745 First-Aid Kits

(See AMC OPS-1.745)

(a) An operator shall not operate an aeroplane unless it is equipped with adequate medical supplies (first-aid kits), readily accessible for use, (refer to the following Table):

Number of passenger seats installed	Number of First-Aid Kits required
0 to 100	1
101 to 200	2
201 to 300	3
301 and more	4

(b) An operator shall ensure that first-aid kits are:
   (1) Inspected periodically to confirm, to the extent possible, that contents are maintained in the condition necessary for their intended use; and
   (2) Replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant.

CAR OPS-1.755 Emergency Medical Kit

(See AMC OPS-1.755)

(a) An operator shall not operate an aeroplane with a maximum approved passenger seating configuration of more than thirty (30) seats unless it is equipped with an emergency medical kit if any point on the planned route is more than sixty (60) minutes flying time (at normal cruising speed) from an aerodrome at which qualified medical assistance could be expected to be available.
(b) The commander shall ensure that drugs are not administered except by qualified doctors, nurses or similarly qualified personnel.
(c) Conditions for carriage
   (1) The emergency medical kit must be dust and moisture proof and shall be carried under security conditions, where practicable, on the flight deck; and
   (2) An operator shall ensure that emergency medical kits are:
      i. Inspected periodically to confirm, to the extent possible, that the contents are maintained in the condition necessary for their intended use; and
      ii. Replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant.

CAR OPS-1.760 First-aid oxygen

(See IEM OPS-1.760)

(a) An operator shall not operate a pressurised aeroplane, above 25,000 ft, when a cabin crew member is required to be carried, unless it is equipped with a supply of undiluted oxygen for passengers who, for physiological reasons, might require oxygen following a cabin depressurisation. The amount of oxygen shall be calculated using an average flow rate of at least three (3) litres Standard Temperature Pressure Dry (STPD)/minute/person and shall be sufficient for the remainder of the flight after cabin de-pressurisation when the cabin altitude exceeds 8,000 ft but does not exceed 15,000 ft, for at least 2% of the passengers carried, but in no case for less than one person. There shall be a sufficient number of dispensing units, but in no case less than two (2), with a means for cabin crew to use the supply. The dispensing units may be of a portable type.
(b) The amount of first-aid oxygen required for a particular operation shall be determined on the basis of cabin pressure altitudes and flight duration, consistent with the operating

procedures established for each operation and route.

(c) The oxygen equipment provided shall be capable of generating a mass flow to each user of at least four (4) litres per minute, STPD. Means may be provided to decrease the flow to not less than two (2) litres per minute, STPD, at any altitude.

CAR OPS-1.770 Supplemental oxygen – Pressurised aeroplanes

(See IEM OPS-1.770 & AC OPS-1.770 (b)(2)(v))

(a) ***General***

(1) An operator shall not operate a pressurised aeroplane at pressure altitudes above 10,000 ft unless supplemental oxygen equipment, capable of storing and dispensing the oxygen supplies required by this paragraph, is provided.

(2) The amount of supplemental oxygen required shall be determined on the basis of cabin pressure altitude, flight duration and the assumption that a cabin pressurisation failure will occur at the pressure altitude or point of flight that is most critical from the standpoint of oxygen need, and that, after the failure, the aeroplane will descend in accordance with emergency procedures specified in the Aeroplane Flight Manual to a safe altitude for the route to be flown that will allow continued safe flight and landing.

(3) Following a cabin pressurisation failure, the cabin pressure altitude shall be considered the same as the aeroplane pressure altitude, unless it is demonstrated to the Authority that no probable failure of the cabin or pressurisation system will result in a cabin pressure altitude equal to the aeroplane pressure altitude. Under these circumstances, the demonstrated maximum cabin pressure altitude may be used as a basis for determination of oxygen supply.

(4) Pressurized aeroplanes intended to be operated at flight altitudes at which the atmospheric pressure is less than 376 hPa (25 000 ft) shall be equipped with a device to provide positive warning to the flight crew of any dangerous loss of pressurization.

(b) ***Oxygen equipment and supply requirements***

(1) Flight crew members

i. Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen in accordance with Appendix 1. If all occupants of flight deck seats are supplied from the flight crew source of oxygen supply, then they shall be considered as flight crew members on flight deck duty for the purpose of oxygen supply. Flight deck seat occupants, not supplied by the flight crew source, are to be considered as passengers for the purpose of oxygen supply.

ii. Flight crew members, not covered by sub-paragraph (b)(1)(i) above, are to be considered as passengers for the purpose of oxygen supply.

iii. Oxygen masks shall be located so as to be within the immediate reach of flight crew members whilst at their assigned duty station.

iv. All flight crew members in pressurized aeroplanes operating at pressure altitudes above 25,000 ft (less than 376 hPa), shall have available at the flight duty station a quick-donning type of oxygen mask which will readily supply oxygen on demand.

(2) Cabin crew members, additional crew members and passengers

i. Cabin crew members and passengers shall be supplied with supplemental oxygen in accordance with Appendix 1, except when sub-paragraph (v) below applies. Cabin crew members carried in addition to the minimum number of cabin crew members required, and additional crew members, shall be considered as passengers for the purpose of oxygen supply.

ii. Aeroplanes intended to be operated at pressure altitudes above 25,000 ft shall be provided sufficient spare outlets and masks and/or sufficient portable oxygen units with masks for use by all required cabin crew members. The spare outlets and/or portable oxygen units are to be distributed evenly throughout the cabin to ensure immediate availability of oxygen to each required cabin crew member regardless of his location at the time of cabin pressurisation failure.

iii. Aeroplanes intended to be operated at pressure altitudes above 25,000 ft shall be provided an oxygen dispensing unit connected to oxygen supply terminals immediately available to each occupant, wherever seated. The total number of dispensing units and outlets shall exceed the number of seats by at least 10%. The extra units are to be evenly distributed throughout the cabin.

iv. Aeroplanes intended to be operated at pressure altitudes above 25,000 ft or which, if operated at or below 25,000 ft, cannot descend safely within four (4) minutes to 13,000 ft, and for which the individual certificate of airworthiness was first issued by an ICAO Contracting State or elsewhere on or after 9 November 1998, shall be provided with automatically deployable oxygen equipment immediately available to each occupant, wherever seated. The total number of dispensing units and outlets shall exceed the number of seats by at least 10%. The extra units are to be evenly distributed throughout the cabin.

v. The oxygen supply requirements, as specified in Appendix 1, for aeroplanes not certificated to fly above 25,000 ft, may be reduced to the entire flight time between 10,000 ft and 13,000 ft cabin pressure altitudes for all required cabin crew members and for at least 10% of the passengers if, at all points along the route to be flown, the aeroplane is able to descend safely within four (4) minutes to a cabin pressure altitude of 13,000 ft.

CAR OPS-1.775 Supplemental oxygen – Non-Pressurised aeroplanes

(See Appendix 1 to CAR OPS-1.775 (a))

(a) General

(1) An operator shall not operate a non-pressurised aeroplane at altitudes above 10,000 ft unless supplemental oxygen equipment, capable of storing and dispensing the oxygen supplies required, is provided.

(2) The amount of supplemental oxygen for sustenance required for a particular operation shall be determined on the basis of flight altitudes and flight duration, consistent with the operating procedures established for each operation in the Operations Manual and with the routes to be flown, and with the emergency procedures specified in the Operations Manual.

(3) An aeroplane intended to be operated at pressure altitudes above 10,000 ft shall be provided with equipment capable of storing and dispensing the oxygen supplies required.

(b) Oxygen supply requirements

(1) Flight crew members. Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen in accordance with Appendix 1. If all occupants of flight deck seats are supplied from the flight crew source of oxygen supply, then they shall be considered as flight crew members on flight deck duty for the purpose of oxygen supply.

(2) Cabin crew members, additional crew members and passengers. Cabin crew members and passengers shall be supplied with oxygen in accordance with Appendix 1. Cabin crew members carried in addition to the minimum number of cabin crew members required, and additional crew members, shall be considered as passengers for the purpose of oxygen supply.

CAR OPS-1.780 Crew Protective Breathing Equipment

(a) An operator shall not operate a pressurised aeroplane or, an unpressurised aeroplane with a maximum certificated take-off mass exceeding 5700 kg or having a maximum approved seating configuration of more than nineteen (19) seats unless:
   (1) It has equipment to protect the eyes, nose and mouth of each flight crew member while on flight deck duty and to provide oxygen for a period of not less than fifteen (15) minutes. The supply for Protective Breathing Equipment (PBE) may be provided by the supplemental oxygen required by CAR OPS-1.770(b)(1) or CAR OPS-1.775(b)(1).
   (2) In addition, when the flight crew is more than one and a cabin crew member is not carried, portable PBE must be carried to protect the eyes, nose and mouth of one member of the flight crew and to provide breathing gas for a period of not less than fifteen (15) minutes; and
   (3) It has sufficient portable PBE to protect the eyes, nose and mouth of all required cabin crew members and to provide breathing gas for a period of not less than fifteen (15) minutes.

(b) PBE intended for flight crew use must be conveniently located on the flight deck and be easily accessible for immediate use by each required flight crew member at their assigned duty station.

(c) PBE intended for cabin crew use must be installed adjacent to each required cabin crew member duty station.

(d) An additional, easily accessible portable PBE must be provided and located at or adjacent to the hand fire extinguishers required by CAR OPS-1.790(c) and (d) except that, where the fire extinguisher is located inside a cargo compartment, the PBE must be stowed outside but adjacent to the entrance to that compartment.

(e) PBE while in use, must not prevent communication where required by CAR OPS-1.685, CAR OPS-1.690, CAR OPS-1.810 and CAR OPS-1.850.

CAR OPS-1.785 HUD or Equivalent displays

(See Appendix 1 to CAR-OPS 1.785 HUD, VS or Equivalent)

An operator shall not operate an aeroplane equipped with a HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system unless:

(a) An approval has been issued by the Authority for the operational use of such displays,
(b) The equipment meets the appropriate airworthiness certification requirements;
(c) The operator has carried out a safety risk assessment of the operations supported by the HUD or equivalent displays, EVS, SVS or CVS;
(d) The operator has established and documented the procedures for the use of, and training requirements for, a HUD or equivalent displays, EVS, SVS or CVS
(e) The criteria for the use of such systems for the safe operation of an aeroplane as described in Appendix 1 to CAR-OPS 1.785 HUD, VS or Equivalent is complied with as applicable

Note 1: Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) ICAO Doc 9859 and CAR-100.

Note 2.-Information regarding, automatic landing systes, a HUD or equivalent displays, EVS, SVS, or CVS, is contained in the Manual of All-Weather Operations (Doc 9365).

CAR OPS-1.790 Hand fire extinguishers

(See AMC-1 OPS-1.790 and AMC-2 OPS-1.790)

An operator shall not operate an aeroplane unless hand fire extinguishers are provided for use in crew, passenger and, as applicable, cargo compartments and galleys in accordance with the following:

(a) The type and quantity of extinguishing agent must be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used and, for personnel compartments, must minimise the hazard of toxic gas concentration;

(b) portable fire extinguishers of a type which, when discharged, will not cause dangerous contamination of the air within the aeroplane. 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 that is not readily accessible to the flight crew;

(c) At least one hand fire extinguisher, containing Halon 1211 (bromo-chloro-difluoro-methane, CBrCIF2), or equivalent as the extinguishing agent, must be conveniently located on the flight deck for use by the flight crew;

(d) At least one hand fire extinguisher must be located in, or readily accessible for use in, each galley not located on the main passenger deck;

(e) At least one readily accessible hand fire extinguisher must be available for use in each Class A or Class B cargo or baggage compartment and in each Class E cargo compartment that is accessible to crew members in flight; and

(f) At least the following number of hand fire extinguishers must be conveniently located in the passenger compartment(s):

Maximum approved passenger seating configuration	Number of Extinguishers
7 to 30	1
31 to 60	2
61 to 200	3
201 to 300	4
301 to 400	5
401 to 500	6
501 to 600	7
601 to 700	8

When two or more extinguishers are required, they must be evenly distributed in the passenger compartment.

At least one of the required fire extinguishers located in the passenger compartment of an aeroplane with a maximum approved passenger seating configuration of at least thirty one (31), and not more than sixty (60), and at least two of the fire extinguishers located in the passenger compartment of an aeroplane with a maximum approved passenger seating configuration of sixty one (61) or more must contain Halon 1211 (bromo-chloro-difluoromethane, CBrCIF2), or equivalent as the extinguishing agent.

CAR OPS-1.795 Crash axes and crowbars

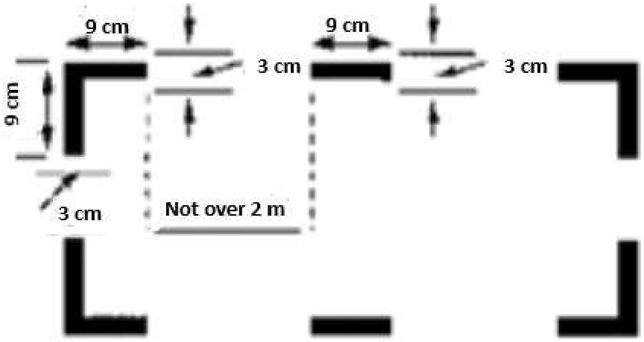
(a) An operator shall not operate an aeroplane with a maximum certificated take-off mass exceeding 5700 kg or having a maximum approved passenger seating configuration of more than nine (9) seats unless it is equipped with at least one crash axe or crowbar located on the flight deck. If the maximum approved passenger seating configuration is more than two hundred (200), an additional crash axe or crowbar must be carried and located in or near the most rearward galley area.

(b) Crash axes and crowbars located in the passenger compartment must not be visible to passengers.

CAR OPS-1.800 Marking of break-in points

(a) An operator shall ensure that, if areas of the fuselage suitable for break-in by rescue crews in an emergency are marked on an aeroplane as shown below. The colour of the markings shall be red or yellow, and if necessary, they shall be outlined in white to contrast with the background. If the corner markings are more than two (2) metres apart, intermediate lines nine (9) cm x 3 cm shall be inserted so that there is no more than two (2) metres between adjacent marks.

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



CAR OPS-1.805 Means of emergency evacuation

(a) An operator shall not operate an aeroplane with passenger emergency exit sill heights:
   (1) Which are more than 1.83 metres (6 feet) above the ground with the aeroplane on the ground and the landing gear extended; or
   (2) Which would be more than 1.83 metres (6 feet) above the ground after the collapse of, or failure to extend of, one or more legs of the landing gear and for which a Type Certificate was first applied for on or after 1 April 2000, unless it has equipment or devices available at each exit, where sub-paragraphs (1) or (2) apply, to enable passengers and crew to reach the ground safely in an emergency.

(b) Such equipment or devices need not be provided at over-wing exits if the designated place on the aeroplane structure at which the escape route terminates is less than 1·83 metres (6 feet) from the ground with the aeroplane on the ground, the landing gear extended, and the flaps in the takeoff or landing position, whichever flap position is higher from the ground.

(c) In aeroplanes required to have a separate emergency exit for the flight crew and:
   (1) For which the lowest point of the emergency exit is more than 1·83 metres (6 feet) above the ground with the landing gear extended; or,
   (2) For which a Type Certificate was first applied for on or after 1 April 2000, would be more than 1·83 metres (6 ft) above the ground after the collapse of, or failure to extend of, one or more legs of the landing gear, there must be a device to assist all members of the flight crew in descending to reach the ground safely in an emergency.

CAR OPS-1.810 Megaphones

(See AMC OPS-1.810)

(a) An operator shall not operate an aeroplane with a maximum approved passenger seating configuration (MAPSC) of more than sixty (60) and carrying one or more passengers, unless it is equipped with portable battery-powered megaphones readily accessible for use by crew members during an emergency evacuation; (Refer to the following table)
   (1) For each passenger deck:

Passenger seating configuration	Number of Megaphones Required
61 to 100	1
101 or more	2

(2) For aeroplanes with more than one passenger deck, when the total passenger seating configuration is sixty (60) to one hundred (100), at least one (1) megaphone is required on each deck.

CAR OPS-1.815 Emergency lighting

(a) An operator shall not operate a passenger carrying aeroplane which has a maximum approved passenger seating configuration of more than 9 unless it is provided with an emergency lighting system having an independent power supply to facilitate the evacuation of the aeroplane. The emergency lighting system must include:

(1) For aeroplanes which have a maximum approved passenger seating configuration of more than nineteen (19):

i. Sources of general cabin illumination;

ii. Internal lighting in floor level emergency exit areas; and

iii. Illuminated emergency exit marking and locating signs.

iv. For aeroplanes for which the application for the type certificate or equivalent was filed before 1 May 1972, and when flying by night, exterior emergency lighting at all over-wing exits, and at exits where descent assist means are required.

v. For aeroplanes for which the application for the type certificate or equivalent was filed in, on or after 1 May 1972, and when flying by night, exterior emergency lighting at all passenger emergency exits.

vi. For aeroplanes for which the type certificate was first issued in, on or after 1 January 1958, floor proximity emergency escape path marking system in the passenger compartment(s).

(2) For aeroplanes which have a maximum approved passenger seating configuration of nineteen (19) or less and are certificated to FAR/CS–23 or FAR/CS–25:

i. Sources of general cabin illumination;

ii. Internal lighting in emergency exit areas; and

iii. Illuminated emergency exit marking and locating signs.

(3) For aeroplanes which have a maximum approved passenger seating configuration of nineteen (19) or less and are not certificated to FAR/CS–23 or FAR/CS–25, sources of general cabin illumination.

(b) After 1 April 1998 an operator shall not, by night, operate a passenger carrying aeroplane which has a maximum approved passenger seating configuration of nine (9) or less unless it is provided with a source of general cabin illumination to facilitate the evacuation of the aeroplane. The system may use dome lights or other sources of illumination already fitted on the aeroplane and which are capable of remaining operative after the aeroplane's battery has been switched off.

CAR OPS-1.820 Emergency Locator Transmitter (ELT)

(See AC OPS-1.820)

(a) An operator shall not operate an aeroplane authorised to carry more than nineteen (19) passengers unless it is equipped with at least:

(1) two ELTs, one of which shall be automatic for aeroplanes first issued with an individual certificate of airworthiness after 1 July 2008; or

(2) At least one automatic ELT and meets the certificate requirements of paragraph (1)

(b) An operator shall not operate an aeroplane authorised to carry nineteen (19) passengers or less unless it is equipped with at least:

(1) one ELT of any type; or

(2) one automatic ELT for aeroplanes first issued with an individual certificate of airworthiness after 1 July 2008.

(c) An operator shall ensure that all ELTs carried to satisfy the above requirements operate in accordance with the relevant provisions of ICAO Annex 10, Volume III.

(d) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress.

(e) The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the CAA.

CAR OPS-1.825 Life Jackets

(See IEM OPS-1.825)

(a) *Land aeroplanes*. An operator shall not operate a land aeroplane:

(1) When flying over water and at a distance of more than fifty (50) nautical miles from the shore; or

(2) When taking off or landing at an aerodrome where the take-off or approach path is so disposed over water that in the event of a mishap there would be a likelihood of a ditching, unless it is equipped with life jackets with a survivor locator light attached, for each person on board. Each life jacket must be stowed in a position easily accessible from the seat or berth of the person for whose use it is provided. Life jackets for infants may be substituted by other approved flotation devices equipped with a survivor locator light.

(3) “Landplanes”include amphibians operated as landplanes. Seaplanes and amphibians. See Subpart T, CAR OPS-1.1445.

(4) Information regarding the acceptable means of compliance particularly in the use of infants can be found in ICAO Doc 10153 Chapter 11 Attachment D

CAR OPS-1.830 Life-rafts and survival ELTs for extended overwater flights

(See AMC OPS-1.830(b)(2)

(a) On overwater flights, an operator shall not operate an aeroplane at a distance away from land, which is suitable for making an emergency landing, greater than that corresponding to:

(1) 120 minutes at cruising speed or 400 nautical miles, whichever is the lesser, for aeroplanes capable of continuing the flight to an aerodrome with the critical power unit(s) becoming inoperative at any point along the route or planned diversions; or

(2) 30 minutes at cruising speed or 100 nautical miles, whichever is the lesser, for all other aeroplanes, unless the equipment specified in sub-paragraphs (b) and (c) below is carried.

(b) Sufficient life-rafts to carry all persons on board. Unless excess rafts of enough capacity are provided, the buoyancy and seating capacity beyond the rated capacity of the rafts must accommodate all occupants of the aeroplane in the event of a loss of one raft of the largest rated capacity. The life-rafts shall be equipped with:

(1) A survivor locator light; and

(2) Lifesaving equipment including means of sustaining life as appropriate to the flight to be undertaken (see AMC OPS-1.830(b)(2)); and

(c) At least two survival Emergency Locator Transmitters (ELT(S)) capable of transmitting on the distress frequencies prescribed in ICAO Annex 10, Volume V, Chapter 2. (See AMC OPS-1.820)

(d) at the earliest practicable date, but not later than 1 May 2020, on all aeroplanes of a maximum certificated takeoff mass of over 27 000 kg, and with an MAPSC of more than 19 and all aeroplanes with an MCTOM of more than 45500 kg involved in commercial operations shall be equipped with a securely attached underwater locating device operating at a frequency of 8.8 kHz $\pm$ 1kHz, unless:

(1) The aeroplane is operated over routes on which it is not at a distance of more than 180 NM from the shore: or

(2) The aeroplane is equipped with an automatic means to determine the location of the

point of end of flight within 6 NM accuracy (following an accident where the aeroplane is severely damaged).

Note: This automatically activated underwater locating device shall operate for a minimum of thirty (30) days and shall not be installed in wings or empennage.

CAR OPS-1.835 Survival equipment

(See AMC OPS-1.835(c) and IEM OPS-1.835)

An operator shall not operate an aeroplane across areas in which search and rescue would be especially difficult unless it is equipped with the following:

(a) Be equipped with such signalling devices and life-saving equipment (including means of sustaining life) as may be appropriate to the area overflown;

(b) At least one ELT(S) capable of transmitting on the distress frequencies prescribed in ICAO Annex 10, Volume V, Chapter 2 (See AC OPS-1.820); and

(c) Additional survival equipment for the route to be flown taking account of the number of persons on board (See AMC OPS-1.835(c)), except that the equipment specified in subparagraph need not be carried when the aeroplane either:

(1) Remains within a distance from an area where search and rescue is not especially difficult corresponding to:

i. 120 minutes at the one engine inoperative cruising speed for aeroplanes capable of continuing the flight to an aerodrome with the critical power unit(s) becoming inoperative at any point along the route or planned diversions; or

ii. 30 minutes at cruising speed for all other aeroplanes, or,

(2) For aeroplanes certificated to FAR/CS–25 or equivalent, no greater distance than that corresponding to ninety (90) minutes at cruising speed from an area suitable for making an emergency landing.

SECTION 2 – SUBPART K – INSTRUMENTS & EQUIPMENT

IEM OPS-1.630 Instruments and Equipment – Approval and Installation

(See CAR OPS-1.630)

(1) For Instruments and Equipment required by CAR OPS-1 Subpart K, "Approved" means that compliance with the applicable TSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a TSO does not exist, the applicable airworthiness standards apply unless otherwise prescribed in CAR OPS-1 or CAR-M.

(2) "Installed" means that the installation of Instruments and Equipment has been demonstrated to comply with the applicable airworthiness requirements of EASA CS-23/CS-25 (or an equivalent accepted by the CAA), or the relevant code used for Type Certification, and any applicable requirement prescribed in CAR OPS-1.

(3) Instruments and Equipment approved in accordance with design requirements and performance specifications other than TSOs, before the applicability dates prescribed in CAR OPS-1.001(b), are acceptable for use or installation on aeroplanes operated for the purpose of commercial air transportation provided that any relevant OPS requirement is complied with.

(4) When a new version of a TSO (or of a specification other than a TSO) is issued, Instruments and Equipment approved in accordance with earlier requirements may be used or installed on aeroplanes operated for the purpose of commercial air transportation provided that such Instruments and Equipment are operational, unless removal from service or withdrawal is required by means of an amendment to CAR OPS-1 or CAR-M.

AMC OPS-1.650/1.652 Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-1.650/1.652)

(1) Individual requirements of these paragraphs may be met by combinations of instruments or by integrated flight systems or by a combination of parameters on electronic displays provided that the information so available to each required pilot is not less than that provided by the instruments and associated equipment as specified in this Subpart.

(2) The equipment requirements of these paragraphs may be met by alternative means of compliance when equivalent safety of the installation has been shown during type certification approval of the aeroplane for the intended kind of operation.

IEM OPS-1.650/1.652 Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-1.650/1.652)
(See table below)

SERIAL		FLIGHTS UNDER VFR			FLIGHTS UNDER IFR OR AT NIGHT		
INSTRUMENT		SINGLE PILOT	TWO PILOTS REQUIRED	MAX T/O MASS AUTH>5700 kg OR MAX PAX>9 Pax	SINGLE PILOT	TWO REQUIRED PILOTS	MAX T/O MASS AUTH>5700 kg OR MAX PAX>9 Pax
(a)		(b)	(c)	(d)	(e)	(f)	(g)
1	Magnetic Compass	1	1	1	1	1	1
2	Accurate Time Piece	1	1	1	1	1	1
3	OAT Indicator	1	1	1	1	1	1

4	**Sensitive Pressure Altimeter**	1	2	2	2 Note (5)	2 Note (5)	2 Note (5)
5	**Air Speed Indicator**	1	2	2	1	2	2
6	**Heated Pitot system**			2	1	2	2
7	**Pitot heat failure Indicator**						2
8	**Vertical Speed Indicator**	1	2	2	1	2	2
9	**Turn and slip Indicator OR Turn Coordinator**	1 Note (1)	2 Notes (1) & (2)	2 Notes (1) & (2)	1 Note (4)	2 Note (4)	2 Note (4)
10	**Attitude Indicator**	1 Note (1)	2 Notes (1) & (2)	2 Notes (1) & (2)	1	2	2
11	**Gyroscopic Direction Indicator**	1 Note (1)	2 Notes (1) & (2)	2 Notes (1) & (2)	1	2	2
12	**Standby Attitude Indicator**						1
13	**Mach Number Indicator**	**See Note (3) for all aeroplanes**					

Notes 1: For local flights (A to A, 50 nm radius, not more than 60 mins duration) the instruments at Serials 9(b) 10(b) and 11 (b) may be replaced by EITHER a turn and slip indicator, OR a turn coordinator, OR both an attitude indicator and a slip indicator.

Note 2: The substitute instruments permitted by Note (1) shall be provided at each pilot's station.

Note 3: Serial 13 - A Mach number indicator is required for each pilot whenever compressibility limitations are not otherwise indicated by airspeed indicators.

Note 4: For IFR or at night, a Turn and Slip indicator, or a slip indicator and a third (standby) attitude indicator certificated according to CS 25 or equivalent, is required.

Note 5: Neither Three pointers, nor drum pointer altimeters satisfy the requirement.

AMC OPS1.650(i) & 1.652(i) Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-1.650(i) & 1.652(i))

A means to indicate outside air temperature indicator may be an air temperature indicator which provides indications that are convertible to outside air temperature.

IEM OPS-1.650(p) & 1.652(s) Headset, boom microphone and associated equipment

(See CAR OPS-1.650(p)/1.652(s))

A headset, as required by CAR OPS-1.650(p) and CAR OPS-1.652(s), consists of a communication device which includes an earphone(s) to receive and a microphone to transmit audio signals to the aeroplane’s communication system. To comply with the minimum performance requirements, the earphone(s) and microphone should match with the communication system’s characteristics and the flight deck environment. The headset should be adequately adjustable to fit the pilot’s head. Headset boom microphones should be of the noise cancelling type.

AMC OPS-1.652(d) & (k)(2) Flight and Navigational Instruments and Associated Equipment

(See CAR OPS-1.652(d) & (k)(2))

A combined pitot heater warning indicator is acceptable provided that a means exists to identify the failed heater in systems with two or more sensors.

AMC OPS 1.653 GNSS

(See CAR-OPS 1.653)

CAA Mandatory Minimum Navigation System is TSO-C 145 /146 /196 or RNP capable aircraft as approved by the CAA.

Note 1: TSO-C 145 /146 /196 (or later versions) GNSS are recommended as this standard of GNSS equipment may be required to meet later navigation and ADS-B approvals.

Note 2: The above represents minimum equipment requirements. Some operations under the PBN may require more than one GNSS unit to be fitted.

AC OPS-1.680(a)(2) Quarterly Radiation Sampling

(See CAR OPS-1.680(a)(2))

(1) Compliance with CAR OPS 1.680(a)(2) may be shown by conducting quarterly radiation sampling during aeroplane operation using the following criteria:
   (a) The sampling should be carried out in conjunction with a Radiological Agency or similar organisation acceptable to the Authority;
   (b) Sixteen route sectors which include flight above 49,000 ft should be sampled every quarter (three months). Where less than sixteen route sectors which include flight above 49,000 ft are achieved each quarter, then all sectors above 49,000 ft should be sampled.;
   (c) The cosmic radiation recorded should include both the neutron and non-neutron components of the radiation field.

(2) The results of the sampling, including a cumulative summary quarter on quarter, should be reported to the Authority under arrangements acceptable to the Authority.

AMC OPS-1.690(b)(6) Crew member interphone system

(See CAR OPS-1.690(b)(6))

(1) The means of determining whether or not an interphone call is a normal or an emergency call may be one or a combination of the following:
   (a) Lights of different colours;
   (b) Codes defined by the operator (e.g. Different number of rings for normal and emergency calls);
   (c) Any other indicating signal acceptable to the Authority.

IEM OPS-1.690(b)(7) Crewmember interphone system

(See CAR OPS-1.690(b)(7))

At least one interphone system station for use by ground personnel should be, where practicable, so located that the personnel using the system may avoid detection from within the aeroplane.

CAR OPS-1.700 Cockpit Voice Recorders

(See CAR OPS 1.700)

The operational performance requirements for Cockpit Voice Recorders should be those laid down in EUROCAE Document ED56 or ED56A (Minimum Operational Performance Requirements for Cockpit Voice Recorder Systems) December 1993 or as amended.

AC OPS-1.700, 1.705 and 1.710 Cockpit Voice Recorders

(See CAR OPS-1.700, and 1.70)

Summary table of applicable requirements

MCTOM	**ALL AEROPLANES** (See CAR OPS-1.710 (CVR-2)		**ALL AEROPLANES** (See CAR OPS-1.700 (CVR-1)
5700 Kg	NO REQUIREMENT	**POWERED AEROPLANES** with a MAPSC of more than 9 (Applicability 1 Apr 2000) (See CAR OPS-1.705(CVR-2)	**POWERED AEROPLANES** with a MAPSC of more than 9 (Applicability 1 Apr 2000) (See CAR OPS-1.700(CVR-1)
0	1.1.1990	1.4.1998	**DATE OF ISSUE OF THE FIRST INDIVIDUAL CoA**

Note: MCTOM = Maximum Certificated Take-Off Mass; and
MAPSC = Maximum Approved Passenger Seating Configuration

AC OPS 1.705/1.710 Cockpit Voice Recorders

(See CAR OPS-1.705/1.710)

Account should be taken of the operational performance requirements for Cockpit Voice Recorders as laid down in EUROCAE Documents ED56 or ED56A (Minimum Operational Performance Requirements for Cockpit Voice Recorder Systems) dated February 1988 and December 1993 respectively.

AC OPS 1.715 Flight Data Recorders

(See CAR OPS-1.715)

(1) The operational performance requirements for Flight Data Recorders should be those laid down in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.
(2) The parameters to be recorded should meet, as far as practicable, the performance specifications (designated ranges, sampling intervals, accuracy limits and minimum resolution in read-out) defined in the relevant tables of EUROCAE Minimum Operational Performance Specification for Flight Data Recorder Systems, Document ED 55 dated May 1990. The remarks columns of those tables are acceptable means of compliance to the parameter specifications.
(3) For aeroplanes with novel or unique design or operational characteristics, the additional parameters should be those required in accordance with CS-25 or an equivalent accepted by the CAA during type or supplemental type certification or validation.
(4) If recording capacity is available, as many of the additional parameters specified in Table A1.5 of Document ED 55 (or as amended) dated May 1990 as possible should be recorded.

Appendix 1 to CAR OPS-1.715 Flight data recorders - CAT - List of parameters to be recorded

Table A1 – Aeroplanes with a maximum certificated take-off mass of over 5700 kg

Note: The number in the left-hand column reflect the Serial Numbers depicted in EUROCAE document ED55

No.	Parameter
1	Time or relative time count
2	Pressure altitude
3	Indicated airspeed
4	Heading
5	Normal acceleration
6	Pitch attitude
7	Roll attitude
8	Manual radio transmission keying
9	Propulsive thrust/ power on each engine and cockpit thrust/power lever position if applicable
10	Trailing edge flap or cockpit control selection
11	Leading edge flap or cockpit control selection
12	Thrust reverse status
13	Ground spoiler position and/or speed brake selection
14	Total or outside air temperature
15	Autopilot, auto-throttle and AFCS mode and engagement status
16	Longitudinal acceleration (Body axis)
17	Lateral acceleration

Table A2 – Aeroplanes with a maximum certificated take-off mass of 5700 kg or below

Note: The number in the left-hand column reflect the Serial Numbers depicted in EUROCAE document ED55

No.	Parameter
1	Time or relative time count
2	Pressure altitude
3	Indicated airspeed
4	Heading
5	Normal acceleration
6	Pitch attitude
7	Roll attitude
8	Manual radio transmission keying
9	Propulsive thrust/ power on each engine and cockpit thrust/power lever position if applicable
10	Trailing edge flap or cockpit control selection
11	Leading edge flap or cockpit control selection
12	Thrust reverse status
13	Ground spoiler position and/or speed brake selection
14	Total or outside air temperature
15	Autopilot/auto-throttle engagement status
16	Angle of attack (if a suitable sensor is available)
17	Longitudinal acceleration (Body axis)

Table B – Additional parameters for aeroplanes with a maximum certificated take-off mass of over 27 000 kg

Note: The number in the left-hand column reflect the Serial Numbers depicted in EUROCAE document ED55

No.	Parameter
18	Primary flight controls - Control surface position and/or pilot input (pitch, roll, yaw)
19	Pitch trim position
20	Radio altitude
21	Vertical beam deviation (ILS Glide path or MLS Elevation)
22	Horizontal beam deviation (ILS Localiser or MLS Azimuth)
23	Marker Beacon Passage
24	Warnings
25	Reserved (Navigation receiver frequency selection is recommended)
26	Reserved (DME distance is recommended)
27	Landing gear squat switch status or air/ground status
28	Ground Proximity Warning System
29	Angle of attack
30	Low pressure warning (hydraulic and pneumatic power)
31	Groundspeed
32	Landing gear or gear selector position

Table C – Aeroplanes equipped with electronic display systems

Note: The number in the center column reflect the Serial Numbers depicted in EUROCAE document ED55 table A1.5

No.	No.	Parameter
33	6	Selected barometric setting (Each pilot station)
34	7	Selected altitude
35	8	Selected speed
36	9	Selected mach number
37	10	Selected vertical speed
38	11	Selected heading
39	12	Selected flight path
40	13	Selected decision height
41	14	EFIS display format
42	15	Multi -function /Engine /Alerts display format

Appendix 1 to CAR OPS-1.720 Flight data recorders - GA - List of parameters to be recorded

Table A – Aeroplanes with a maximum certificated take-off mass of over 5700 Kg

No.	Parameter
1	Time or relative time count
2	Pressure altitude
3	Indicated airspeed
4	Heading
5	Normal acceleration
6	Pitch attitude
7	Roll attitude
8	Manual radio transmission keying unless an alternate means to synchronise FDR and CVR recordings is provided
9	Power on each engine
10	Trailing edge flap or cockpit control selection
11	Leading edge flap or cockpit control selection
12	Thrust reverse position (for turbojet aeroplanes only)
13	Ground spoiler position and/or speed brake selection
14	Outside air temperature or Total air temperature
15a 15b	Autopilot engagement status Autopilot operating modes, auto-throttle and AFCS systems engagement status and operating modes

Table B – Additional parameters for aeroplanes with a maximum certificated take-off mass of over 27 000 kg

No.	Parameter
16	Longitudinal acceleration
17	Lateral acceleration
18	Primary flight controls - Control surface position and/or pilot input (pitch, roll and yaw)
19	Pitch trim position
20	Radio altitude
21	Glide path deviation
22	Localiser deviation
23	Marker beacon passage
24	Master warning
25	NAV 1 and NAV 2 frequency selection
26	DME 1 and DME 2 distance
27	Landing gear squat switch status
28	Ground proximity warning system
29	Angle of attack
30	Hydraulics, each system (low pressure)
31	Navigation data
32	Landing gear or gear selector position

AC OPS-1.715/1.720 & 1.725 Flight Data Recorders

(See CAR OPS-1.720 /1.725)
(See Appendix 1 to AC OPS-1.715/1.720 & 1.725)

(1) The parameters to be recorded should meet the performance specifications (designated ranges, recording intervals and accuracy limits) defined in Table A of Appendix 1 to AC OPS1.720/1.725. Remarks in Table 1 of Appendix 1 to AC OPS-1.715/1.720/1.725 are acceptable means of compliance to the parameter's requirements.
(2) Flight data recorder systems, for which the recorded parameters do not comply with the performance specifications of Table A of Appendix 1 to AC OPS-1.715/1.720/1.725 (i.e. range, sampling intervals, accuracy limits and recommended resolution readout) may be acceptable to the Authority.
(3) For all aeroplanes, so far as practicable, when further recording capacity is available, the recording of the following additional parameters should be considered:
   (a) Remaining parameters in Table B of Appendix 1 to CAR OPS-1.720 or CAR OPS-1.725 as applicable;
   (b) Any dedicated parameter relating to novel or unique design or operational characteristics of the aeroplane;
   (c) operational information from electronic display systems, such as EFIS, ECAM or EICAS, with the following order of priority:
      i. parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and auto-flight system engagement and mode indications if not recorded from another source;

ii. display system selection/status,e.g. SECTOR, PLAN, ROSE, NAV, WXR, Composite, Copy, etc.;
iii. warning and alerts;
iv. the identity of displayed pages from emergency procedures and checklists.

(d) retardation information including brake application for use in the investigation of landing overruns or rejected take offs; and
(e) additional engine parameters (EPR, N1, EGT, fuel flow, etc.)

(4) For the purpose of CAR OPS-1.720(d) and 1.720(e), the alleviation should be acceptable only when adding the recording of missing parameters to the existing flight data recorder system would require a major upgrade of the system itself. Account should be taken of the following:
(a) The extent of the modification required
(b) The down-time period; and
(c) Equipment software development.

(5) For the purpose of CAR OP-1.720(d) and 1.720(e), 1.725(c)(2) 1.725(c)(3) "capacity available" refers to the space on both Flight Data Acquisition Unit and the flight data recorder not allocated for recording the required parameters, or the parameters recorded for the purpose of CAR OPS1.037 (Accident prevention and flight safety programme) as acceptable to the Authority.

(6) For the purpose of CAR OPS-1.720(d)(1), 1.720(e)(1), 1.725(c)(2)(i) and 1.725(c)(3), a sensor is considered "readily available" when it is already available or can be easily incorporated.

Appendix 1 to AC OPS-1.715/1.720/1.725 Parameters to be recorded

(See AC OPS-1.715/1.720/1.725)

TABLE 1 – Parameters Performance Specifications

Serial No.	Parameter	Measurement Range	Sampling Interval in seconds	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions	Remarks
1	Time or relative time count	24 hours	4	±0·125% per hour	1 second	UTC time preferred where available, otherwise elapsed time
2	Pressured altitude	-1 000 ft to maximum certificated altitude of aircraft +5000 ft	1	±100 ft to ±700 ft	5 ft	For altitude record error see CS TSO C124
3	Indicated airspeed	50 kt to max VSO MaxVSO to 1·2 Vd	1	±5% ±3 %	1kt	Vso stalling speed or minimum steady flight speed in the landing configuration VdF design diving speed
4	Heading	360º	1	±2º	0·5º	
5	Normal acceleration	-3 g to +6 g	0·125 ±	0·125 ±1% of maximum range excluding a datum error of ± 5%	0·004 g	
6	Pitch attitude	±75º	1	±2º	0·5º	
7	Roll attitude	±180º	1	±2º	0·5º	

Serial No.	Parameter	Measurement Range	Sampling Interval in seconds	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions	Remarks
8	Manual radio transmission keying	Discrete	1	-	-	On-off (one discrete). An FDR/CVR time synchronisation signal complying with EUROCAE Document ED55 dated May 1990 paragraph 4.2.1 is an acceptable alternative means of compliance
9	Power on each engine	Full range	Each engine each second	±2%	0·2% of full range	Sufficient parameters e.g. EPR/N, or Torque/Np as appropriate to the particular engine should be recorded to determine power
10	Trailing edge flap or cockpit control selection	Full range or, each discrete position	2	±5% or as pilot's indicator	0·5% of full range	
11	Leading edge flap or cockpit control selection	Full range or each discrete position	2	-	0·5% of full range	
12	Thrust reverser position	Stowed, in transit, and reverse	Each reverser each second	±2% unless higher accuracy uniquely required	-	
13	Ground spoiler and/or speed brake selection	Full range or each discrete position	1	±2º	0·2% of full range	
14	Outside air temperatures or Total air temperature	Sensor range	2	-	0·3º	
15a 15b	Autopilot engagement status Autopilot operating modes, auto-throttle & AFCS systems engagement status and operating modes	A suitable combination of discrete	1			
16	Longitudinal acceleration	± 1 g	0·25	± 1·5% of maximum range excluding a datum error of ± 5%	0·004 g	
17	Lateral acceleration	±1 g	0·25	±1·5% of maximum range excluding a datum error of ±5%	0·004 g	
18	Primary flight controls. Control surface positions and/or pilot input (pitch, roll, yaw)	Full range	1	±2º unless higher accuracy uniquely required	0·2% of full range	For aeroplanes with conventional control systems 'or' applies. For aeroplanes with non- mechanical control systems 'and' applies for aeroplanes with split surfaces a suitable combination of inputs is acceptable in lieu of recording each surface separately
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required	0·3% of full range	

Serial No.	Parameter	Measurement Range	Sampling Interval in seconds	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions	Remarks
20	Radio altitude	-20 ft to +2500 ft	1	±2 ft or ±3% whichever is greater below 500 ft and ±5% above 500 ft	1 ft below 500ft, 1 ft +5% of full range above 500 ft	As installed. Accuracy limits are recommended
21	Glide path deviation	Signal range	1	±3%	0·3% of full range	As installed. Accuracy limits are recommended
22	Localiser deviation	Signal range	1	±3%	0·3% of full range	As installed. Accuracy limits are recommended
23	Marker beacon passage	Discrete	1	–	–	A single discrete is acceptable for all markers
24	Master warning	Discrete	1	–	–	
25	NAV 1 and 2 frequency selection	Full range	4	As installed	–	
26	DME 1 and 2 distance	0-200 nm	4	As installed	–	Recording of latitude and longitude from INS or other navigation system is a preferred alternative
27	Landing gear squat switch status	Discrete	1	–	–	
28	Ground proximity warning system (GPWS)	Discrete	1	–	–	
29	Angle of attack	Full range	0·5	As installed	0·3% of full range	
30	Hydraulics	Discrete(s)	2	–	–	
31	Navigation data	As installed	1	As installed	–	
32	Landing gear or gear selector position	Discrete	4	As installed	–	
33	Groundspeed	As installed	1	Data should be obtained from the most accurate system	1kt	
34	Brakes (left and right brake pressure, left and right brake pedal position)	(Maximum metered brake range, discrete or full range)		±5%	2% of full range	

Serial No.	Parameter	Measurement Range	SamplingI nterval in seconds	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions	Remarks
35	Engine fuel metering valve position indicated vibration level, N_2, EGT, fuel flow, fuel cut-off lever position, N_3, engine fuel metering valve position)	Each engine each second		As installed	2% of full range	Application for type certification is submitted to a Contracting State on or after 1 January 2023
36	TCAS/ACAS (traffic alert and collision avoidance system)	Discrete	1	As installed		
37	Wind shear warning	Discrete	1	As installed		
38	Selected barometric setting (pilot, co-pilot)	As installed	1	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	
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) (course/DSTRK, path angle, final approach path (IRNAV/IAN))		1			
45	Selected decision height	As installed	64	As installed	Sufficient to determine crew selection	
46	EFIS display format (pilot, co-pilot)	Discrete	4	As installed		
47	Multi-function/engine/alerts display format	Discrete	4	As installed		

Serial No.	Parameter	Measurement Range	Sampling Interval in seconds	Accuracy limits (sensor input compared toFDR readout)	Recording resolutions	Remarks
48	AC electrical bus status	Discrete	4	As installed		
49	DC electrical bus status	Discrete	4	As installed		
50	Engine bleed valve position	Discrete	4	As installed		
51	APU bleed valve position	Discrete	4	As installed		
52	Computer failure	Discrete	4	As installed		
53	Engine thrust command	As installed	2	As installed		
54	Engine thrust target	As installed	4	As installed	2% of full range	
55	Computed centre of gravity	As installed	64	As installed	1% of full range	
56	Fuel quantity in CG trim tank	As installed	64	As installed	1% of full range	
57	Head up display in use	As installed	41	As installed		
58	Para visual display on/off	As installed	1	As installed		
59	Operational stall protection, stick shaker and pusher activation	As installed	1	As installed		
60	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)	As installed	4	As installed		
61	Ice detection	As installed	4	As installed		
62	Engine warning each engine vibration	As installed	1	As installed		
63	Engine warning each engine over temperature	As installed	1	As installed		
64	Engine warning each engine oil pressure low	As installed	1	As installed		
65	Engine warning each engine over speed	As installed	1	As installed		

Serial No.	Parameter	Measurement Range	Sampling Interval in seconds	Accuracy limits (sensor input compared to FDR readout)	Recording resolutions	Remarks
66	Yaw trim surface position	Full range	2	±3% unless higher Accuracy uniquely required	0.3% of full range	
67	Roll trim surface position	Full range	2	±3% unless higher Accuracy uniquely required	0.3% of full range	
68	Yaw or sideslip angle	Full range	1	±5%	0.5°	
69	De-icing and/or anti-icing systems selection	Discrete	4	As installed		
70	Hydraulic pressure (each system)	Full range	2	±5%	100 psi	
71	Loss of cabin pressure	Discrete	1			
72	Cockpit trim control input position, Pitch	Full range	1	±5%	0.2% of full range or as installed	
73	Cockpit trim control input position, Roll	Full range	1	±5%	0.2% of full range or as installed	
74	Cockpit trim control input position, Yaw	Full range	1	±5%	0.2% of full range or as installed	
75	All cockpit flight control input forces (control wheel, control column, rudder pedal)	Full range ±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))		±5%	0.2% of full range or as installed	
76	Event marker	Discrete	1			
77	Date	365 days	64	As installed		
78	ANP or EPE or EPU	As installed	4	As installed		Application for type certification submitted to a Contracting State on or after 1 January 2022
79	Cabin pressure altitude	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft	
80	Aeroplane computed weight	As installed		As installed	1% of full range	Application for type certification submitted to a Contracting State on or after 1 January 2022
81	Flight director command	Full range		± 2°	0.5°	Application for type certification submitted to a Contracting State on or after 1 January 2022
82	Vertical speed	As installed		As installed (32 ft/min recommended)	16 ft/min	Application for type certification submitted to a Contracting State on or after 1 January 2022

Additional information to be considered

(a) Operational information from electronic display systems, such as Electronic Flight Instruments Systems (EFIS), Electronic Centralised Aircraft Monitor (ECAM) and Engine Indications and Crew Alerting System (EICAS). Use the following order of priority:
  (1) Parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and auto-flight system engagement and mode indications if not recorded from another source;
  (2) Display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;
  (3) Warnings and alerts;
  (4) The identity of displayed pages for emergency procedures and checklists.

(b) Retardation information including brake application for use in the investigation of landing overruns and rejected take-offs; and

(c) Additional engine parameters (EPR, N1, EGT, fuel flow, etc.).

Appendix 1 to CAR OPS-1.715/1.720/1.725 Flight data recorders - List of parameters to be recorded

Table A - Aeroplanes with a maximum certificated take-off mass over 5700 Kg

No.	Parameter
1	Time or relative time count
2	Pressure altitude
3	Indicated airspeed
4	Heading
5	Normal acceleration

Table B – Additional parameters for aeroplanes with a maximum certificated take-off mass over 27 000 kg

No.	Parameter
6	Pitch attitude
7	Roll attitude
8	Manual radio transmission keying unless an alternate means to synchronise FDR and CVR recordings is provided
9	Power on each engine
10	Trailing edge flap or cockpit control selection
11	Leading edge flap or cockpit control selection
12	Thrust reverse position (for turbojet aeroplanes only)
13	Ground spoiler position and/or speed brake selection
14	Outside air temperature or Total air temperature

No.	Parameter
15a 15b	Autopilot engagement status Autopilot operating modes, auto-throttle and AFCS systems, engagement status and operating modes
16	Longitudinal acceleration
17	Lateral acceleration
18	Primary flight controls - Control surface position and/or pilot input (pitch, roll and yaw)
19	Pitch trim position
20	Radio altitude
21	Glide path deviation
22	Localiser deviation
23	Marker beacon passage
24	Master warning
25	NAV 1 and NAV 2 frequency selection
26	DME 1 and DME 2 distance
27	Landing gear squat switch status
28	Ground proximity warning system
29	Angle of attack
30	Hydraulics, each system (low pressure)
31	Navigation data (latitude, longitude, ground speed and drift angle)
32	Landing gear or gear selector position

Table C – Description of Applications for Date Link Recorders

Item No	Application type	Application description	Recording content
1	Data link initiation	This includes any applications used to log on to or initiate data link service. In FANS-1/A and ATN, these are ATS facilities notification (AFN) and context management (CM) respectively.	C
2	Controller/pilot communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C

Item No	Application type	Application description	Recording content
3	Addressed surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the automatic dependent surveillance — contract (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link-automatic terminal service (D-ATIS), digital Notice to Airmen (D-NOTAM) and other textual data link services.	C
5	Aircraft broadcast surveillance	This includes elementary and enhanced surveillance systems, as well as automatic dependent surveillance — broadcast (ADS-B) output data. Where parametric data sent by the helicopter are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6	Aeronautical operational control data	This includes any application transmitting or receiving data used for aeronautical operational control purposes (per the ICAO definition of operational control).	M*

AC OPS-1.715/1.720/1.725 Flight Data Recorders

(See CAR OPS-1.715, 1.720 and 1.725)

Summary table of applicable requirements and parameters recorded.

See Appendix 1 to CAR OPS 1.725		See Appendix 1 to CAR OPS 1.720	See Appendix 1 to CAR OPS 1.715
TURBINE POWERED AEROPLANES • Table A (APP-1 to CAR OPS-1.715/1.720/1.725) parameters. 1 - 5; and • For aeroplanes of a type first type certificated after 30.09.69 Table B (APP-1 OPS-1.725) parameters. 6 - 15b	**TURBINE POWERED AEROPLANES** •Table A (APP-1 to CAR OPS-1.715/1.720/1.725) parameters. 1 - 5; and • For aeroplanes of a type first type certificated after 30.09.69 Table B (APP-1 OPS-1.725) parameters. 6 - 15b; and • If sufficient capacity is available on FDR system remaining Table B (APP-1 OPS1.725) parameters	**ALL AEROPLANES** •Table A (APP-1 OPS1.720) parameters. 1 - 15b; and •Table B APP-1 OPS-(1.720) parameters. 16 - 32	**ALL AEROPLANES** •Table A1 (APP-1 OPS-1.715) parameters. 1 - 17; and •Table B (APP-1 OPS-1.715) parameters. 18 - 32; and •Table C (EFIS) parameters. 33 - 42; and •Parameters relating to novel or unique design features

A/C Weight MCTOM	See Appendix 1 to CAR OPS-1.725		See Appendix 1 to CAR OPS-1.720	See Appendix 1 to CAR OPS-1.715
27000 kg	**TURBINE POWERED AEROPLANES** Table A (APP-1 to CAR OPS-1.715/1.720/ 1.725) parameters. 1 - 5	**TURBINE POWERED AEROPLANES** • Table A (APP-1 to CAR OPS-1.715/1.720/1.725) parameters. 1 - 5; and • If sufficient capacity is available on FDR system Table B (1.725) parameters 6 - 15b	**ALL AEROPLANES** Table A (1.720) parameters. 1 - 15b	**ALL AEROPLANES** • Table A1 (APP-1 OPS-1.715) parameters. 1 - 17; and • Table C (EFIS) parameters 33 - 42; and • Parameters relating to novel or unique design features
5700 kg	No Requirement	No Requirement	No Requirement	**MULTI-ENGINE TURBINE POWERED AEROPLANES MASPC > 9** • Table A2 (APP-1 OPS-1.715) parameters. 1 - 17; and • Table C (EFIS) parameters. 33 - 42; and • Parameter relating to novel or unique design features

AC OPS-1.727 Combination recorders

(See CAR OPS-1.727)

When two combination recorders are installed, one should be located near the cockpit, in order to minimise the risk of a data loss due to the failure of the wiring that gather data to the recorder. The other should be located at the rear of the aeroplane in order to minimise the risk of a data loss due to recorder damage in the case of a crash.

AC OPS-1.730(a)(3) Seats, seat safety belts, harnesses and child restraint devices

(See CAR OPS-1.730(a)(3))

(1) General

A child restraint device (CRD) is considered to be acceptable if:

(a) It is a ‘supplementary loop belt’ manufactured with the same techniques and the same materials of the approved safety belts; or

(b) It complies with paragraph (2).

(2) Acceptable CRDs

Provided the CRD can be installed properly on the respective aircraft seat, the following CRDs are considered “acceptable”:

(a) Types of CRDs

i. CRDs approved for use in aircraft only by any JAA Authority, the FAA or Transport Canada (on the basis of a national technical standard) and marked accordingly.

ii. CRDs approved for use in motor vehicles according to the UN standard ECE R 44, -03 or later series of Amendments; or

iii. CRDs approved for use in motor vehicles and aircraft according to Canadian CMVSS 213/213.1; or

iv. CRDs approved for use in motor vehicles and aircraft according to US FMVSS No. 213 and are manufactured to these standards on or after February 26, 1985. US approved CRDs manufactured after this date must bear the following labels in red lettering:
   1) "THIS CHILD RESTRAINT SYSTEM CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS "and
   2) "THIS RESTRAINT IS CERTIFIED FOR USE IN MOTOR VEHICLES AND AIRCRAFT".

v. CRDs qualified for use in aircraft according to the German "Qualification Procedure for Child Restraint Systems for Use in Aircraft" (TÜV Doc.: TÜV/958-01/2001).

(b) Devices approved for use in cars manufactured and tested to standards equivalent to those listed in 2(a) (i) to (v) inclusive, which are acceptable to the Authority. The device must be marked with an associated qualification sign, which shows the name of the qualification organisation and a specific identification number, related to the associated qualification project.

(c) The qualifying organization shall be a competent and independent organization that is acceptable to the Authority.

(3) Location

(a) Forward facing CRDs may be installed on both forward and rearward facing passenger seats but only when fitted in the same direction as the passenger seat on which it is positioned. Rearward facing CRDs can only be installed on forward facing passenger seats. A CRD may not be installed within the radius of action of an airbag, unless it is obvious that the airbag is de-activated or it can be demonstrated that there is no negative impact from the airbag.

(b) A child in a restraint device should be located as near to a floor level exit as feasible.

(c) A child in a restraint device should be seated in accordance with CAR OPS-1.280 and IEM OPS-1.280, "Passenger Seating" so as to not hinder evacuation for any passenger.

(d) A child in a restraint device should neither be located in the row leading to an emergency exit nor located in a row immediately forward or aft of an emergency exit. A window passenger seat is the preferred location. An aisle passenger seat or a cross aisle passenger seat is not recommended.

(e) Other locations may be acceptable provided the access of neighbor passengers to the nearest aisle is not obstructed by the CRD.

(f) In general, only one CRD per row segment is recommended. More than one CRD per row segment is allowed if the children are from the same family or travelling group provided the children are accompanied by a responsible person sitting next to them.

(g) A Row Segment is the fraction of a row separated by two aisles or by one aisle and the aircraft fuselage.

(4) Installation

(a) CRDs shall only be installed on a suitable aircraft seat with the type of connecting device they are approved or qualified for. e.g., CRDs to be connected by a three- point harness only (most rearward facing baby CRDs currently available) shall not be attached to an aircraft seat with a lap belt only, a CRD designed to be attached to a vehicle seat by means of rigid bar lower anchorages (ISO-FIX or US equivalent) only, shall only be used on aircraft seats that are equipped with such connecting devices and shall not be attached by the aircraft seat lap belt. The method of connecting must be clearly shown in the manufacturer's instructions to be provided with each CRD.

(b) All safety and installation instructions must be followed carefully by the responsible person accompanying the infant. Cabin crew should prohibit the use of any inadequately installed CRD or not qualified seat.

(c) If a forward facing CRD with a rigid backrest is to be fastened by a lap belt, the restraint device should be fastened when the backrest of the passenger seat on which it rests is in a reclined position. Thereafter, the backrest is to be positioned upright. This procedure ensures better tightening of the CRD on the aircraft seat if the aircraft seat is reclinable.

(d) The buckle of the adult safety belt must be easily accessible for both opening and closing, and must be in line with the seat belt halves (not canted) after tightening.

(e) Forward facing restraint devices with an integral harness must not be installed such that the adult safety belt is secured over the child.

(5) Operation

(a) Each CRD shall remain secured to a passenger seat during all phases of flight, unless it is properly stowed when not in use.

(b) Where a CRD is adjustable in recline it must be in an upright position for all occasions when passenger restraint devices are required to be used according to CAR OPS1.320(c)(2).

IEM OPS-1.740 Placards

(See CAR OPS-1.740)

The markings required must:

(1) Be painted, or affixed by other equally permanent means;

(2) Be red in colour, and in any case in which the colour of the adjacent back-ground is such as to render red markings not readily visible, be outlined in white or some other contrasting colour in such a manner as to render them readily visible;

(3) Be kept at all times clean and un-obscured.

AMC OPS-1.745 First-Aid Kits

(See CAR OPS-1.745)

List of contents in a First Aid Kit would include:

(1) Antiseptic swabs (10 packs)
(2) Bandage, adhesive strips
(3) Bandage, gauze 7.5 cm x 4.5m
(4) Bandage, triangular 100 cm. folded and safety pins;
(5) Dressing, burn 10 x 10cm;
(6) Dressing, compress, sterile 7.5cm x 12cm. approx.;
(7) Dressing, gauze, sterile 10.4x10.4cm. approx.;
(8) Adhesive tape, 2.5cm (roll);
(9) Skin closure strips;
(10) Hand cleanser or antiseptic cleansing swabs;
(11) Pad for shield or tape for eye;
(12) First Aid Scissors or trauma shears, 10cm (maximum)
(13) Adhesive tape, surgical 1.2 cm x 4.6 m;
(14) Tweezers, splinter;
(15) Disposable gloves (several pairs);
(16) Thermometers (non-mercury);
(17) Resuscitation mask with one way valve;
(18) First aid manual (an operator may decide to have one manual per aircraft I an early accessible location)
(19) Incident record form.

First aid kit could include the following medications.

(1) Mild to moderate analgesic
(2) Antiemetic
(3) Nasal decongestant

(4) Antacid
(5) Antihistamine
(6) Antidiarrheal
(7) Antibiotic burn cream
(8) Hydrocortisone sunburn cream

A list of contents in 2 languages (English and Arabic) will be placed inside the First Aid Kit tamperproof box. This list will also include information on the effects and side effects of medications carried.

AMC OPS-1.755 Emergency Medical Kit

(See CAR OPS-1.755)

(1) The following should be included in the emergency medical kit carried in the aeroplane: Sphygmomanometer – non mercury
(2) Stethoscope
(3) Syringes and needles Oropharyngeal airways (2 sizes) Tourniquet
(4) Coronary vasodilator e.g. nitro-glycerine, Anti-smasmodic e.g. hyascene Epinephrine 1:1,000
(5) Adrenocortical steroid e.g. hydrocortisone Major analgesic e.g. nalbuphine
(6) Diuretic e.g. fursemide
(7) Antihistamine e.g. diphenhydramine hydrochloride Sedative/anticonvulsant e.g. diazepam
(8) Medication for Hypoglycaemia, hypertonic glucose and/or glucagon Antiemetic e.g. metoclopramide
(9) Atropine Digoxin
(10) Disposable Gloves
(11) Bronchial Dilator – injectable and inhaled form
(12) Needle Disposal Box
(13) Catheter
(14) A list of contents in 2 languages (English and Arabic). This should include information on the effects and side effects of drugs carried.

IEM OPS-1.760 First-aid Oxygen

(See CAR OPS-1.760)

(1) First–aid oxygen is intended for those passengers who, having been provided with the supplemental oxygen required under CAR OPS-1.770, still need to breathe undiluted oxygen when the amount of supplemental oxygen has been exhausted.
(2) When calculating the amount of first-aid oxygen, an operator should take into account the fact that, following a cabin depressurisation, supplemental oxygen as calculated in accordance with Appendix 1 to CAR OPS-1.770 should be sufficient to cope with hypoxic problems for:
   (a) all passengers when the cabin altitude is above 15,000 ft; and
   (b) a proportion of the passengers carried when the cabin altitude is between 10,000 ft and 15,000 ft.
(3) For the above reasons, the amount of first-aid oxygen should be calculated for the part of the flight after cabin depressurisation during which the cabin altitude is between 8,000 ft and 15,000 ft, when supplemental oxygen may no longer be available.
(4) Moreover, following cabin depressurisation an emergency descent should be carried out to the lowest altitude compatible with the safety of the flight. In addition, in these circumstances, the aeroplane should land at the first available aerodrome at the earliest opportunity.
(5) The conditions above should reduce the period of time during which the first-aid oxygen may be required and consequently should limit the amount of first-aid oxygen to be carried on board.

IEM OPS-1.770 Supplemental Oxygen – Pressurised Aeroplanes

(See CAR OPS-1.770)

(1) A quick donning mask is the type of mask that:
   (a) Can be placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand and within 5 seconds and will thereafter remain in position, both hands being free;
   (b) Can be put on without disturbing eye glasses and without delaying the flight crew member from proceeding with assigned emergency duties;
   (c) After being put on, does not prevent immediate communication between the flight crew members and other crew members over the aeroplane intercommunication system;
   (d) Does not inhibit radio communications.

(2) In determining the supplemental oxygen for the routes to be flown, it is assumed that the aeroplane will descend in accordance with the emergency procedures specified in the Operations Manual, without exceeding its operating limitations, to a flight altitude that will allow the flight to be completed safely (i.e. flight altitudes ensuring adequate terrain clearance, navigational accuracy, hazardous weather avoidance etc.)

Appendix 1 to CAR OPS-1.770 Supplemental Oxygen – Minimum Requirements for Pressurised Aeroplanes

(a)	(b)
SUPPLY FOR:	**DURATION AND CABIN PRESSURE ALTITUDE**
1. All occupants of flight deck seats on flight deck duty	Entire flight time when the cabin pressure altitude exceeds 13,000 ft and entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 13 000 ft after the first 30 minutes at those altitudes, but in no case less than: (1) 30 minutes for aeroplanes certificated to fly at altitudes not exceeding 25,000 ft (Note 2) (2) 2 hours for aeroplanes certificated to fly at altitudes more than 2,000 ft (Note 3).
2. All required cabin crew members	Entire flight time when cabin pressure altitude exceeds 13,000 ft but not less than 30 minutes (Note 2), and entire flight time when cabin pressure altitude is greater than 10,000 ft but does not exceed 13,000 ft after the first 30 minutes at these altitudes.
3. 100% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 15,000 ft but in no case less than 10 minutes. (Note 4)
4. 30% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 14,000 ft but does not exceed 15,000 ft.
5. 10% of passengers (Note 5)	Entire flight time when the cabin pressure altitude exceeds 10,000 ft but does not exceed 14,000 ft after the first 30 minutes at these altitudes.

Note 1: The supply provided must take account of the cabin pressure altitude and descent profile for the routes concerned.

Note 2: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certificated operating altitude to 10,000 ft in 10 minutes and followed by 20 minutes at 10,000 ft.

Note 3: The required minimum supply is that quantity of oxygen necessary for a constant rate of descent from the aeroplane's maximum certificated operating altitude to 10 000 ft in 10 minutes and followed by 110 minutes at 10,000 ft. The oxygen required in CAR OPS-1.780(a)(1) may be included in determining the supply required.

Note 4: The required minimum supply is that quantity of oxygen necessary for a constant rate of *descent from the aeroplane's maximum certificated operating altitude to 15,000 ft in 10 minutes.*

Note 5: For the purpose of this table 'passengers' means passengers actually carried and includes infants.

AC OPS-1.770(b)(2)(v) Supplemental Oxygen - Pressurised Aeroplanes (Not certificated to fly above 25,000 ft)

(See CAR OPS-1.770 (b)(2)(v))

(1) With respect to CAR OPS-1.770(b)(2)(v) the maximum altitude up to which an aeroplane can operate, without a passenger oxygen system installed and capable of providing oxygen to each cabin occupant, should be established using an emergency descent profile which takes into account the following conditions:
   (a) 17 seconds time delay for pilot's recognition and reaction including mask donning, for trouble shooting and configuring the aeroplane for the emergency descent;
   (b) maximum operational speed (VMO) or the airspeed approved in the Aeroplane Flight Manual for emergency descent, whichever is the less;
   (c) all engines operative;
   (d) the estimated mass of the aeroplane at the top of climb.

(2) Emergency descent data (charts) established by the aeroplane manufacturer and published in the Aeroplane Operating Manual and/or Aeroplane Flight Manual should be used to ensure uniform application of the rule.

(3) On routes where the oxygen is necessary to be carried for 10% of the passengers for the flight time between 10,000ft and 13,000ft the oxygen may be provided either:
   (a) by a plug-in or drop-out oxygen system with sufficient outlets and dispensing units uniformly distributed throughout the cabin so as to provide oxygen to each passenger at his own discretion when seated on his assigned seat; or:
   (b) by portable bottles when a fully trained cabin crew member is carried on board of each such flight.

Appendix 1 to CAR OPS-1.775 Supplemental Oxygen for Non-Pressurised Aeroplanes

(a)	(b)
SUPPLY FOR:	**DURATION AND PRESSURE ALTITUDE**
(1) All occupants of flight deck seats on flight deck duty	Entire flight time at pressure altitudes above 10,000 ft
(2) All required cabin crew members	Entire flight time at pressure altitudes above 13,000 ft and for any period exceeding 30 minutes at pressure altitudes above 10,000 ft but not exceeding 13,000 ft
(3) 100% of passengers (See Note)	Entire flight time at pressure altitudes above 13,000 ft.
(4) 10% of passengers (See Note)	Entire flight time after 30 minutes at pressure altitudes greater than 10 000 ft but not exceeding 13,000 ft.

Note: For the purpose of this table 'passengers' means passengers actually carried and includes infants under the age of two (2) years.

Appendix 1 to CAR-OPS 1.785 HUD, VS or Equivalent Head Up Display (HUD), Vision System (VS) or Equivalent

(SeeCAR-OPS-1.785)

Introduction

The material in this attachment provides guidance for certified HUD and vision systems intended for operational use in aircraft engaged in international air navigation. A HUD, vision systems and hybrid systems may be installed and operated to provide guidance, enhance situational awareness and/or to obtain an operational credit by establishing minima below the aerodrome operating minima, for approach ban purposes, or reducing the visibility requirements or requiring fewer ground facilities as compensated for by airborne capabilities. HUD and vision systems may be installed separately or together as part of a hybrid system. Any operational credit to be obtained from their use require approval from the State of Registry/ Operator.

Note 1: "Vision systems" is a generic term referring to the existing systems designed to provide images, i.e. enhanced vision systems (EVS), synthetic vision systems (SVS) and combined vision systems (CVS).

Note 2: Operational credit can be granted only within the limits of the design approval.

Note 3: Currently, operational credit has been given only to vision systems containing an image sensor providing a real-time image of the actual external scene on the HUD.

1. HUD and equivalent displays

1.1 General

1.1.1 A HUD presents flight information into the pilot's forward external field of view without significantly restricting that external view.

1.1.2 A variety of flight information may be presented on a HUD depending on the intended flight operation, flight conditions, systems capabilities and operational approval. A HUD may include, but is not limited to, the following:

(a) airspeed;
(b) altitude;
(c) heading;
(d) vertical speed;
(e) angle of attack;
(f) flight path or velocity vector;
(g) attitude with bank and pitch references;
(h) course and glide path with deviation indications;
(i) status indications(e.g. navigation sensor, autopilot, flight director); and
(j) alerts and warning displays(e.g. ACAS, wind shear, ground proximity warning).

1.2 Operational applications

1.2.1 Flight operations with a HUD can improve situational awareness by combining flight information located on head-down displays with the external view to provide pilots with more immediate awareness of relevant flight parameters and situation information while they continuously view the external scene. This improved situational awareness can also reduce errors in flight operations and improve the pilot's ability to transition between instrument and visual references as meteorological conditions change. Flight operations applications may include the following:

(a) enhanced situational awareness during all flight operations, but especially during taxi, take-off, approach and landing;
(b) reduced flight technical error during take-off, approach and landing; and
(c) improvements in performance due to precise prediction of touchdown area, tail strike awareness/warning and rapid recognition of and recovery from unusual attitudes.

1.2.2 A HUD may be used for the following purposes:

(a) to supplement conventional flight deck instrumentation in the performance of a particular task or operation. The primary cockpit instruments remain the primary means for manually controlling or manoeuvring the aircraft; and (b) as a primary flight display;

(i) information presented by the HUD may be used by the pilot in lieu of scanning head-down displays. Operational approval of a HUD for such use allows the pilot to control the aircraft by reference to the HUD for approved ground or flight operations; and

(ii) information presented by the HUD may be used as a means to achieve additional navigation or control performance. The required information is displayed on the HUD. Operational credit, in the form of lower minima, for a HUD used for this purpose may be approved for a particular aircraft or automatic flight control system. Additional credit may also be allowed when conducting HUD operations in situations where automated systems are otherwise used.

1.2.3 A HUD, as a stand-alone system, may qualify for operations with reduced visibility or RVR or replace some parts of the ground facilities such as touchdown zone and/or centre line lights. Examples and references to publications in this regard can be found in the Manual of All-Weather Operations(Doc 9365).

1.2.4 A HUD equivalent display is one that has at least the following characteristics; a head-up presentation not requiring transition of visual attention from head down to head up; displays sensor- derived imagery conformal with the pilot's external view; permits simultaneous view of the EVS sensor imagery, required aircraft flight symbology, and the external view; and display characteristics and dynamics are suitable for manual control of the aircraft. Before such systems can be used, the appropriate airworthiness and operational approvals should be obtained.

1.3 HUD training

1.3.1 Training requirements should be established, monitored and approved by the Authority of the State of Registry for general aviation. Training requirements should include requirements for recent experience if the State determines that these requirements are significantly different than the current requirements for the use of conventional head- down instrumentation.

1.3.2 HUD training should address all flight operations for which the HUD is designed and operationally approved. Some training elements may require adjustments based on whether the aeroplane has a single or dual HUD installation. Training should include contingency procedures required in the event of head-up display degradation or failure. HUD training should include the following elements as applicable to the intended use:

(a) an understanding of the HUD, its flight path, energy management concepts and symbology. This should include operations during critical flight events (e.g. ACAS Traffic Advisory/Resolution Advisory, upset and wind shear recovery, engine or system failure);

(b) HUD limitations and normal procedures, including maintenance and operational checks performed to ensure normal system function prior to use. These checks include pilot seat adjustment to attain and maintain appropriate viewing angles and verification of HUD operating modes;

(c) HUD use during low visibility operations, including taxi, take-off, instrument approach and landing in both day and night conditions. This training should include the transition from head down to head-up and head-up to head-down operations;

(d) failure modes of the HUD and the impact of the failure modes or limitations on crew performance;

(e) crew coordination, monitoring and verbal call-out procedures for single HUD installations with head-down monitoring for the pilot not equipped with a HUD and head-up monitoring for the pilot equipped with a HUD;

(f) crew coordination, monitoring and verbal call-out procedures for dual HUD installations with use of a HUD by the pilot flying the aircraft and either head-up or head-down monitoring by the other pilot;

(g) consideration of the potential for loss of situational awareness due to "tunnel vision" (also known as cognitive tunnelling or attention tunnelling);

(h) any effects that weather, such as low ceilings and visibilities, may have on the performance of a

(i) HUD; and

(j) HUD airworthiness requirements.

2. Vision systems

2.1 General

2.1.1 Vision systems can display electronic real-time images of the actual external scene achieved through the use of image sensors (EVS) or display synthetic images, which are derived from the onboard avionic systems (SVS). Vision systems can also consist of a combination of these two systems or combined vision systems (CVS). Such a system may display electronic real-time images of the external scene using the EVS component of the system. However, the merging of EVS and SVS into a CVS is dependent on the intended function (e.g. whether or not there is intent to achieve operational credit).

2.1.2 The information from vision systems may be displayed on a head-up or head-down display. When enhanced vision imagery is displayed on a HUD, it should be presented to the pilot’s forward external field of view without significantly restricting that external view.

2.1.3 The enhanced position fixing and guidance provided by SVS may provide additional safety for all phases of flight especially low visibility taxi, take-off, approach and landing operations.

2.1.4 Light emitting diode (LED) lights may not be visible to infrared-based vision systems due to the fact that LED lights are not incandescent and they do not have a significant heat signature. Operators of such vision systems will need to acquire information about the LED implementation programmes at aerodromes where they operate.

2.2 Operational applications

2.2.1 Flight operations with enhanced vision image sensors allow the pilot to view an image of the external scene obscured by darkness or other visibility restrictions. When the external scene is partially obscured, enhanced vision imaging may allow the pilot to acquire an image of the external scene earlier than with natural or unaided vision. The improved acquisition of an image of the external scene may improve situational awareness.

2.2.2 Vision system imagery may also allow pilots to detect terrain or obstructions on the runway or taxiways. A vision system image can also provide visual cues to enable earlier runway alignment and a more stabilized approach.

2.2.3 The combined display of aircraft performance, guidance and imagery may allow the pilot to maintain a more stabilized approach and smoothly transition from enhanced visual references to natural visual references.

2.3 Vision systems training

2.3.1 Training requirements should be established, monitored and approved by the Authority. Training requirements should include recency of experience requirements if the Authority determines that these requirements are significantly different than the current requirements for the use of a HUD without enhanced vision imagery or conventional head-down instrumentation.

2.3.2 Training should address all flight operations for which the vision system is approved. This training should include contingency procedures required in the event of system degradation or failure. Training for situational awareness should not interfere with other required operations. Training for operational credit should also require training on the applicable

HUD used to present the enhanced visual imagery. Training should include the following elements as applicable:

(a) an understanding of the system characteristics and operational constraints;
(b) normal procedures, controls, modes and system adjustments (e.g. sensor theory including radiant versus thermal energy and resulting images);
(c) operational constraints, normal procedures, controls, modes and system adjustments;
(d) limitations;
(e) airworthiness requirements;
(f) vision system display during low visibility operations, including taxi, take-off, instrument approach and landing; system use for instrument approach procedures in both day and night conditions;
(g) failure modes and the impact of failure modes or limitations upon crew performance, in particular, for two-pilot operations;
(h) crew coordination and monitoring procedures and pilot call-out responsibilities;
(i) transition from enhanced imagery to visual conditions during runway visual acquisition;
(j) rejected landing: with the loss of visual cues of the landing area, touchdown zone or rollout area;
(k) any effects that weather, such as low ceilings and visibilities, may have on the performance of the vision system; and
(l) effects of aerodrome lighting using LED lights.

2.4 Operational concepts

2.4.1 Instrument approach operations that involve the use of vision systems include the instrument phase and the visual phase. The instrument phase ends at the published MDA/H or DA/H unless a missed approach is initiated. The continued approach to landing from MDA/H or DA/H will be conducted using visual references. The visual references will be acquired by use of an EVS or CVS, natural vision or a combination of the two.

2.4.2 Down to a defined height, typically 30 m (100 ft), the visual references will be acquired by means of the vision system. Below this height the visual references should be solely based on natural vision. In the most advanced applications, the vision system is expected to be able to be used down to touchdown without the requirement for natural vision acquisition of visual references. Using the EVS or CVS does not change the classification of an instrument approach procedure, since the published DA/H remains unchanged and manoeuvring below DA/H is conducted by visual references acquired by means of the an EVS or CVS.

2.4.3 In addition to the operational credit that EVS/CVS is able to provide, these systems may also provide an operational and safety advantage through improved situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for Type A approach operations than for Type B approach operations

2.5 Visual references

2.5.1 The required visual references do not change due to the use of an EVS or CVS, but those references are allowed to be acquired by means of either vision system until a certain height during the approach.

2.5.2 In regions that have developed requirements for operations with vision systems, the visual references are indicated in Table 2.B-1.

Table2.B-1

OPERATIONS BELOW DA/DH OR MDA/MDH	
Example 1	**Example 2**
For procedures designed to support Type A operations, the following visual references for the intended runway should be distinctly visible and identifiable: (a) the approach lighting system; or (b) the runway threshold, identified by at least one of the following: − the beginning of the runway landing surface; − threshold lights; or − runway end identifier lights; and (c) the touchdown zone, identified by at least one of the following: − the runway touchdown zone landing surface; − touchdown zone lights; − touchdown zone markings; or − runway lights.	For procedures designed to support 3D Type A and Type B Cat I operations, the following visual references should be displayed and identifiable to the pilot on the EVS image: (a) elements of the approach lighting system; or (b) the runway threshold, identified by at least one of the following: − the beginning of the runway landing surface; − threshold lights; − threshold identification lights; or − the touchdown zone, identified by at least one of the following: (c) the runway touchdown zone landing surface; - touchdown zone lights; - touchdown zone markings; or - runway lights
Operations below 60 m (200 ft) above touchdown zone elevation –	Operations below 60 m (200 ft) above threshold elevation –
No additional requirements apply at 60 m (200 ft)	For procedures designed to support 3D Type A operations, the visual references are the same as those specified below for Type B Cat I
Operations below 30 m (100 ft) above touchdown zone elevation –	Operations below 30 m (100 ft) above threshold elevation –
The visibility should be sufficient for the following to be distinctly visible and identifiable to the pilot without reliance on the EVS: (a) the lights or markings of the threshold; or (b) the lights or markings of the touchdown zone.	For procedures designed to support Type B Cat II operations, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot without reliance on the EVS: (a) the lights or markings of the threshold; or (b) the lights or markings of the touchdown zone.

3. Hybrid systems

3.1 A hybrid system generically means that two or more systems are combined. The hybrid system typically has improved performance compared to each of the component systems, which in turn may qualify for operational credit. Vision systems are normally part of a hybrid system, e.g. EVS is typically combined with a HUD. Including more components in the hybrid system normally enhances the performance of the system.

3.2 Table 2.B-2 provides some examples of hybrid system components. Any combination of the listed systems may constitute a hybrid system. The degree of operational credit that may be given to a hybrid system depends on its performance (accuracy, integrity and availability) as assessed and determined by the certification and operational approval processes.

Table 2.B-2. Examples of Hybrid system components

Systems based on image sensors	Systems not based on image sensors
EVS • Passive infrared sensors • Active infrared sensors • Passive millimetre wave radiometer • Active millimetre wave radar	SVS
	Auto-flight systems, flight control computers, automatic landing systems
	Systems for position fixing
CVS (where the EVS component as above qualifies for operational credit)	CVS (the SVS component)
	HUD, equivalent display
	ILS, GNSS

4. Operational credits

4.1 Aerodrome operating minima are expressed in terms of minimum visibility/RVR and MDA/H or DA/H. With respect to operational credit this means that the visibility/RVR requirements, established in the instrument approach procedure, may be reduced or satisfied for aircraft equipped with appropriately approved vision systems such as EVS. Reasons for granting operational credit may be when aircraft are better equipped than what was originally considered when designing the instrument approach procedure or when runway visual aids considered in the design of the procedure are not available but can be compensated by on-board equipment.

4.2 Credits related to visibility/RVR can be given using at least three concepts. The first concept is to reduce the required RVR which will allow the aircraft to continue the approach beyond the approach ban point with a reported RVR lower than what was established for the approach procedure. Where a minimum visibility is prescribed, a second concept to grant operational credit may be used. In this case, the required minimum visibility is kept unchanged, but it is satisfied by means of the on-board equipment, typically an EVS. The result of both these concepts is that operations are allowed in meteorological conditions where otherwise they would not be possible. A third concept is to give operational credit by

allowing operations in visibility/RVR which are not lower than those established for the approach procedure, but the approach operation is conducted with less facilities on the ground. One example of the latter is to allow category II operations without touchdown and/or centre line lights, compensated by additional on-board equipment, e.g. a HUD.

4.3 Granting operational credits does not affect the classification of an instrument approach procedure since, instrument approach procedures are designed to support a given instrument approach operation (i.e. Type, Category). However, the design of those procedures may not take into consideration on-board equipment that may compensate for facilities on the ground.

4.4 In order to provide optimum service, the ATS may have to be informed about the capabilities of the better-equipped aircraft, e.g. which is the minimum RVR required.

4.5 In addition to the operational credit that HUD, vision systems and hybrid systems are able to provide, these systems will also provide an operational and safety advantage through improved situational awareness, earlier acquisition of visual references and smoother transition to references by natural vision. These advantages are more pronounced for 3D Type A approach operations than for Type B approach operations.

5. Operational Procedures

5.1 It is not prohibited to use vision systems in connection with circling. However, due to the system layout of a vision system and the nature of a circling procedure, key visual references can be obtained only by natural vision, and operational credit is not feasible for existing vision systems. The vision system may provide additional situational awareness.

5.2 The operational procedures associated with the use of a HUD, vision systems and hybrid systems should be included in the operations manual. The instructions in the operations manual should include:

(a) any limitation that is imposed by the airworthiness or operational approvals; (b) how operational credit affects:

(1) flight planning with respect to destination and alternate aerodromes;
(2) ground operations;
(3) flight execution, e.g. approach ban and minimum visibility;
(4) crew resource management that takes into account the equipment configuration, e.g. the pilots may have different presentation equipment;
(5) standard operating procedures, e.g. use of auto-flight systems, call-outs that may be particular to the vision system or hybrid system, criteria for stabilized approach;
(6) ATS flight plans and radio communication.

6. Approvals

6.1 General

6.1.1 An operator that wishes to conduct operations with a HUD or equivalent display, vision system or hybrid system will need to obtain certain approvals (See Annex 6, Part I, 4.2.8.1.1 and 6.23, and the corresponding requirements in Annex 6, Parts II and III). The extent of the approvals will depend on the intended operation and the complexity of the equipment.

6.1.2 Enhanced vision imagery may be used to improve situational awareness without a specific operational approval. However, the standard operating procedures for these types of operations need to be specified in the operations manual. An example of this type of operation may include an EVS or an SVS on a head-down display that is used only for situational awareness of the surrounding area of the aircraft during ground operations where the display is not in the pilot's primary field of view. For enhanced situational awareness, the installation and operational procedures need to ensure that the operation of the vision system does not interfere with normal procedures or the operation or use of other aircraft systems. In some cases, modifications to these normal procedures for other aircraft systems or equipment may be necessary to ensure compatibility.

6.1.3 When a vision system or a hybrid system with vision systems imagery is used for operational credit, operational approvals will typically require that the imagery be combined with flight guidance and presented on a HUD. Operational approvals may require that this information also be presented on a head-down display. Operational credit may be applied for any flight operation, but credit for instrument approach and take-off operations is most common.

6.1.4 When the application for approval relates to operational credits for systems not including a vision system, the guidance in this attachment may be used to the extent applicable as determined by the Authority for general aviation.

6.1.5 Operators should be aware that some States may require some information about the operational credit(s) which has been granted by the Authority or the State of Registry for general aviation. Typically the approval from that State will have to be presented, and in some cases the State of the Aerodrome may wish to issue an approval or to validate the original approval.

6.2 Approvals for operational credit:

1. To obtain operational credit the operator will need to specify the desired operational credit and submit a suitable application. The content of a suitable application should include:

(a) Applicant details —– required for all approval requests. The official name and business or trading name(s), address, mailing address, e-mail address and contact telephone/fax numbers of the applicant.

Note: For AOC holders, the company name, AOC number and e-mail address should be required.

(b) Aircraft details — required for all approval requests. Aircraft make(s), model(s) and registration mark(s).

(c) Operator's vision system compliance list. The contents of the compliance list are included in Table 2.B-3. The compliance list should include the information that is relevant to the approval requested and the registration marks of the aircraft involved. If more than one type of aircraft/fleet is included in a single application a completed compliance list should be included for each aircraft/fleet.

(d) Documents to be included with the application. Copies of all documents referred to in column 4 of the operator's vision system compliance list (Table 2.B-3) should be included when returning the completed application form to the civil aviation Authority. There should no need to send complete manuals; only the relevant sections/pages should be required.

(e) Name, title and signature.

2. The Operator shall apply to the Authority for operational credit(s) authorization for operations with advanced aircraft. Where the operational credit relates to low visibility operations, the Authority shall issue a specific approval. Such authorizations shall not affect the classification of the instrument approach procedure.

   Note 1.- Operational credit includes:

   (a) For the purposes of an approach ban (An instrument approach shall not be continued below 300 m (1 000 ft) above the aerodrome elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the aerodrome operating minima) or dispatch considerations, a minimum below the aerodrome operating minima;

   Note1.-Guidance on operational credit and how to express the operational credit in the Operations Specifications is contained in the Manual of ALL-Weather Operations(ICAO Doc 9365)

3. The applicant for a specific approval for the operational credit, the Operator shall ensure that:

   a) The aeroplane meets the appropriate airworthiness certification requirements;
   b) the information necessary to support effective crew tasks for the operation is appropriately available to both pilots where the number of flight crew members specified in the operations manual is more than one;
   c) the operator has carried out a safety risk assessment of the operations supported by the equipment;
   d) the operator has established and documented normal and abnormal procedures and MEL;
   e) The operator has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;
   f) the operator has established a system for data collection, evaluation and trend monitoring for low visibility operations for which there is an operational credit; and
   g) the operator has instituted appropriate procedures in respect of continuing airworthiness (maintenance and repair) practices and programmes.

   Note 1. Guidance on Safety risk assessments is contained in ICAO Doc 9859

   Note 2. Guidance on Operational approvals is contained in ICAO Doc 9365

4. For operations with operational credit with minima above those related to low visibility operations, the operator shall comply with the Authority established criteria for the safe operation of the eroplane.

   Note. -Guidance on operational credit for operations with minima above those related to low visibility operations is contained in the Manual of All-Weather Operations (ICAO Doc 9365).

Table 2.B-3 Example of an AOC vision system compliance list

Main Heading	Expanded areas to be addressed by the application / Sub-requirements	Operator's operations manual reference or document reference
1. Reference documents used in compiling the submission	The submission should be based on current up-to-date regulatory material. A compliance statement showing how the criteria of the applicable regulations and requirements have been satisfied.	
2. Aircraft flight manual (AFM)	A copy of the relevant AFM entry showing the aircraft certification basis for the vision system and any operational conditions.	
3. Feedback and reporting of Significant problems	An outline of the process for the reporting of failures in the operational use of procedures. *Note: In particular, significant problems with the vision system/ HUD systems, reporting on circumstances/ locations where the vision system was unsatisfactory.*	

Main Heading	Expanded areas to be addressed by the application / Sub-requirements	Operator's operations manual reference or document reference
4. Instrument approach chart provider and operating minima	The name of the provider of the relevant instrument approach charts. Confirmation that all aerodrome operating minima are established in accordance with criteria specified by the relevant Authority.	
5.Operations manual entries and SOP Sub Requirements	Manufacturer/operator developed. Manufacturer's procedures are recommended as a starting point and should include at least the items in the sub-requirements below. Definitions. Check crew qualified for vision system/HUD operations. MEL handling. Equipment required for vision system operations. Types of approach where vision systems can be used. Statement that the autopilot/flight director should be used whenever possible. Minimum visual references for landing. Approach ban and RVR. Stabilized approach criteria. Correct seating and eye position. Crew coordination, e.g. duties of the pilot flying and the pilot not flying: - limitations; - designation of handling and non- handling pilots; - use of automatic flight control system; - checklist handling; - approach briefing; - radio communications handling; - monitoring and cross-checking of instruments and radio aids; and - use of the repeater display by the pilot not flying. Contingency procedures including: • failures above and below decision height; • ILS deviation warnings; • autopilot & auto-throttle disconnect; • electrical failures; • engine failure; • failures and loss of visual references at or below decision height; • vision system/HUD failure below normal decision height; • wind shear; • ACAS warnings; EGPWS warnings	
6. Safety risk assessment	Sub requirements: Operator's safety risk assessment	

AMC-1 OPS-1.790 Hand Fire Extinguishers

(See CAR OPS-1.790)

(1) The number and location of hand fire extinguishers should be such as to provide adequate availability for use, account being taken of the number and size of the passenger compartments, the need to minimise the hazard of toxic gas concentrations and the location of toilets, galleys etc. These considerations may result in the number being greater than the minimum prescribed.
(2) There should be at least one fire extinguisher suitable for both flammable fluid and electrical equipment fires installed on the flight deck. Additional extinguishers may be required for the protection of other compartments accessible to the crew in flight. Dry chemical fire extinguishers should not be used on the flight deck, or in any compartment not separated by a partition from the flight deck, because of the adverse effect on vision during discharge and, if conductive, interference with electrical contacts by the chemical residues.
(3) Where only one hand fire extinguisher is required in the passenger compartments it should be located near the cabin crew member's station, where provided.
(4) Where two or more hand fire extinguishers are required in the passenger compartments and their location is not otherwise dictated by consideration of paragraph (1) above, an extinguisher should be located near each end of the cabin with the remainder distributed throughout the cabin as evenly as is practicable.
(5) Unless an extinguisher is clearly visible, its location should be indicated by a placard sign or an appropriate symbol.

AMC-2 OPS-1.790 Hand Fire Extinguishers

Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in an aeroplane 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 an aeroplane for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall:

(a) meet the applicable minimum performance requirements of the State of Registry; and

(b) not be of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.

Note: Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.

AMC OPS-1.810 Megaphones

(See CAR OPS-1.810)

(1) Where one megaphone is required, it should be readily accessible from a cabin crew member's assigned seat. Where two or more megaphones are required, they should be suitably distributed in the passenger cabin(s) and readily accessible to crew members assigned to direct emergency evacuations.
(2) This does not necessarily require megaphones to be positioned such that they can be reached by a crew member when strapped in a cabin crew member's seat.
(3) In the event of a known emergency situation, where the use of the megaphone may be required it should be relocated to a position readily accessible to the cabin crew member's seat.

AC OPS-1.820 Emergency Locator Transmitter (ELT)

(See CAR OPS-1.820, CAR OPS-1.830(c) and CAR OPS-1.835(b))

(1) An Emergency Locator Transmitter (ELT) is a generic term describing equipment which broadcasts distinctive signals on designated frequencies and, depending on application, may be activated by impact or be manually activated. An ELT is one of the following:
   - (a) Automatic Fixed (ELT(AF)). An automatically activated ELT which is permanently attached to an aircraft;
   - (b) Automatic Portable (ELT(AP)). An automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft;
   - (c) Automatic Deployable (ELT(AD)). An ELT, which is rigidly attached to the aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided;
   - (d) 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.

(2) An automatic portable ELT, (ELT(AP)), as installed in accordance with CAR OPS-1.820, may be used to replace one ELT(S) provided that it meets the ELT(S) requirements. A water activated ELT(S) is not an ELT(AP).

IEM OPS-1.825 Life Jackets

(See CAR OPS-1.825)

For the purpose of CAR OPS-1.825, seat cushions are not considered to be flotation devices when calculating the number of life jackets required to be on the aircraft.

AMC OPS-1.830(b)(2) Life-rafts and ELT for extended overwater flights

(See CAR OPS-1.830(b)(2))

(1) The following should be readily available with each life-raft:
   - (a) Means for maintaining buoyancy;
   - (b) A sea anchor:
   - (c) Life-lines, and means of attaching one life-raft to another;
   - (d) Paddles for life-rafts with a capacity of 6 or less;
   - (e) Means of protecting the occupants from the elements;
   - (f) A water-resistant torch;
   - (g) Signalling equipment to make the pyrotechnical distress signals described in ICAO Annex 2;
   - (h) 100 g of glucose tablet for each 4, or fraction of 4, persons which the life-raft is designed to carry:
   - (i) At least 2 litres of drinkable water provided in durable containers or means of making sea water drinkable or a combination of both; and (j) First-aid equipment.
   - (j) As far as practicable, items listed above should be contained in a pack.

IEM OPS-1.835 Survival Equipment

(See CAR OPS-1.835)

(1) The expression 'Areas in which search and rescue would be especially difficult' should be interpreted in the context of this CAR as meaning:
   - (a) Areas so designated by the State responsible for managing search and rescue; or
   - (b) Areas that are largely uninhabited and where:
      - i. The State responsible for managing search and rescue has not published any information to confirm that search and rescue would not be especially difficult; and

ii. The State referred to in (a) above does not, as a matter of policy, designate areas as being especially difficult for search and rescue.

AMC OPS-1.835(c) Survival Equipment

(See CAR OPS-1.835(c))

(1) At least the following survival equipment should be carried when required:

(a) Two (2) litres of drinkable water for each 50, or fraction of 50, persons on board provided in durable containers;
(b) One knife;
(c) One set of Air/Ground codes;
(d) In addition, when polar conditions are expected, the following should be carried:
(e) A means for melting snow;
(f) Sleeping bags for use by 1/3 of all persons on board and space blankets for the remainder or space blankets for all passengers on board;
(g) One (1) Arctic/Polar suit for each crew member carried.
(h) If any item of equipment contained in the above list is already carried on board the aeroplane in accordance with another requirement, there is no need for this to be duplicated.

SUBPART L – COMMUNICATION AND NAVIGATION EQUIPMENT

CAR OPS-1.845 General introduction

(See GM OPS-1.845)

(a) An operator shall ensure that a flight does not commence unless the communication and navigation equipment required under this Subpart is:
  (1) Approved and installed in accordance with the requirements applicable to them, including the minimum performance standard and the operational and airworthiness requirements;
  (2) Installed such that the failure of any single unit required for either communication or navigation purposes, or both, will not result in the failure of another unit required for communications or navigation purposes.
  (3) In operable condition for the kind of operation being conducted except as provided in the MEL (CAR OPS-1.030 refers); and
  (4) So arranged that if equipment is to be used by one flight crew member at his station during flight it must be readily operable from his station. When a single item of equipment is required to be operated by more than one flight crew member it must be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.

(b) Communication and navigation equipment minimum performance standards are those prescribed in the applicable Technical Standard Orders (TSO), unless different performance standards are prescribed in the operational or airworthiness codes. Communication and navigation equipment complying with design and performance specifications other than TSO on the date of CAR OPS-1 implementation may remain in service, or be installed, unless additional requirements are prescribed in this Subpart. Communication and navigation equipment which has already been approved does not need to comply with a revised TSO or a revised specification, other than TSO, unless a retroactive requirement is prescribed.

(c) An Operator shall obtain operational approval before operating in areas where compliance with Performance Based Communication and Surveillance (PBCS) requirements is specified. (See AMC 1.845(c))

CAR OPS-1.850 Radio Equipment

(a) An operator shall not operate an aeroplane unless it is equipped with radio required for the kind of operation being conducted.

(b) Where two independent (separate and complete) radio systems are required under this Subpart, each system must have an independent antenna installation except that, where rigidly supported non-wire antennae or other antenna installations of equivalent reliability are used, only one antenna is required.

(c) The radio communication equipment required to comply with paragraph (a) above must also provide for communications on the aeronautical emergency frequency 121·5 MHz.

CAR OPS-1.855 Audio Selector Panel

An operator shall not operate an aeroplane under IFR unless it is equipped with an audio selector panel accessible to each required flight crew member.

CAR OPS-1.860 Radio equipment for operations under VFR over routes navigated by reference to visual landmarks

An operator shall not operate an aeroplane under VFR over routes that can be navigated by reference to visual landmarks, unless it is equipped with the radio communication equipment necessary under normal operating conditions to fulfil the following:

(a) Communicate with appropriate ground stations;
(b) Communicate with appropriate air traffic control facilities from any point in controlled airspace within which flights are intended; and
(c) Receive meteorological information;

CAR OPS-1.865 Communication and Navigation equipment for operations under IFR, or under VFR over routes not navigated by reference to visual landmarks

(See AMC OPS-1.865) (See AC OPS-1.865 (c)(1)(i) & AC OPS-1.865(e))

(a) An operator shall not operate an aeroplane under IFR, or under VFR over routes that cannot be navigated by reference to visual landmarks, unless the aeroplane is equipped with radio communication and navigation equipment in accordance with the requirements of air traffic services in the area(s) of operation.
(b) *Radio equipment*. An operator shall ensure that radio equipment comprises not less than:
  (1) Two independent radio communication systems necessary under normal operating conditions to communicate with an appropriate ground station from any point on the route including diversions; and
  (2) SSR transponder equipment as required for the route being flown.
(c) *Navigation equipment.* An operator shall ensure that navigation equipment:
  (1) Comprises not less than:
    i. One VOR receiving system, one ADF system, one DME except that an ADF system need not be installed provided that the use of ADF is not required in any phase of the planned flight (See AC OPS-1.865(c)(1)(i));
    ii. One ILS or MLS where ILS or MLS is required for approach navigation purposes;
    iii. One Marker Beacon receiving system where a Marker Beacon is required for approach navigation purposes;
    iv. An Area Navigation System when area navigation is required for the route being flown;
    v. An additional DME system on any route, or part thereof, where navigation is based only on DME signals;
    vi. An additional VOR receiving system on any route, or part thereof, where navigation is based only on VOR signals; and
    vii. An additional ADF system on any route, or part thereof, where navigation is based only on NDB signals, or
  (2) Complies with the Required Navigation Performance (RNP) Type for operation in the airspace concerned. (See also CAR OPS-1.243.)
(d) An operator may operate an aeroplane that is not equipped with the navigation equipment specified in sub-paragraph(s) (c)(1)(vi) and/or (c)(1)(vii) above, provided that it is equipped with alternative equipment authorised, for the route being flown, by the Authority. The reliability and the accuracy of alternative equipment must allow safe navigation for the intended route.
(e) An operator shall ensure that VHF communication equipment, ILS Localiser and VOR receivers installed on aeroplanes to be operated in IFR are of a type that has been approved as complying with the FM immunity performance standards (See AC OPS- 1.865(e)).

CAR OPS-1.866 Transponder equipment

(See AMC OPS-1.866)

(a) An operator shall not operate an aeroplane unless it is equipped with;
  (1) A pressure altitude reporting SSR transponder; and
  (2) any other SSR transponder capability required for the route being flown.
(b) An operator shall ensure that that any aeroplane:
  (1) operating under IFR, are equipped with SSR transponders having the capabilities set

out in AMC OPS-1.866 Part 1;

(2) with a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots, operating flights under IFR or within controlled airspace, are equipped with SSR transponders having, in addition to the capabilities set out in AMC OPS-1.866 Part 1, 2 and 3. The ADS-B functionality shall be installed no later than the date of mandate of ADS-B (1 January 2020) (Also see CAR OPS1.867).

(c) An operator shall ensure that aircraft equipped in accordance with paragraph (b) and having a maximum certified take-off mass exceeding 5700 kg or having a maximum cruising true airspeed capability greater than 250 knots operate with antenna diversity as prescribed in paragraph 3.1.2.10.4 of ICAO Annex 10, Volume IV.

(d) All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

CAR OPS-1.867 ADS-B (OUT and IN)

(See AMC OPS 1.867 ADS-B)

ADS-B refers to automatic dependent surveillance - broadcast, a surveillance technique in which aircraft automatically provide, via a data link, data derived from on-board navigation and positionfixing systems. It refers to a surveillance technology where ADS-B Out equipped aircraft broadcast position, altitude, velocity, and other information in support of both air-to-ground and air-to-air surveillance applications.

(a) ADS-B OUT

An operator shall not operate an aeroplane under IFR after 01 January 2020, unless it is equipped with ADS-B OUT.

(b) ADS-B IN

An operator shall not operate an aeroplane equipped with the ADS-B IN capability unless approved by the CAA.

CAR OPS-1.870 Additional navigation equipment for operations in MNPS airspace

(See AC OPS-1.870)

(a) An operator shall not operate an aeroplane in MNPS airspace unless it is equipped with navigation equipment that complies with minimum navigation performance specifications prescribed in ICAO Doc 7030 in the form of Regional Supplementary Procedures.

(b) The navigation equipment shall continuously provide indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and

(c) The equipment shall be authorized by the Authority for the MNPS operations concerned.

(d) The navigation equipment required by this paragraph must be visible and usable by either pilot seated at his duty station.

(e) For unrestricted operation in MNPS airspace an aeroplane must be equipped with two independent Long Range Navigation Systems (LRNS).

(f) For operation in MNPS airspace along notified special routes an aeroplane must be equipped with one Long Range Navigation System (LRNS), unless otherwise specified.

CAR OPS-1.872 Equipment for operation in defined airspace with Reduced Vertical Separation Minima (RVSM)

(a) An operator shall ensure that aeroplanes operated in RVSM airspace are equipped with:

(1) Two independent altitude measurement systems;

(2) An altitude alerting system;

(3) An automatic altitude control system; and

(4) A secondary surveillance radar (SSR) transponder with altitude reporting system that can be connected to the altitude measurement system in use for altitude keeping.

SECTION 2 – SUBPART L – COMMUNICATIONS & NAVIGATION EQUIPMENT

AMC OPS-1.845(c) PBCS (Performance Based Communication Surveillance) Operational approval

(See CAR-OPS 1.845(c)) (Reference: ICAO Doc 9869 PBCS Manual, ICAO PBCS websites: https://www.icao.int/airnavigation/pbcs)

The following should be submitted by the applicant for an operation approval:

(a) Airspace PBCS specifications required to be met by the appropriate airspace authorities;

(b) The operator's documentation to ensure that it includes:

i. normal and abnormal procedures including contingency procedures in particular to ensure that the required Communications/Navigation/Surveillance (CNS) systems are operational and flight crews report any failure or malfunction of GNSS, ADS-C or CPDLC equipment to Air Traffic Control (ATC) as soon as it becomes apparent;

ii. flight crew qualification and proficiency requirements, in accordance with appropriate RCP/RSP specification(s);

iii. procedures to ensure that the planned use of associated communication and surveillance capabilities for the flight will be in accordance with regulations, policies and procedures in control areas for the flight, as published by the applicable States in their AIPs (or equivalent publications);

iv. procedures to ensure that the proper denotation of PBCS capabilities are included in the ICAO flight plan;

v. a training programme for relevant personnel (including required non-flight crew personnel) consistent with the intended operations; and vi. appropriate maintenance procedures to ensure continued airworthiness, in accordance with the appropriate RCP/RSP specification(s).

(c) Following means for demonstrating the aircraft eligibility and airworthiness compliance with the TCP/RSP allocations (any limitations, assumptions or specific procedures considered in the framework of the airworthiness approval must be addressed):

i. The aircraft manufacturer should demonstrate that the aircraft system meets the RCP/RSP allocations. For a FANS 1/A CPDLC and ADS-C aircraft system, RTCA DO306/EUROCAE ED122 is equivalent to RCP 240, RCP 400, RSP 180 and RSP 400 specifications. For an ATN B1 or FANS 1/A CPDLC aircraft system, RTCA DO-290/EUROCAE ED-120 provides performance criteria for the EUR Region.

ii. The aircraft manufacturer should also demonstrate that the aircraft meets the RCP/RSP integrity criteria and associated safety requirements. RCP/RSP integrity is typically shown by analysis, design, system architecture, and evaluations of HMI, taking into account flight crew training and qualification programmes instituted by the aircraft operator.

iii. The aircraft manufacturer should demonstrate that the aircraft system meets the RCP/RSP availability criteria. RCP/RSP availability is typically shown by the evaluation of equipment failure and the number of similar components (redundancy) installed on the aircraft. For voice communication, the number and types of radios required may be specified by operating rules and airspace requirements (i.e. the AIP or equivalent publication).

iv. The aircraft manufacturer should demonstrate that the aircraft system, when operating with a representative ATS system (i.e. simulation or real ground system), is capable of meeting the operational RCP/RSP time and continuity criteria.

v. The aircraft manufacturer should demonstrate that the aircraft system provides the flight crew with alerts in case of aircraft system or connectivity failures, causing the aircraft to be incapable of meeting the RCP/RSP specification.

vi. The aircraft manufacturer should identify any specific items related to PBCS capability in the master minimum equipment list (MMEL).

vii. The aircraft manufacturer supplier should identify the demonstrated PBCS capability of the aircraft, any associated operating limitations, information and procedures, in the flight manual.

(d) Means of ensuring that the aircraft system is properly maintained, including configuring user modifiable software, such as those used to manage communication media and routing policies, to meet the appropriate RCP/RSP specification(s).

(e) Means of ensuring compliance of contracted services, such as those with communication services providers (CSPs) with respect to PBCS operations. CSPs should be bound by contractual arrangements stipulating the RCP/RSP allocations, notification to ATS units, aircraft operators and others, as appropriate, of any failure condition that may impact PBCS operations, and any monitoring or recording requirements; and

(f) Documentation and maintenance of:

i. Operating procedures for the specific data link system(s) including use of message sets;

ii. Procedures for participation in PBCS monitoring programmes including problem reporting;

iii. Policies and procedures to control configuration of aircraft system including software; and communication subnetwork for managing media and routing.

Note: ICAO Doc 9869 (PBCS Manual) can be used as additional guidance for PBCS implementation and monitoring.

GM OPS-1.845 Communication and Navigation Equipment – Approval and Installation

(See CAR OPS-1.845)

(1) For Communication and Navigation Equipment required by CAR OPS-1 Subpart L, "Approved" means that compliance with the applicable TSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a TSO does not exist, the applicable airworthiness standards or equivalent apply unless otherwise prescribed in CAR OPS-1 or CAR-M.

(2) "Installed" means that the installation of Communication and Navigation Equipment has been demonstrated to comply with the applicable airworthiness requirements of CS-23/CS-25 (or an equivalent accepted by the CAA), or the relevant code used for an equivalent Type Certification, and any applicable requirement prescribed in CAR OPS-1.

(3) Communication and Navigation Equipment approved in accordance with design requirements and performance specifications other than TSOs, are acceptable for use or installation on aeroplanes operated for the purpose of commercial air transportation provided that any relevant OPS requirement is complied with.

(4) When a new version of a TSO (or of a specification other than a CS-TSO) is issued, Communication and Navigation Equipment approved in accordance with earlier requirements may be used or installed on aeroplanes operated for the purpose of commercial air transportation provided that such Communication and Navigation Equipment are operational, unless removal from service or withdrawal is required by means of an amendment to CAR OPS1 or CAR-M.

AMC OPS-1.865 Combinations of Instruments and Integrated Flight Systems

(See CAR OPS-1.865)

Individual requirements of CAR OPS-1.865 may be met by combinations of instruments or by integrated flight systems or by a combination of parameters on electronic displays provided that the information so available to each required pilot is not less than that provided by the instruments and associated equipment specified.

AC OPS-1.865(c)(1)(i) IFR operations without ADF system

(See CAR OPS-1.865(c)(1)(i))

(1) To perform IFR operations without an ADF system installed, an operator should consider the following guidelines on equipment carriage, operational procedures and training criteria.
(2) The removal/non-installation of ADF equipment from an aeroplane may only be done where it is not essential for navigation, provided that alternative equipment giving equivalent or enhanced navigation capability is carried. The carriage of an additional VOR receiver may accomplish this or a GNSS receiver approved for IFR operations.
(3) For IFR operations without ADF, an operator should ensure that:
   (a) route segments that rely solely on ADF for navigation are not flown;
   (b) a firm commitment is made not to fly any ADF/NDB procedures;
   (c) that the MEL has been amended to take account of the non-carriage of ADF;
   (d) that the Operations Manual does not reference any procedures based on NDB signals for the aeroplanes concerned;
   (e) that flight planning and dispatch procedures are consistent with the above-mentioned criteria.
(4) The removal of ADF should be taken into account by the operator in the initial and recurrent training of flight crew.

AC OPS-1.865(e) FM Immunity Equipment Standards

(See CAR OPS-1.865(e))

(1) FM immunity performance Standards for ILS Localiser, VOR receivers and VHF communication receivers have been incorporated in ICAO Annex 10, Volume I – Radio Navigation Aids Fifth Edition dated July 1996, Chapter 3, Paragraphs 3.1.4, 3.3.8 and Volume III, Part II – Voice Communications Systems, Paragraph 2.3.3.
(2) Acceptable equipment standards, consistent with ICAO Annex 10, are contained in EUROCAE Minimum Operational Performance Specifications, documents ED-22B for VOR receivers, ED23B for VHF communication receivers and ED-46B for LOC receivers and the corresponding RTCA documents DO-186, DO-195 and DO-196.

Note: Operations within the Oman FIR do not require FM Immunity.

AMC OPS-1.866 Transponder Equipment

(See CAR-OPS 1.866)

(A) Part 1: SSR transponder capabilities

(1) The minimum capability for the secondary surveillance transponder should be Mode S Level 2 certified in accordance with ICAO Annex 10, Volume IV, paragraphs 2.1.5.1.2, 2.1.5.1.7 and 3.1.2.10.
(2) Each implemented transponder register should be compliant with the corresponding section of ICAO Document 9871.
(3) The following data items should be made available to the transponder and be transmitted by the transponder via the Mode S protocol and in accordance with the formats specified in ICAO document 9871 (2nd edition):
   (a) 24-bit ICAO aircraft address;
   (b) Mode A code;
   (c) pressure altitude;
   (d) flight status (on the ground or airborne);
   (e) data link capability report;
      — airborne collision avoidance system (ACAS) capability,
      — Mode S specific services capability,

— aircraft identification capability,
— squitter capability,
— surveillance identifier capability,
— common usage Ground Initiated Comms.
— B (GICB) capability report (indication of change),
— Mode S subnetwork version number;

(f) common usage GICB capability report;
(g) aircraft identification;
(h) special position indication (SPI);
(i) emergency status (general emergency, no communications, unlawful interference) including the use of specific Mode A codes to indicate different emergency states;
(j) ACAS active resolution advisories when the aircraft is equipped with Traffic alert and collision avoidance system II (TCAS II).

(4) Other data items may be made available to the transponder.
(5) The data items referred to in para (4) should only be transmitted by the transponder via the Mode S protocol if the aircraft and equipment certification process covers the transmission of these data items via the Mode S protocol.
(6) The continuity of transponder functionality supporting the Mode S protocol should be equal to or less than 2. 10 -4 per flight hour (i.e. mean time between failure equal to or greater than 5 000 flight hours).

(B) Part 2: SSR transponder capabilities

(1) The minimum capability for the secondary surveillance transponder should be Mode S Level 2 certified in accordance with paragraphs 2.1.5.1.2, 2.1.5.1.6, 2.1.5.1.7 and 3.1.2.10 of ICAO Annex 10, Volume IV.
(2) Each implemented transponder register should be compliant with the corresponding section of ICAO document 9871.
(3) The following data items should be made available to the transponder and be transmitted by the transponder via Version 2 of the extended squitter (ES) ADS-B protocol in accordance with the formats specified in ICAO document 9871:

(a) 24-bit ICAO aircraft address;
(b) aircraft identification;
(c) Mode A code;
(d) special position indication (SPI) using the same source as for the same parameter specified in Part A;
(e) emergency status (general emergency, no communications, unlawful interference) using the same source as for the same parameter specified in Para A(3)(i) above;
(f) ADS-B version number (equal to 2);
(g) ADS-B emitter category;
(h) geodetic horizontal position in accordance with the world geodetic system revision 1984 (WGS84) latitude and longitude, both while airborne or on the ground;
(i) geodetic horizontal position quality indicators (corresponding to the integrity containment bound (NIC), 95 % navigation accuracy category for position (NAC p), source integrity level (SIL) and system design assurance level (SDA));
(j) pressure altitude using the same source as for the same parameter specified in Para A;
(k) geometric altitude in accordance with the world geodetic system revision 1984 (WGS84), provided in addition and encoded as a difference to pressure altitude;
(l) geometric vertical accuracy (GVA);
(m) velocity over ground, both while airborne (east/west and north/south

airborne velocity over ground) or on the ground (surface heading/ground track and movement);

(n) velocity quality indicator corresponding to navigation accuracy category for velocity (NAC v);

(o) coded aircraft length and width;

(p) global navigation satellite system (GNSS) antenna offset;

(q) vertical rate: barometric vertical rate using the same source as for the same parameter specified in the data item in point 2 (g) of Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol, or Global Navigation Satellite System (GNSS) vertical rate;

(r) mode control panel/flight control unit (MCP/FCU) selected altitude using the same source as for the same parameter specified in Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol; EN L 305/44 Official Journal of the European Union 23.11.2011

(s) barometric pressure setting (minus 800 hecto-Pascals) using the same source as for the same parameter specified in Part C when the aircraft is required and capable to transmit this data item via the Mode S protocol;

(t) ACAS active resolution advisories when the aircraft is equipped with TCAS II using the same source as for the same parameter specified in Part A.

(4) Surveillance data items (the data items in point 3(h), (k) and (m)) and their quality indicator data items (the data items in point 3(i), (l) and (n)) should be provided to the transponders on the same physical interface.

(5) The data source connected to the transponder and providing the data items in point 3(h) and (i) should meet the following data integrity requirements:

(a) horizontal position (data item in point 3(h)) source integrity level (SIL, expressed with respect to NIC) should be equal to or less than 10 -7 per flight-hour;

(b) horizontal position (data item in point 3(h)) integrity time to alert (leading to a change of the NIC quality indicator), if on-board monitoring is required to meet the horizontal position source integrity level, should be equal to or less than 10 seconds.

(6) The primary data source providing the data items in point 3(h) and (i) should be at least compatible with GNSS receivers that perform receiver autonomous integrity monitoring (RAIM) and fault detection and exclusion (FDE), along with the output of corresponding measurement status information, as well as integrity containment bound and 95 % accuracy bound indications.

(7) The system integrity level of the data sources providing the data items in point 3(f), (g), (k) to (p) should be equal to or less than 10 -5 per flight-hour.

(8) The quality indicator information (NIC, NACp, SIL, SDA, NACv and GVA) (the data items in point 3(i), (l) and (n)) should express the actual performance of the selected data source as valid at the time of applicability of the measurement of the data items in point 3(h), (k) and (m)).

(9) With respect to the processing of the data items in point 3(a) to (t), the transponder system integrity level for the extended squitter ADS-B protocol, including any interconnecting avionics to the transponder, should be equal to or less than 10 -5 per flight-hour.

(10) The total latency of the horizontal position data (the data items in point 3(h) and (i)) should be equal to or less than 1,5 second in 95 % of all transmissions.

(11) The uncompensated latency of the horizontal position data (data item in point 3(h)) should be equal to or less than 0,6 second in 95 % of the cases and should be equal to or less than 1,0 second in 99,9 % of all transmissions.

(12) The total latency of the ground speed data items (the data items in point 3(m) and (n)) should be equal to or less than 1,5 second in 95 % of all transmissions.

(13) If the transponder is set to use a Mode A conspicuity code of 1000, then the

broadcast of Mode A code information via the extended squitter ADS-B protocol should be inhibited.

(14) Other data items may be made available to the transponder.

(15) Except for military reserved formats, the data items referred to in point 14 should only be transmitted by the transponder via the extended squitter ADS-B protocol if the aircraft and equipment certification process covers the transmission of these data items via the extended squitter ADS-B protocol.

(16) The continuity of transponder functionality supporting the ADS-B protocol should be equal to or less than 2. 10 -4 per flight hour (i.e. mean time between failure equal to or greater than 5,000 flight hours).

(C) Part 3: SSR transponder additional capabilities

(1) Each transponder register that is implemented should be compliant with the corresponding section of ICAO document 9871 (2nd edition).

(2) The following data items should be made available to the transponder and be transmitted by the transponder as requested by the ground-based surveillance chain, via the Mode S protocol and in accordance with the formats specified in ICAO document 9871 (2nd edition):

  (a) MCP/FCU selected altitude;
  (b) roll angle;
  (c) true track angle;
  (d) ground speed;
  (e) magnetic heading;
  (f) indicated airspeed (IAS) or mach number; (g) vertical rate (barometric or baro-inertial);
  (h) barometric pressure setting (minus 800 hecto-Pascals);
  (i) track angle rate or true airspeed if track angle rate is not available.
  (j) Other data items may be made available to the transponder.

(3) The data items referred to in para (c)(2) should only be transmitted by the transponder via the Mode S protocol if the aircraft and equipment certification process covers the transmission of these data items via the Mode S protocol.

AMC OPS-1.867 ADS-B

(See CAR-OPS 1.867 ADS-B)

ADS-B capability should be demonstrated against EASA/FAA Certification Specifications - Airborne Communications, Navigation and Surveillance (CS-ACNS) or an equivalent accepted by the Authority.

AC OPS-1.870 Additional Navigation Equipment for operations in MNPS Airspace

(See CAR OPS-1.870)

(1) A Long-Range Navigation System may be one of the following:

  (a) One Inertial Navigation System (INS).
  (b) One Global Navigation Satellite System (GNSS).
  (c) One navigation system using inputs from one or more Inertial Reference Systems (IRS), or any other MNPS approved sensor system.
  (d) To conform to the Long-range navigation System Specification, a GNSS and its operational use should be approved in accordance with the relevant requirements for MNPS airspace.

(2) An integrated navigation system which offers equivalent functional availability, integrity and redundancy, when approved may, for the purpose of this requirement, be considered as two independent Long Range Navigation Systems.

SUBPART M – AEROPLANE MAINTENANCE

Withdrawn

This Subpart has been entirely withdrawn due to the implementation of CAR-M

SUBPART N – FLIGHT CREW

CAR OPS-1.930 Flight Crew Member Emergency Duties

(a) The operator shall, for each type of aeroplane, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation.

(b) Annual training in accomplishing these functions shall be contained in the operator's training programme and shall include instruction in the use of all emergency and life-saving equipment required to be carried, and drills in the emergency evacuation of the aeroplane.

CAR OPS-1.935 Flight Crew Member Training Programmes

(a) The operator shall establish and maintain a ground and flight training programme, approved by the Authority, which ensures that all flight crew members are adequately trained to perform their assigned duties.

(b) The training programme shall:

(1) include ground and flight training facilities and properly qualified instructors as determined by the Authority;

(2) consist of ground and flight training in the type(s) of aeroplane on which the flight crew member serves;

(3) include proper flight crew coordination and training in all types of emergency and abnormal situations or procedures caused by engine, airframe or systems malfunctions, fire or other abnormalities; and

(4) include upset prevention and recovery training;

(5) include training in knowledge and skills related to visual and instrument flight procedures for the intended area of operation, charting, human performance including threat and error management and in the transport of dangerous goods;

(6) ensure that all flight crew members know the functions for which they are responsible and the relation of these functions to the functions of other crew members, particularly in regard to abnormal or emergency procedures; and

(7) be given on a recurrent basis, as determined by the Authority and shall include an assessment of competence.

Note 1: Flight training may, to the extent deemed appropriate by the Authority, be given in flight simulation training devices approved by the Authority for that purpose.

Note 2: The scope of the recurrent training required by CAR OPS-1.930 and paras (a) & (b) above, may be varied and need not be as extensive as the initial training given in a particular type of aeroplane.

Note 3: The use of correspondence courses and written examinations as well as other means may, to the extent deemed feasible by the Authority, be utilized in meeting the requirements for periodic ground training.

Note 4: For more information on dangerous goods operational requirements, see Subpart R.

Note 5: Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factors Training Manual (Doc 9683).

Note 6: Information for pilots and flight operations personnel on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

Note 7: Guidance material to design flight crew training programmes can be found in the Manual of Evidence-based Training (Doc 9995).

Note 8: Guidance material on the different means used to assess competence can be found in the Attachment to Chapter 2 of the Procedures for Air Navigation Services — Training (PANSTRG, Doc 9868).

Note 9: Procedures for upset prevention and recovery training in a flight simulation training device are contained in the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868).

Note 10: Guidance on upset prevention and recovery training in a flight simulation training device is contained in the Manual on Aeroplane Upset Prevention and Recovery Training (Doc 10011).

(c) The requirement for recurrent flight training in a particular type of aeroplane shall be considered fulfilled by:
   (1) the use, to the extent deemed feasible by the Authority, of flight simulation training devices approved by that State for that purpose; or
   (2) the completion within the appropriate period of the proficiency check required by CAR OPS-1.965(b) in that type of aeroplane.

CAR OPS-1.940 Composition of Flight Crew

(See Appendices 1 & 2 to CAR OPS-1.940) (See AMC OPS-1.940(a)(4));

(a) An operator shall ensure that:
   (1) The composition of the flight crew and the number of flight crew members at designated crew stations are both in compliance with, and no less than the minimum specified in, the Aeroplane Flight Manual (AFM);
   (2) The flight crew includes additional flight crew members when required by the type of operation, and is not reduced below the number specified in the Operations Manual;
   (3) All flight crew members hold an applicable and valid license, rating and valid medical certificate, issued by the Authority in accordance with CAR-FCL requirements and are suitably qualified and competent to conduct the duties assigned to them;
   (4) Procedures are established, acceptable to the Authority, to prevent the crewing together of inexperienced flight crew members (See AMC OPS-1.940(a)(4));
   (5) One pilot amongst the flight crew, qualified as a pilot-in-command in accordance with CAR–FCL, is designated as the commander, who may delegate the conduct of the flight to another suitably qualified pilot; and
   (6) When a dedicated System Panel Operator is required by the AFM, the flight crew includes one crew member who holds a Flight Engineer's license or is a suitably qualified flight crew member and acceptable to the Authority.
   (7) When engaging the services of flight crew members who are self-employed and/or working on a freelance or part-time basis, the requirements of Subpart N are complied with. In this respect, particular attention must be paid to the total number of aircraft types or variants that a flight crew member may fly for the purposes of commercial air transportation, which must not exceed the requirements prescribed in CAR OPS-1.980 and CAR OPS-1.981, including when his services are engaged by another operator. For crew members serving the operator as a commander, initial operator's Crew Resource Management (CRM) training shall be completed before commencing unsupervised line flying. However, for crew members serving the operator as a commander after 1 April 2002, initial CRM training shall be completed before commencing unsupervised line flying unless the crew member has previously completed an initial operator's CRM course.

(b) *Minimum flight crew for operations under IFR or at night.*
For operations under IFR or at night, an operator shall ensure that:
(1) For all turbo-propeller aeroplanes with a maximum approved passenger seating configuration of more than nine (9) and for all turbojet aeroplanes, the minimum flight crew is two (2) pilots; or
(2) Aeroplanes other than those covered by sub-paragraph (b)(1) above are operated by a single pilot provided that the requirements of Appendix 2 to CAR OPS-1.940 are satisfied. If the requirements of Appendix 2 are not satisfied, the minimum flight crew is two (2) pilots.

CAR OPS-1.943 Initial Operator's Crew Resource Management (CRM) training

(See AMC OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))
(See IEM OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(a) When a flight crew member has not previously completed initial Operator's Crew Resource Management (CRM) training (either new employees or existing staff), then the operator shall ensure that the flight crew member completes an initial CRM training course. New employees shall complete initial Operator's CRM Training within their first year of joining an operator. Flight crew who are already operating as flight crew members in commercial air transportation and who have not completed CRM training shall complete an initial operator's CRM training course.
(b) If the flight crew member has not previously been trained in Human Factors, then a theoretical course based on the human performance and limitations programme for the ATPL (see the requirements applicable to the issue of Flight Crew Licenses) shall be completed before the initial Operator's CRM training or combined with the initial Operator's CRM training.
(c) Initial CRM training shall be conducted by at least one CRM facilitator acceptable to the Authority who may be assisted by experts in order to address specific areas. (See AMC OPS1.943, 1.945(a)(9), 1.955(b)(6) & 1.965(e)), (See IEM OPS-1.943/1.945(a)(9), 1.955(b)(6) & 1.965(e))
(d) Initial CRM training is conducted in accordance with a detailed course syllabus included in the Operations Manual.

CAR OPS-1.945 Conversion training and checking

(See Appendix 1 to CAR OPS-1.945 / AMC OPS-1.945 / IEM OPS-1.945)
(See AMC OPS-1.943/ 1.945(a)(9)/1.955(b)(6)/ 1.965(e))
(See IEM OPS-1.943/ 1.945(a)(9)/1.955(b)(6)/ 1.965(e))
(See AMC-1 CAR OPS-1.945&1.965)(See AMC-2 CAR OPS-1.945&1.965)
(See GM-1 CAR-OPS 1.945) (See GM-1 CAR-OPS 1.945 & 1.965)
(See GM-2 CAR-OPS 1.945&1.965) (See GM-3 CAR-OPS 1.945&1.965)
(See GM-4 CAR-OPS 1.945&1.965) (See GM-5 CAR-OPS 1.945&1.965)

(a) An operator shall ensure that:
(1) A flight crew member completes a Type Rating course which satisfies the requirements applicable to the issue of Flight Crew Licenses requirements of CAR–FCL when changing from one type of aeroplane to another type or class for which a new type or class rating is required;
(2) A flight crew member completes an operator's conversion course before commencing unsupervised line flying:
i. When changing to an aeroplane for which a new type or class rating is required; or
ii. When changing operator;
(3) Conversion training is conducted by suitably qualified personnel in accordance with a detailed course syllabus included in the Operations Manual. The operator shall ensure that the personnel integrating elements of CRM into conversion training are

suitably qualified;

(4) The amount of training required by the operator's conversion course is determined after due note has been taken of the flight crew member's previous training as recorded in his training records prescribed in CAR OPS-1.985;

(5) The minimum standards of qualification and experience required of flight crew members before undertaking conversion training are specified in the Operations Manual;

(6) Each flight crew member undergoes the checks required by CAR OPS-1.965(b) and the training and checks required by CAR OPS-1.965(d) before commencing line flying under supervision;

(7) Upon completion of line flying under supervision, the check required by CAR OPS-1.965(c) is undertaken;

(8) Once an operator's conversion course has been commenced, a flight crew member does not undertake flying duties on another type or class until the course is completed or terminated; and

(9) Elements of CRM training are integrated into the conversion course. (See AMC OPS1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))(SeeIEM OPS-1.943/1.945(a)(9), 1.955(b)(6), 1.965(e) and AMC OPS-1.945(a)(9) and IEM OPS-1.945(a)(9)).

(b) In the case of changing aeroplane type or class, the check required by CAR OPS-1.965(b) may be combined with the type or class rating skill test under the requirements applicable to the issue of Flight Crew Licenses.

(c) The operator's conversion course and the Type or Class Rating course required for the issue of Flight Crew Licenses may be combined.

(d) A pilot, undertaking a ZFTT course, shall:

(1) Commence Line Flying Under Supervision (LIFUS) as soon as possible within twenty-one (21) days after completion of the skill test. If Line Flying Under Supervision has not been commenced within the twenty-one (21) days, the operator shall provide appropriate training acceptable to the Authority. (See IEM OPS-1.945(d))

(2) Complete the six (6) take-offs and landings required in Appendix CAR FCL- 1.261(c)(2) in a flight simulator, qualified in accordance with CAR-ORA (SUBPART- FSTD) and user approved by the Authority, not later than twenty-one (21) days after the completion of the skill test. This simulator session shall be conducted by a TRI(A) occupying a pilot's seat. If these take-offs and landings have not been performed within the twenty-one (21) days, the operator shall provide refresher training acceptable to the Authority.

(3) If these takeoffs and landings have not been performed within the twenty-one (21) days, a pilot shall be provided an additional ZFTT simulator session of six (6) take-offs and landings prior to commencing LIFUS. For any subsequent gap in commencing LIFUS after the additional simulator session, the Head of Training shall ensure that the pilot has completed three (3) take-offs and landings in a ZFTT simulator session in the previous twenty-one (21) days prior to commencing LIFUS.

CAR OPS-1.950 Differences training and Familiarisation training

(a) An operator shall ensure that a flight crew member completes:

(1) Differences training which requires additional knowledge and training on an appropriate training device or the aeroplane;

i. When operating another variant of an aeroplane of the same type or another type of the same class currently operated; or

ii. When changing equipment and/or procedures on types or variants currently operated;

(2) Familiarisation training which requires the acquisition of additional knowledge:

i. When operating another aeroplane of the same type; or

ii. When changing equipment and/or procedures on types or variants currently operated.

(b) The operator shall specify in the Operations Manual when such differences training or familiarisation training is required.

CAR OPS-1.955 Nomination as commander

(a) An operator shall ensure that for upgrade to commander from co-pilot and for those joining as commanders:
   (1) A minimum level of experience, acceptable to the Authority, is specified in the Operations Manual; and
   (2) For multi-crew operations, the pilot completes an appropriate command course.
(b) The command course required by sub-paragraph (a)(2) above must be specified in the Operations Manual and include at least the following:
   (1) Training in a STD (including Line Orientated Flying Training) and/or flying training;
   (2) An operator proficiency check operating as commander;
   (3) Commander's responsibilities;
   (4) Line training in command under supervision. A minimum of 10 sectors is required for pilots already qualified on the aeroplane type;
   (5) Completion of a commander's line check as prescribed in CAR OPS-1.965(c) and route and aerodromecompetence qualification as prescribed in CAR OPS1.975; and
   (6) Elements of Crew Resource Management (See AMC OPS-1.943/1.945(a)(9), 1.955(b)(6) & 1.965(e)) (See IEM OPS-1.943, 1.945(a)(9), 1.955(b)(6) & 1.965(e))

CAR OPS-1.960 Commanders holding a Commercial Pilot License

(a) An operator shall ensure that:
   (1) A Commercial Pilot License (CPL) holder does not operate as a commander of an aeroplane certificated in the Aeroplane Flight Manual for single pilot operations unless:
      i. When conducting passenger carrying operations under Visual Flight Rules (VFR) outside a radius of 50 nm from an aerodrome of departure, the pilot has a minimum of 500 hours total flight time on aeroplanes or holds a valid Instrument Rating; or
      ii. When operating on a multi-engine type under Instrument Flight Rules (IFR), the pilot has a minimum of 700 hours total flight time on aeroplanes which includes 400 hours as pilot-in-command (in accordance with CAR FCL) of which 100 hours have been under IFR including 40 hours multi-engine operation. The 400 hours as pilot-in-command may be substituted by hours operating as copilot on the basis of two (2) hours co-pilot is equivalent to one hour as pilot-in-command provided those hours were gained within an established multi-pilot crew system prescribed in the Operations Manual;
   (2) In addition to sub-paragraph (a)(1)(ii) above, when operating under IFR as a single pilot, the requirements prescribed in Appendix 2 to CAR OPS-1.940 are satisfied; and
   (3) In multi-pilot crew operations, in addition to sub-paragraph (a)(1) above, and prior to the pilot operating as commander, the command course prescribed in CAR OPS1.955(a)(2) is completed.

CAR OPS-1.965 Recurrent training and checking

(See Appendix 1 to CAR-OPS 1.965 Recurrent training and checking – Pilots & Appendix 2 to CAROPS-1.965) (See AMC OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e) Crew Resource Management (CRM)) (See IEM OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)) (See AMC-1 CAR-OPS 1.945 & 1.965)
(See AMC-2 CAR-OPS 1.945&1.965) (See GM-1 CAR-OPS 1.945&1.965)
(See GM-2 CAR-OPS 1.945&1.965) (See GM-3 CAR-OPS 1.945&1.965)
(See GM-4 CAR-OPS 1.945&1.965) (See GM-5 CAR-OPS 1.945&1.965)
(See AMC OPS-1.965(d)) (See GM OPS-1.965(b)(2))

(a) **General.** An operator shall ensure that:

(1) Each flight crew member undergoes recurrent training and checking and that all such training and checking is relevant to the type or variant of aeroplane on which the flight crew member operates;

(2) A recurrent training and checking programme is established in the Operations Manual and approved by the Authority;

(3) Recurrent training is conducted by the following personnel:

i. *Ground and refresher training* – by suitably qualified personnel;

ii. *Aeroplane/STD training* – by a Type Rating Instructor (TRI), Class Rating Instructor (CRI) or in the case of the STD content, a Synthetic Flight Instructor (SFI), providing that the TRI, CRI or SFI satisfies the operator's experience and knowledge requirements sufficient to instruct on the items specified in Appendix 1 to CAR OPS-1.965 paragraphs (a)(1)(i)(A) and (B);

iii. *Emergency and safety equipment training* – by suitably qualified personnel; and

iv. *Crew Resource Management (CRM):*

A. Integration of CRM elements into all the phases of the recurrent training by all the personnel conducting recurrent training. The operator shall ensure that all personnel conducting recurrent training are suitably qualified to integrate elements of CRM into this training;

B. Modular CRM training – by at least one CRM facilitator acceptable to the Authority (see AMC OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)) who may be assisted by experts in order to address specific areas.

(4) Recurrent checking is conducted by the following personnel:

i. *Operator proficiency check* – by a Type Rating Examiner (TRE), Class Rating Examiner (CRE) or, if the check is conducted in a STD a TRE, CRE or a Synthetic Flight Examiner (SFE), trained in CRM concepts and the assessment of CRM skills;

ii. *Line checks* – by suitably qualified commanders nominated by the operator and acceptable to the Authority;

iii. *Emergency and safety equipment checking* – by suitably qualified personnel.

(b) Operator Proficiency Check

(1) An operator shall ensure that:

i. Each flight crew member undergoes operator proficiency checks to demonstrate his competence in carrying out normal, abnormal and emergency procedures; and

ii. The check is conducted without external visual reference when the flight crew member will be required to operate under IFR.

iii. Each flight crew member undergoes operator proficiency checks as part of a normal flight crew complement.

(2) The period of validity of an operator proficiency check shall be six (6) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous operator proficiency check, the period of validity shall be extended from the date of issue until six (6) calendar months from the expiry date of that previous operator proficiency check.

(3) The period of validity of an operator proficiency check for private aeroplanes below a maximum certificated take-off mass of 5700 kg, and not turbo jet, shall be twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous operator proficiency check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous operator proficiency check.

(c) **Line Check.** An operator shall ensure that each flight crew member undergoes a line check on the aeroplane to demonstrate his competence in carrying out normal line operations described in the Operations Manual. The period of validity of a line check shall be twelve (12) calendar months, in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous line check the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous line check. (See AMC OPS-1.965(c)).

(d) **Emergency and Safety Equipment training and checking.** An operator shall ensure that each flight crew member undergoes training and checking on the location and use of all emergency and safety equipment carried. The period of validity of an emergency and safety equipment check shall be twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous emergency and safety check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous emergency and safety equipment check.
(See AMC OPS -1.965(d)).

(e) **CRM.** An operator shall ensure that:
   (1) Elements of CRM are integrated into all appropriate phases of the recurrent training, and;
   (2) Each flight crew member undergoes specific modular CRM training. All major topics of CRM training shall be covered over a period not exceeding 3 years;

(f) **Ground and Refresher training.** An operator shall ensure that each flight crew member undergoes ground and refresher training at least every twelve (12) calendar months. If the training is conducted within three (3) calendar months prior to the expiry of the twelve (12) calendar months period, the next ground and refresher training must be completed within twelve (12) calendar months of the original expiry date of the previous ground and refresher training.

(g) **Aeroplane/STD training.** An operator shall ensure that each flight crew member undergoes aeroplane/STD training at least every twelve (12) calendar months. If the training is conducted within three (3) calendar months prior to the expiry of the twelve (12) calendar months period, the next aeroplane/STD training must be completed within twelve (12) calendar months of the original expiry date of the previous aeroplane/STD training.

CAR OPS-1.968 Pilot qualification to operate in either pilot's seat

(See Appendix 1 to CAR OPS-1.968)

(a) An operator shall ensure that:
   (1) A pilot who may be assigned to operate in either pilot's seat completes appropriate training and checking; and
   (2) The training and checking programme is specified in the Operations Manual and is acceptable to the Authority.

CAR OPS-1.970 Recent experience

(See AMC OPS-1.970 & IEM OPS-1.970(a)(2))

(a) An operator shall ensure that:
   (1) Commander.
      i. A pilot does not operate an aeroplane as commander unless he has carried out at least three take-offs and three landings as pilot flying in an aeroplane of the same type/class of the aeroplane type to be used, in the preceding ninety (90) days; and
   (2) Co-pilot.
      i. A co-pilot does not serve at the flight controls during take-off and landing

unless he has operated the controls as a pilot for three take-offs and landings in an aeroplane of the same type/class of the aeroplane type to be used, in the preceding ninety (90) days.

(b) The ninety (90)-day period prescribed in sub-paragraphs (a)(1) and (2) above may be extended up to a maximum of one hundred and twenty (120) days by line flying under the supervision of a Type Rating Instructor or Examiner. For periods beyond one hundred and twenty (120) days, the recency requirement is satisfied by a training flight in the aeroplane type to be used.

CAR OPS-1.975 Route and Aerodrome Competence qualification

(See AMC OPS-1.975)

(a) An operator shall ensure that, prior to being assigned as commander or as pilot to whom the conduct of the flight may be delegated by the commander, the pilot has obtained adequate knowledge of the route to be flown and of the aerodromes (including alternates), facilities and procedures to be used.

(b) A pilot-in-command shall have made an actual approach into each aerodrome of landing on the route, accompanied by a pilot who is qualified for the aerodrome, as a member of the flight crew or as an observer on the flight deck, unless:

  (1) The approach to the aerodrome is not over difficult terrain and the instrument approach procedures and aids available are similar to those with which the pilot is familiar, and a margin to be approved by the Authority is added to the normal operating minima, or there is reasonable certainty that approach and landing can be made in visual meteorological conditions; or

  (2) The descent from the initial approach altitude can be made by day in visual meteorological conditions; or

  (3) The operator qualifies the pilot-in-command to land at the aerodrome concerned by means of an adequate pictorial presentation; or

  (4) The aerodrome concerned is adjacent to another aerodrome at which the pilot-in-command is currently qualified to land. *Note: Refer AMC OPS-1.975 paras (2) to (5)*

(c) The period of validity of the route and aerodrome competence qualification shall be twelve (12) calendar months in addition to the remainder of:

  (1) The month of qualification; or

  (2) The month of the latest operation on the route or to the aerodrome.

(d) Route and aerodrome competence qualification shall be revalidated by operating on the route or to the aerodrome within the period of validity prescribed in sub-paragraph (c) above.

(e) If revalidated within the final three (3) calendar months of validity of previous route and aerodrome competence qualification, the period of validity shall extend from the date of revalidation until twelve (12) calendar months from the expiry date of that previous route and aerodrome competence qualification.

(f) In the event that more than twelve (12) months elapse in which a pilot-in-command has not made such a trip on a route in close proximity and over similar terrain, within such a specified area, route or aerodrome, and has not practiced such procedures in a training device which is adequate for this purpose, prior to again serving as a pilot-in-command within that area or on that route, that pilot must requalify in accordance with AMC OPS-1.975 and paragraph (b) above.

(g) An operator shall ensure that, prior to being assigned as flight crew members on an ETOPS flight, the flight crew has obtained adequate knowledge of the ETOPS procedures and philosophy including the ETOPS route to be flown and of the aerodromes (including alternates).

(h) The operator shall maintain a record, sufficient to satisfy the Authority of the qualification of the pilot and the manner in which such qualification was achieved.

CAR OPS-1.978 Alternative Training and Qualification Programme

(See Appendix 1 to CAR OPS-1.978) (See AC OPS-1.978)
(See AC-1 to 8 for Appendix 1 to CAR OPS-1.978)

(a) An operator, following a minimum of two years continuous operations, may substitute the training and checking requirements for flight crew specified in Appendix 1 to CAR OPS-1.978(a) by an Alternative Training and Qualification Programme (ATQP) approved by the Authority. The two years continuous operations may be reduced at the discretion of the Authority.
(b) The ATQP must contain training and checking which establishes and maintains a level of proficiency demonstrated to be at least not less than the level of proficiency achieved by following the provisions of CAR OPS-1.945, 1.965 and 1.970. The standard of flight crew training and qualification shall be established prior to the introduction of ATQP; the required ATQP training and qualification standards shall also be specified.
(c) An operator applying for approval to implement an ATQP shall provide the Authority with an implementation plan in accordance with paragraph (c) of Appendix 1 to CAR OPS-1.978.
(d) In addition to the checks required by CAR OPS-1.965 and 1.970 an operator shall ensure that each flight crew member undergoes a Line Orientated Evaluation (LOE).
(e) After two (2) years of operating within an approved ATQP an operator may, with the approval of the Authority, extend the periods of validity of CAR OPS-1.965 and 1.970 as follows:
    (1) Operator proficiency check – twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous operator proficiency check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous operator proficiency check.
    (2) The Line Check – twenty-four (24) calendar months in addition to the remainder of the month of issue. If issued within the final 6 calendar months of validity of a previous line check, the period of validity shall extend from the date of issue until twenty-four (24) calendar months from the expiry date of that previous line check. The line check may be combined with a Line Oriented Quality Evaluation (LOQE) with the approval of the Authority.
    (3) Emergency and Safety equipment checking – twenty-four (24) calendar months in addition to the remainder of the month of issue. If issued within the final six (6) calendar months of validity of a previous check, the period of validity shall extend from the date of issue until twenty-four (24) calendar months from the expiry date of that previous check.
(f) The ATQP shall be the responsibility of a nominated post-holder.

CAR OPS-1.980 Operation on more than one type or variant

(See Appendix 1 to CAR OPS-1.980) (See AMC-1 OPS-1.980 & AMC-2 OPS-1.980(b))

(a) An operator shall ensure that a flight crew member does not operate on more than one type or variant, unless: the flight crew member is competent to do so.
(b) When considering operations of more than one type or variant, an operator shall ensure that the differences and/or similarities of the aeroplanes concerned justify such operations, taking account of the following:
    (1) The level of technology;
    (2) Operational procedures;
    (3) Handling characteristics.

(Note: See AMC-2 OPS-1.980(b) and IEM OPS-1.980(b))

(c) An Operator shall ensure that a flight crew member operating more than one type or variant complies with all of the requirements prescribed in Subpart N for each type or variant unless the Authority has approved the use of credit(s) related to the training, checking and recent experience requirements.

(d) An operator shall specify appropriate procedures and/or operational restrictions, approved by the Authority, in the Operations Manual, for any operation on more than one type or variant covering:

(1) The flight crew members' minimum experience level;
(2) The minimum experience level on one type or variant before beginning training for and operation of another type or variant;
(3) The process whereby flight crew qualified on one type or variant will be trained and qualified on another type or variant; and
(4) All applicable recent experience requirements for each type or variant.

CAR OPS-1.981 Operation of helicopters and aeroplanes

(a) When a flight crew member operates both helicopters and aeroplanes:

(1) An operator shall ensure that operations of helicopter and aeroplane are limited to one type of each.
(2) The operator shall specify appropriate procedures and/or operational restrictions, approved by the Authority, in the Operations Manual.

CAR OPS-1.985 Training records

(See IEM OPS-1.985)

(a) An operator shall:

(1) Maintain records of all training, checking and qualification prescribed in CAR OPS-1.945, 1.955, 1.965, 1.968 and 1.975 undertaken by a flight crew member; and
(2) Make the records of all conversion courses and recurrent training and checking available, on request, to the flight crew member concerned.

SECTION 2 – SUBPART N – FLIGHT CREW

AMC OPS-1.940(a)(4) Crewing of Inexperienced Flight Crew Members

(See CAR OPS-1.940(a)(4))

(1) An operator should consider that a flight crew member is inexperienced, following completion of a Type Rating or command course, and the associated line flying under supervision, until he has achieved on the Type either:
   - (a) 100 flying hours and flown 10 sectors within a consolidation period of 120 consecutive days; or
   - (b) 150 flying hours and flown 20 sectors (no time limit).

(2) A lesser number of flying hours or sectors, subject to any other conditions which the Authority may impose, may be acceptable to the Authority when:
   - (a) A new operator is commencing operations; or
   - (b) An operator introduces a new aeroplane type; or
   - (c) Flight crew members have previously completed a type conversion course with the same operator; or
   - (d) The aeroplane has a Maximum Take-off Mass below 10 tonnes or a Maximum Approved Passenger Seating Configuration of less than 20.

Appendix 1 to CAR OPS-1.940 In-flight relief of flight crew members

(a) A flight crew member may be relieved in flight of his duties at the controls by another suitably qualified flight crew member.

(b) Relief of the Commander
   - (1) The commander may delegate conduct of the flight to:
     - i. Another qualified commander; or
     - ii. For operations only above FL 200, a pilot qualified as detailed in subparagraph(c) below.

(c) Minimum requirements for a pilot relieving the commander:
   - (1) Valid Airline Transport Pilot License;
   - (2) Conversion training and checking (including Type Rating training) as prescribed in CAR OPS- 1.945;
   - (3) All recurrent training and checking as prescribed in CAR OPS-1.965 and CAR OPS-1.968; and
   - (4) Route competence qualification as prescribed in CAR OPS-1.975.

(d) Relief of the co-pilot:
   - (1) The co-pilot may be relieved by:
     - i. Another suitably qualified pilot; or
     - ii. A cruise relief co-pilot qualified as detailed in sub-paragraph (e) below.

(e) Minimum requirements for Cruise Relief Co-Pilot:
   - (1) Valid Commercial Pilot License with Instrument Rating;
   - (2) Conversion training and checking, including Type Rating training, as prescribed in CAR OPS-1.945 except the requirement for take-off and landing training;
   - (3) All recurrent training and checking as prescribed in CAR OPS-1.965 except the requirement for take-off and landing training; and
   - (4) To operate in the role of co-pilot in the cruise only and not below FL 200.
   - (5) Recent experience as prescribed in CAR OPS-1.970 is not required. The pilot shall, however, carry out Flight Simulator recency and refresher flying skill training at intervals not exceeding ninety (90) days. This refresher training may be combined with the training prescribed in CAR OPS- 1.965.

(f) Relief of the system panel operator. A system panel operator may be relieved in flight by a crew member who holds a Flight Engineer's license or by a flight crew member with a qualification acceptable to the Authority.

Appendix 2 to CAR OPS-1.940 Single Pilot Operations Under IFR or at Night

(a) Aeroplanes referred to in CAR OPS-1.940(b)(2) may be operated by a single pilot under IFR or at night when the following requirements are satisfied:
   (1) The operator shall include in the Operations Manual a pilot's conversion and recurrent training programme which includes the additional requirements for a single pilot operation;
   (2) In particular, the cockpit procedures must include:
      i. Engine management and emergency handling;
      ii. Use of normal, abnormal and emergency checklists;
      iii. ATC communication;
      iv. Departure and approach procedures;
      v. Autopilot management; and
      vi. Use of simplified in-flight documentation;
      vii. Single pilot resource management.
   (3) The recurrent checks required by CAR OPS-1.965 shall be performed in the single pilot role on the type or class of aeroplane in an environment representative of the operation;
   (4) For aeroplane operations under IFR, the pilot shall have:
      i. a minimum of fifty (50) hours flight time on the specific type or class of aeroplane under IFR of which ten (10) hours is as commander; and
      ii. Completed during the preceding ninety (90) days on the relevant type or class of aeroplane:
         A. Five (5) IFR flights, including three (3) instrument approaches, in a single-pilot role; or
         B. An IFR instrument approach check
   (5) for aeroplane operations at night the pilot shall have:
      i. a minimum of fifteen (15) hours flight time at night which may be included in the fifty (50) hours flight time under IFR in (4)(i); and
      ii. completed during the preceding ninety (90) days on the relevant type or class of aeroplane:
         A. three (3) take-offs and landings at night in the single pilot role; or
         B. a night take-off and landing check.

(b) The initial and recurrent flight training and proficiency checks indicated in CAR OPS-1.930 and CAR OPS-1.965, shall be performed by the pilot-in-command in the single pilot role on the class of aeroplane in an environment representative of the operation.

AMC OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e) Crew Resource Management (CRM)

(See CAR OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)/1.965(a)(3)(iv))
(See IEM OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(1) ***General***
   (a) Crew Resource Management (CRM) is the effective utilisation of all available resources (e.g. crew members, aeroplane systems, supporting facilities and persons) to achieve safe and efficient operation.
   (b) The objective of CRM is to enhance the communication and management skills of the flight crew member concerned. The emphasis is placed on the non-technical aspects of flight crew performance.

(2) ***Operator's Initial CRM Training***

(a) CRM training programmes are designed to provide knowledge of, and familiarity with, human factors relevant to flight operations. The course duration should be a minimum of one day for single pilot operations and two days for all other types of operations. It should cover all elements in Table 1, column (a) to the level required by column (c) (Operator's conversion course when changing aircraft type).

(b) A CRM facilitator will possess group facilitation skills and should at least:

i. Have current commercial air transport experience as a flight crew member; and have either:

A. Successfully passed the Human Performance and Limitations (HPL) examination whilst recently obtaining the ATPL (see the requirements applicable to the issue of Flight Crew Licenses); or,

B. If holding a Flight Crew License acceptable under CAR OPS-1.940(a)(3) prior to the introduction of HPL into the ATPL syllabus, have completed a theoretical HPL course covering the mandatory training syllabus for the HPL examination.

ii. Have completed the operator's CRM training; and

iii. Be supervised by suitably qualified CRM training personnel when conducting their first operator's CRM training session; and

iv. Have received additional training in the fields of group management, group dynamics and personal awareness.

(c) Notwithstanding paragraph (b) above, and when acceptable to the Authority;

i. A flight crew member holding a recent qualification as a CRM facilitator may continue to be a CRM facilitator after the cessation of active flying duties;

ii. An experienced non-flight crew CRM facilitator having the knowledge of HPL, may be appointed as a CRM facilitator;

iii. A former flight crew member having knowledge of HPL may become a CRM facilitator if he maintains adequate knowledge of the operation of an aeroplane type and meets the provisions of paragraphs 2(b) (ii), (iii) and (iv).

(d) An operator should ensure that the operator's CRM training programme addresses the nature of the operations of the company, as well as the associated procedures and the culture of the company. This will include areas of operations which produce particular difficulties or involve adverse climatic conditions and any unusual hazards.

(e) If the operator does not have sufficient means to establish an operator's CRM training, they may use a course provided by another operator, or a third-party training organisation acceptable to the Authority. In this event the operator should ensure that the content of the course meets his operational requirements. When crew members from several companies follow the same course, CRM core elements should be specific to the nature of operations of the companies and the trainees concerned.

(f) A flight crew member's CRM skill should not be assessed on completing the applicable modules in the operator's training courses (see Table 1).

(3) ***Operator's Conversion Course CRM training***

(a) If the flight crew member undergoes a conversion course ***with a change of aeroplane*****type**, all elements in Table 1, column (a) should be integrated into all appropriate phases of the operator's conversion course and covered to the level required by column (c) (conversion course when changing type), unless the two operators use the same CRM training (third party) provider.

(b) If the flight crew member undergoes a conversion course ***with a change of operator,*** all elements in Table 1, column (a) shall be integrated into all appropriate phases of the operator's conversion course and covered to the level required by column (d) (conversion course when changing operator).

(c) A flight crew member should not be assessed on completing elements of CRM training which are part of an operator's conversion course.

(4) ***Command course CRM training***

(a) An operator should ensure that all elements in Table 1, column (a) are integrated into the command course and covered to the level required by column (e) (command course).

(b) A flight crew member should not be assessed when completing elements of CRM training which are part of the command course, although feedback should be given.

(5) ***Recurrent CRM training***

(a) An operator should ensure that elements of CRM are integrated into all appropriate phases of recurrent training every year; and that all elements in Table 1, column (a) are covered to the level required by column (f) (recurrent training);

(b) A flight crew member should be assessed on completing elements of CRM training which are part of the recurrent training.

(6) ***Implementation of CRM***

(a) The following table indicates which elements of CRM shall be included in each type of training:

Table 1

<table>
<tr><th>Core Elements

(a)</th><th>Initial
Operator's CRM Training
(b)</th><th>Operator's conversion course when changing type
(c)</th><th>Operator's conversion course when changing operator
(d)</th><th>Command course

(e)</th><th>Recurrent training

(f)</th></tr>
<tr><td>Human error and reliability, error chain, error prevention and detection</td><td rowspan="7">In depth</td><td>In depth</td><td>Overview</td><td>Overview</td><td rowspan="7">Overview</td></tr>
<tr><td>Company safety culture, SOPs, organisational factors</td><td rowspan="2">Not required</td><td>In depth</td><td rowspan="6">In depth</td></tr>
<tr><td>Stress, stress management, fatigue & vigilance</td><td rowspan="3">Not Required</td></tr>
<tr><td>Information acquisition and processing situation awareness, workload management</td><td rowspan="4">Overview</td></tr>
<tr><td>Decision making</td></tr>
<tr><td>Communication and co-ordination inside and outside the cockpit</td><td rowspan="2">Overview</td></tr>
<tr><td>Leadership and team behaviour synergy</td></tr>
<tr><td>Automation, philosophy of the use of automation (if relevant to the type)</td><td rowspan="2">As Required</td><td rowspan="2">In depth</td><td>In depth</td><td rowspan="2">As required</td><td rowspan="2">As required</td></tr>
<tr><td>Specific type-related differences</td><td>Not required</td></tr>
<tr><td>Case based studies</td><td>In depth</td><td>In depth</td><td>In depth</td><td>In depth</td><td>As appropriate</td></tr>
</table>

Note: The levels of training in Table 1 can be described as follows:

(1) 'Required' means training that should be instructional or interactive in style to meet the objectives specified in the CRM training Programme or to refresh and strengthen knowledge gained in a previous training.

(2) 'In-depth' means training that should be instructional or interactive in style taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills and attitudes. The CRM training elements should be tailored to the specific needs of the training phase being undertaken.

(7) ***Co-ordination between flight crew and cabin crew training***;

(a) Operators should, as far as is practicable, provide combined training for flight and cabin crews that includes briefing and debriefing.

(b) There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew Facilitators/ Instructors to observe and provide feedback on the training modules observed.

(c) Provision should be made for transfer of relevant knowledge and skills between flight crew and cabin crew CRM facilitators.

(8) ***Assessment of CRM Skills***

(See IEM OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e), paragraph (4))

(a) Assessment of CRM skills should:

i. Provide feedback to the individual and serve to identify retraining where needed; and

ii. Be used to improve the CRM training system.

(b) Prior to the introduction of CRM skills assessment, a detailed description of the CRM methodology including terminology used, acceptable to the Authority, will be published in the Operations Manual.

(c) Operators shall establish procedures including retraining, to be applied in the event that personnel do not achieve or maintain the required standards (See Appendix 1 to CAR OPS-1.1045, Part D, paragraph 3.2 refers).

(d) If the operator proficiency check is combined with the Type Rating revalidation/ renewal check, the assessment of CRM skills will satisfy the Multi Crew Co- operation requirements of the Type Rating revalidation/renewal. This assessment will not affect the validity of the Type Rating.

IEM OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e) Crew Resource Management (CRM)

(See CAR OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))
(See AMC-CAR OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(1) CRM training should reflect the culture of the operator and be conducted by means of both classroom training and practical exercises including group discussions and accident and serious incident reviews to analyse communication problems and instances or examples of a lack of information or crew management.

(2) Whenever it is practicable to do so, consideration should be given to conducting relevant parts of CRM training in synthetic training devices which reproduce, in an acceptable way, a realistic operational environment and permit interaction. This includes, but is not limited to, simulators with appropriate LOFT scenarios.

(3) It is recommended that, whenever possible, initial CRM training be conducted in a group session outside the company premises so that the opportunity is provided for flight crew

members to interact and communicate away from the pressures of their usual working environment.

(4) Assessment of CRM Skills

(a) Assessment of CRM skills is the process of observing, recording, interpreting, evaluating and debriefing crew members, where appropriate, pilot performance and knowledge against a required standard using an acceptable methodology in the context of overall performance. It includes the concept of self-critique, and feedback which can be given continuously during training or in summary following a check. In order to enhance the effectiveness of the programme this methodology should, where possible, be agreed with flight crew representatives.

(b) NOTECHS or other acceptable methods of CRM skills assessment should be used included in an overall assessment of the flight crew members performance and be in accordance with approved standards. The operator in conjunction with the training modules shall establish suitable methods of assessment. The selection criteria and training requirements of the assessors and their relevant qualifications, knowledge and skills should be established.

(c) Individual assessments are not appropriate until the crew member has completed the Operator's CRM course and completed the first OPC. For first CRM skills assessment, the following methodology is considered satisfactory:

(5) Methodology of CRM skills assessment:

(a) An operator shall establish the CRM training programme, including an agreed list of standard terminology. This should be evaluated with regard to methods, length of training, depth of subjects and effectiveness.

(b) A training and standardisation programme for training personnel shall then be established.

(c) The assessment should be based on the following principles:

i. only observable, repetitive behaviours are assessed,

ii. the assessment should positively reflect any CRM skills that result in enhanced safety,

iii. assessments should include behaviour which contributes to a technical failure, such technical failure being errors leading to an event which requires debriefing by the person conducting the line check,

iv. the crew and, where needed, the individual will then be orally debriefed.

(d) De-identified summaries of all CRM assessments by the operator should be used to provide feedback to update and improve the operator's CRM training.

(6) Levels of Training.

(a) *Required.* means training that should be instructional or interactive in style to meet the objectives specified in the CRM training Programme or to refresh and strengthen knowledge gained in a previous training.

(b) *In Depth.* 'in-depth' means training that should be instructive or group participation (being interactive in style) taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills and attitudes. Core elements should be tailored to the specific needs of the training phase being undertaken.

AMC OPS-1.945 Conversion Course Syllabus

(See CAR OPS-1.945 & Appendix 1 to CAR OPS-1.945)

(1) General

(a) Type rating training when required may be conducted separately or as part of conversion training. When the type rating training is conducted as part of conversion training, the conversion training programme should include all the requirements of CAR FCL-1.

(2) Ground training
   (a) Ground training should comprise a properly organised programme of ground instruction by training staff with adequate facilities, including any necessary audio, mechanical and visual aids. However, if the aeroplane concerned is relatively simple, private study may be adequate if the operator provides suitable manuals and/or study notes.
   (b) The course of ground instruction should incorporate formal tests on such matters as aeroplane systems, performance and flight planning, where applicable.
(3) Emergency and safety equipment training and checking
   (a) On the initial conversion course and on subsequent conversion courses as applicable, the following should be addressed:
      i. Instruction on first aid in general (Initial conversion course only); Instruction on first aid as relevant to the aeroplane type of operation and crew complement including where no cabin crew are required to be carried (Initial and subsequent);
      ii. Aeromedical topics including:
         A. Hypoxia;
         B. Hyperventilation;
         C. Contamination of the skin/eyes by aviation fuel or hydraulic or other fluids;
         D. Hygiene and food poisoning; and
         E. Malaria; iii. The effect of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;
      iv. The operational procedures of security, rescue and emergency services.
      v. Survival information appropriate to their areas of operation (e.g. polar, desert, jungle or sea) and training in the use of any survival equipment required to be carried.
      vi. A comprehensive drill to cover all ditching procedures should be practiced where flotation equipment is carried. This should include practice of the actual donning and inflation of a lifejacket, together with a demonstration or film of the inflation of life rafts and/or slide-rafts and associated equipment. This practice should, on an initial conversion course, be conducted using the equipment in water, although previous certificated training with another operator or the use of similar equipment will be accepted in lieu of further wet-drill training.
      vii. Instruction on the location of emergency and safety equipment, correct use of all appropriate drills, and procedures that could be required of flight crew in different emergency situations. Evacuation of the aeroplane (or a representative training device) by use of a slide where fitted should be included when the Operations Manual procedure requires the early evacuation of flight crew to assist on the ground.
(4) Aeroplane/STD training
   (a) Flying training should be structured and sufficiently comprehensive to familiarise the flight crewmember thoroughly with all aspects of limitations and normal /abnormal and emergency procedures associated with the aeroplane and should be carried out by suitably qualified Type Rating Instructors and/or Type Rating Examiners. For specialised operations such as steep approaches, ETOPS All Weather Operations or QFE operations, additional training should be carried out.
   (b) In planning aeroplane/STD training on aeroplanes with a flight crew of two or more, particular emphasis should be placed on the practice of Line Orientated Flying Training (LOFT) with emphasis on Crew Resource Management (CRM).

(c) Normally, the same training and practice in the flying of the aeroplane should be given to copilots as well as commanders. The ‘flight handling’ sections of the syllabus for commanders and copilots alike should include all the requirements of the operator proficiency check required by CAR OPS-1.965.

(d) Unless the type rating training programme has been carried out in a Flight Simulator usable for zero flight-time (ZFT) conversion, the training should include at least 3 takeoffs and landings in the aeroplane.

(5) Line flying under supervision (LIFUS)

(a) Following completion of aeroplane/STD training and checking as part of the operator’s conversion course, each flight crew member should operate a minimum number of sectors and/or flying hours under the supervision of a flight crew member nominated by the operator and acceptable to the Authority.

(b) The minimum sectors/hours should be specified in the Operations Manual and should be determined by the following:

i. Previous experience of the flight crew member;
ii. Complexity of the aeroplane; and
iii. The type and area of operation.

(c) A line check in accordance with CAR OPS-1.945(a)(8) should be completed upon completion of line flying under supervision.

(6) System Panel Operator

(a) Conversion training for system panel operators should approximate to that of pilots.

(b) If the flight crew includes a pilot with duties of a systems panel operator, he should, after training and the initial check in these duties, operate a minimum number of sectors under the supervision of a nominated additional flight crewmember. The minimum figures should be specified in the Operations Manual and should be selected after due note has been taken of the complexity of the aeroplane and the experience of the flight crewmember.

IEM OPS-1.945(d) Line Flying under Supervision (LIFUS)

(See CAR OPS-1.945(d))

(1) Introduction

(a) Line flying under supervision (LIFUS) provides the opportunity for a flight crew member to carry into practice the procedures and techniques he has been made familiar with during the ground and flying training of a conversion course. This is accomplished under the supervision of a flight crewmember specifically nominated and trained for the task. At the end of line flying under supervision, the respective crewmember should be able to perform a safe and efficient flight conducted within the tasks of his crewmember station.

(b) The following minimum figures for details to be flown under supervision are guidelines for operators to use when establishing their individual requirements.

(2) Turbo jet aircraft

(a) Co-pilot undertaking first conversion course:

i. Total accumulated 100 hours or minimum forty(40) sectors;

(b) Co-pilot upgrading to commander:

i. Minimum twenty (20) sectors when converting to a new type;
ii. Minimum ten (10) sectors when already qualified on the aeroplane type.

AMC OPS-1.945(a)(9) Crew Resource Management – Use of Automation

(See CAR OPS 1.945(a)(9)

(1) The conversion course should include training in the use and knowledge of automation and in

the recognition of systems and human limitations associated with the use of automation. An operator should therefore ensure that a flight crew member receives training on:

(a) The application of the operations policy concerning the use of automation as stated in the Operations Manual; and

(b) System and human limitations associated with the use of automation.

(2) The objective of this training should be to provide appropriate knowledge, skills and behavioral patterns for managing and operating automated systems. Special attention should be given to how automation increases the need for crews to have a common understanding of the way in which the system performs, and any features of automation which make this understanding difficult.

Appendix 1 to CAR OPS-1.945 Operator's Conversion Course

(See AMC OPS-1.945)
(See AMC OPS-1.943, 1.945(a)(9), 1.955(b)(6) & 1.965(e))
(See IEM OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))
(See IEM OPS-1.945)

(a) An operator's conversion course shall include:

(1) Ground training and checking including aeroplane systems, normal, abnormal and emergency procedures;

(2) Emergency and safety equipment training and checking which must be completed before aeroplane training commences;

(3) Aeroplane/STD training and checking; and

(4) Line flying under supervision and line check.

(b) The conversion course shall be conducted in the order set out in sub-paragraph (a) above.

(c) Elements of Crew Resource Management shall be integrated into the conversion course, and conducted by suitably qualified personnel.

(d) When a flight crew member has not previously completed an operator's conversion course, the operator shall ensure that in addition to sub-paragraph (a) above, the flight crew member undergoes general first aid training and, if applicable, ditching procedures training using the equipment in water.

AMC-1 CAR-OPS 1.945 & 1.965 Operator Conversion Training, Checking & Recurrent Training and Checking

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM APPROVED PASSENGER SEATING CONFIGURATION (MAPSC) OF MORE THAN 19 SEATS

(a) Upset prevention training should:

(1) consist of ground training and flight training in an FSTD or an aeroplane;

(2) include all upset prevention elements from Table 1 for the conversion training course; and

(3) include upset prevention elements in Table 1 for the recurrent training programme at least every twelve (12) calendar months, such that all the elements are covered over a period not exceeding three (3) years.

Table 1: Elements and respective components of upset prevention and recovery training

	Elements and Components	Ground training	FSTD or Aeroplane training
A.	**Aerodynamics**		
1.	General aerodynamic characteristics	•	
2.	Aeroplane certification and limitations	•	
3.	Aerodynamics (high and low altitudes)	•	•
4.	Aeroplane performance (high and low altitudes)	•	•
5.	Angle of attack (AOA) and stall awareness	•	•
6.	Stick shaker or other stall-warning device activation (as applicable	•	•
7.	Stick pusher (as applicable) • •	•	•
8.	Mach effects (if applicable to the aeroplane type) • •	•	•
9.	Aeroplane stability • •	•	•
10.	Control surface fundamentals • •	•	•
11.	Use of trims • •	•	•
12.	Icing and contamination effects • •	•	•
13.	Propeller effect: Asymmetric power effect, Power lift effect, Propeller slipstream, Engine Torque effect (as applicable)	•	•
B.	**Causes of and contributing factors to upsets**		
1.	Environmental	•	•
2.	Pilot-induced	•	•
3.	Mechanical (aeroplane systems)	•	•
C.	Safety review of accidents and incidents relating to aeroplane upsets		
1.	Safety review of accidents and incidents relating to aeroplane upsets	•	•
D.	**g-load awareness and management**		
1.	Positive/negative/increasing/decreasing g-loads	•	•
2.	Lateral g awareness (sideslip)	•	•
3.	g-load management	•	•
E.	**Energy management**		
1.	Kinetic energy vs potential energy vs chemical energy (power)	•	•

F.	**Flight path management**		
1.	Relationship between pitch, power and performance	•	•
2.	Performance and effects of differing power plants (if applicable)	•	•
3.	Manual and automation inputs for guidance and control	•	•
4.	Type-specific characteristics	•	•
5.	Management of go-arounds from various stages during the approach	•	•
6.	Automation management	•	•
7.	Proper use of rudder	•	•
G.	**Recognition**		
1.	Type-specific examples of physiological, visual and instrument clues during	•	•
2.	Pitch/power/roll/yaw	•	•
3.	Effective scanning (effective monitoring)	•	•
4.	Type-specific stall protection systems and cues	•	•
5.	Criteria for identifying stalls and upsets	•	•
H.	**System Malfunction** (including immediate handling and subsequent operational considerations, as applicable)		
1.	Flight control defects	•	•
2.	Engine failure (partial or full)	•	•
3.	Instrument failures	•	•
4.	Loss of reliable airspeed	•	•
5.	Automation failures	•	•
6.	Fly-by-wire protection degradations	•	•
7.	Stall protection system failures including icing alerting systems	•	•
I.	**Manual handling skills** (no autopilot, no auto-thrust/auto-throttle and, where possible, without flight directors)		
1.	Flight at different speeds, including slow flight, and altitudes within the full normal flight envelope		•
2.	Procedural instrument flying and manoeuvring including instrument departure and arrival		•
3.	Visual approach		•
4.	Go-arounds from various stages during the approach		•
5.	Steep turns		•

(b) Upset recovery training should:

(1) consist of ground training and flight training in an FFS qualified for the training task;
(2) be completed from each seat in which a pilot's duties require him/her to operate; and
(3) include the recovery exercises in Table 2 for the recurrent training programme, such that all the exercises are covered over a period not exceeding three (3) years.

Table 2: Exercises for upset recovery training

Exercises		Ground training	FFS training
A.	**Recovery from upsets**		
1.	Timely and appropriate intervention	•	•
2.	Recovery from stall events, in the following configurations; — take-off configuration, — clean configuration low altitude, — clean configuration near maximum operating altitude, — landing configuration during the approach phase; and — terrain-critical scenarios	•	•
3.	Recovery from nose high at various bank angles	•	•
4.	Recovery from nose low at various bank angles	•	•
5.	Consolidated summary of aeroplane recovery techniques	•	•

(c) The operator should ensure that personnel providing FSTD UPRT are competent and current to deliver the training, and understand the capabilities and limitations of the device used.
(d) The FFS qualification requirements in (b)(1) are further clarified in the Guidance Material (GM).

AMC-2 CAR-OPS 1.945&1.965 Operator Conversion Training and Checking & Recurrent Training and Checking

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM APPROVED PASSENGER SEATING CONFIGURATION (MAPSC) OF 19 SEATS OR LESS

(a) Upset prevention training should:
  (1) consist of ground training and flight training in an FSTD or an aeroplane;
  (2) include upset prevention elements in Table 1 of AMC-1 CAR OPS-1.945&1.965 for the conversion training course; and
  (3) include upset prevention elements in Table 1 of AMC-1 CAR OPS-1.945&1.965 for the recurrent training programme at least every twelve (12) calendar months, such that all the elements are covered over a period not exceeding three (3) years.
(b) Upset recovery training should:
  (1) consist of ground training and flight training in an FFS qualified for the training task, if available;
  (2) be completed from each seat in which a pilot's duties require him/her to operate; and
  (3) include the recovery exercises in Table 2 of AMC-1 CAR OPS-1.945&1.965 for the recurrent training programme, such that all the exercises are covered over a period not exceeding 3 years.
(c) The operator should ensure that personnel providing FSTD UPRT are competent and current to deliver the training, and understand the capabilities and limitations of the device used.
(d) The FFS qualification requirements in (b)(1) are further specified in the Guidance Material (GM).

GM-1 CAR OPS-1.945 Operator Conversion Training and Checking

OPERATOR CONVERSION COURSE (OCC) FOR MULTI-CREW PILOT LICENCE (MPL) HOLDERS

When defining the amount of training for MPL holders, who undertake their first conversion course on a new type or at an operator other than the one that was involved in their training for the MPL, the operator should put a process in place to ensure that corrective action can be taken if post-MPL license training evaluation indicates the need to do so.

GM-1 CAR OPS-1.945 & 1.965 Operator Conversion Training and Checking & Recurrent Training and Checking

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES

The objective of the UPRT is to help flight crew acquire the required competencies in order to prevent or recover from an aeroplane upset. Prevention training prepares flight crew to avoid incidents whereas recovery training prepares flight crew to prevent an accident once an upset condition has developed.

HUMAN FACTORS

Threat and Error Management (TEM) and Crew Resource Management (CRM) principles should be integrated into the UPRT. In particular, the surprise and startle effect, and the importance of resilience development should be emphasised.

Training should also emphasise that an actual upset condition may expose flight crew to significant physiological and psychological challenges, such as visual illusions, spatial disorientation and unusual g-forces, with the objective to develop strategies to deal with such challenges.

Note: Surprise and startle effect should not be mistakenly over-emphasized. It should be interpreted as a human factor that may occur in an upset condition and as such constitutes an element of awareness training.

USE OF FSTD FOR UPRT

The use of an FSTD provides valuable training without the risks associated with aeroplane training. In order to avoid 'negative transfer of training', the capabilities of the specific FSTD to be used should be considered when designing and delivering the training programme, especially when manoeuvre training could involve operation outside the normal flight envelope of the aeroplane, for example during aerodynamic stall. Type specific content contained in the training programme should be developed in consultation with the Original Equipment Manufacturers (OEMs).

Some FSTDs may offer capabilities that could enhance the UPRT, such as Instructor Operating Station (IOS) features. Operators may consider the value of such features in support of their training objectives.

ADDITIONAL GUIDANCE

Specific guidance to the UPRT elements and exercises contained in the AMC is available from the latest revision of the ICAO Document 10011 ('Manual on UPRT') and further guidance is available from revision 3 of the aeroplane upset prevention and recovery training aid (AUPRTA).

GM-2 CAR OPS-1.945 & 1.965 Operator Conversion Training and Checking & Recurrent Training and Checking

UPSET PREVENTION TRAINING FOR COMPLEX MOTOR-POWERED AEROPLANES

The recurrent training should prioritise the upset prevention elements and respective components according to the operator's safety risk assessment.

Upset prevention training should use a combination of manoeuvre-based and scenario-based training. Scenario based training may be used to introduce flight crew to situations, which if not correctly managed, could lead to an upset condition. Relevant TEM and CRM aspects should be included in scenario-based training and the flight crew should understand the limitations of the FSTD in replicating the physiological and psychological aspects of exposure to upset prevention scenarios.

In order to avoid negative training and negative transfer of training, operators should ensure that the selected upset prevention scenarios and exercises take into consideration the limitations of the FSTD and the extent to which it represents the handling characteristics of the actual aeroplane. If it is determined that the FSTD is not suitable, the operator should ensure that the required training outcome can be achieved by other means.

GO-AROUNDS FROM VARIOUS STAGES DURING THE APPROACH

Operators should conduct the go-around exercises from various altitudes during the approach with all engines operating, taking into account the following considerations:

(a) Un-planned go-arounds expose the crew to the surprise and startle effect;
(b) Go-arounds with various aeroplane configurations and different weights; and
(c) Balked landings (between Decision Altitude and touchdown or after touchdown unless thrust reversers have been activated).

In addition to full thrust all engine go-arounds, operators should consider including exercises using the ‘limited thrust’ go-around procedure, when available. This procedure reduces the risk of the airframe structural limits being exceeded and reduces the risk of crew being exposed to somatogravic illusion and disorientation effects, thereby reducing the risk of aeroplane upsets further.

The go-around exercises should always be performed in accordance with the OEM procedures and recommendations.

GM-3 CAR OPS-1.945 & 1.965 Operator Conversion Training and Checking & Recurrent Training and Checking

UPSET RECOVERY TRAINING FOR COMPLEX MOTOR-POWERED AEROPLANES

The upset recovery training exercises should be manoeuvre-based, which enables flight crew to apply their handling skills and recovery strategy whilst leveraging CRM principles to return the aeroplane from an upset condition to a stabilised flight path.

The flight crew should understand the limitations of the FFS in replicating the physiological and psychological aspects of upset recovery exercises.

In order to avoid negative training and negative transfer of training, operators should ensure that the selected upset recovery exercises take into consideration the limitations of the FFS.

STALL EVENT RECOVERY TRAINING

It is of utmost importance that stall event recovery training takes into account the capabilities of the FFS used. Most current and grandfathered FFS models are deficient in representing the aeroplane in the aerodynamic stall regime, thus practising of ‘full stall’ in such a device could potentially result in negative training or negative transfer of training. The term ‘stall event’ is therefore introduced to cater for the capability of current and grandfathered FFS, and for potential future FFS enhancements. A ‘stall event’ is defined as an occurrence whereby the aeroplane experiences one or more conditions associated with an approach-to-stall or an aerodynamic stall.

IMPORTANT – when using current or grandfathered FFS, the stall event recovery exercises should only be conducted as approach-to-stall exercises.

Stall event recovery training should emphasise the requirement to reduce the angle of attack (AOA) whilst accepting the resulting altitude loss. High-altitude stall event training should be included so that flight crew appreciate the aeroplane control response, the significant altitude loss during the recovery, and the increased time required. The training should also emphasise the risk of triggering a secondary stall event during the recovery.

Recovery from a stall event should always be in accordance with the stall event recovery procedures of the OEMs. If an OEM-approved recovery procedure does not exist, operators should develop and train the aeroplane-specific stall recovery procedure based on the latest revision of the AUPRTA.

Refer to revision 3 of the AUPRTA for a detailed explanation and rationale on the stall event recovery template as recommended by the OEMs. It should be noted that due to previous incorrect guidance and testing criteria, pilots might attempt recovery with no loss of altitude and without recognizing the importance of pitch control and Angle of Attack. Pilots should demonstrate willingness to trade altitude for airspeed to accomplish an expeditious recovery from a stall event.

Note: The tables below (including the callouts) are guidance and should not be interpreted as requirements.

The expectation is that the trainee analyses the situation and demonstrates initial control inputs appropriate to the situation to recover from an upset and learn to manage the energy, arrest the flight path divergence and recover to a stabilized flight path.

Table 1: Recommended Stall Event Recovery Template

<table>
<tr><th colspan="3">Stall Event Recovery Template</th></tr>
<tr><td colspan="3">Pilot Flying - Immediately do the following at first indication of a stall (aerodynamic buffeting, reduced roll stability and aileron effectiveness, visual or aural cues and warnings, reduced elevator (pitch) Authority, inability to maintain altitude or arrest rate of descent, stick shaker activation (if installed). – during any flight phases except at lift-off.</td></tr>
<tr><td colspan="2">Pilot Flying (PF)</td><td>Pilot Monitoring (PM)</td></tr>
<tr><td>1.</td><td>AUTOPILOT – DISCONNECT (A large out-of-trim condition could be encountered when the autopilot is disconnected.)</td><td rowspan="7">MONITOR airspeed and attitude throughout the recovery and ANNOUNCE any continued divergence</td></tr>
<tr><td>2.</td><td>AUTOTHRUST/AUTOTHROTTLE – OFF</td></tr>
<tr><td>3.</td><td>a) NOSE DOWN PITCH CONTROL apply until stall warning is eliminated
b) NOSE DOWN PITCH TRIM (as needed)
(Reduce the angle of attack (AOA) whilst accepting the resulting altitude loss.)</td></tr>
<tr><td>4.</td><td>BANK – WINGS LEVEL</td></tr>
<tr><td>5.</td><td>THRUST – ADJUST (as needed) (Thrust reduction for aeroplanes with underwing mounted engines may be needed)</td></tr>
<tr><td>6.</td><td>SPEEDBRAKES/SPOILERS – RETRACT</td></tr>
<tr><td>7.</td><td>When airspeed is sufficiently increasing - RECOVER to level flight (Avoid the secondary stall due premature recovery or excessive g-loading.)</td></tr>
</table>

This template should be used as a guidance only. Follow the OEM procedure for stall recovery.

NOSE HIGH AND NOSE LOW RECOVERY TRAINING

Nose-high and nose-low recovery training should be in accordance with the strategies recommended by the OEMs contained in the Tables 2 and 3 below. As the OEM procedures always take precedence over the recommendations, operators should consult their OEM on whether any approved typespecific recovery procedures are available prior to using the templates.

Refer to ICAO Revision 3 of the AUPRTA for a detailed explanation and rationale on the nose high and nose low recovery strategies as recommended by the OEMs.

Table 2: Recommended Nose High Recovery Strategy Template

This template should be used as a guidance only. Follow the latest guidance published by your aircraft OEM.

Nose HIGH Recovery Strategy Template		
Either pilot - Recognise and confirm the situation by announcing: **'Nose High'**		
Pilot Flying (PF)		**Pilot Monitoring (PM)**
1.	**AUTOPILOT – DISCONNECT** (if required) (If the A/P is responding correctly to arrest the divergence, it may be appropriate to keep the current level of automation. A large out of trim condition could be encountered when the AP is disconnected.)	**MONITOR** airspeed and attitude throughout the recovery and **ANNOUNCE** any continued divergence
2.	**AUTOTHRUST/AUTOTHROTTLE – OFF** (if required) If the A/T is responding correctly to arrest the divergence, it may be appropriate to keep the current level of automation.	
Nose HIGH Recovery Strategy Template		
Either pilot - Recognise and confirm the situation by announcing: **'Nose High'**		
Pilot Flying (PF)		**Pilot Monitoring (PM)**
3.	**PITCH APPLY NOSE DOWN** Apply as much nose-down control input as required to obtain a nose-down pitch rate. Demonstrate willingness to trade altitude for airspeed to accomplish an expeditious recovery from a stall event	
4.	**THRUST – ADJUST** (as needed) (Thrust reduction for aeroplanes with underwing mounted engines may be needed)	
5.	**ROLL – ADJUST** (if required) (Avoid exceeding 60 degrees bank.)	
6.	When airspeed is sufficiently increasing - **RECOVER** to level flight (Avoid the secondary stall due premature recovery or excessive g-loading.)	

Table 3: Recommended Nose Low Recovery Strategy Template

This template should be used as a guidance only. Follow the latest guidance published by your aircraft OEM.

<table>
<tr><th colspan="3">Nose LOW Recovery Strategy Template</th></tr>
<tr><td colspan="3">Either pilot - Recognise and confirm the situation by announcing: ‘Nose Low’</td></tr>
<tr><td colspan="2">Pilot Flying (PF)</td><td>Pilot Monitoring (PM)</td></tr>
<tr><td>1.</td><td>AUTOPILOT – DISCONNECT (if required)
(If the autopilot is responding correctly, it may not be appropriate to decrease the level of automation while assessing if the divergence is being stopped. A large out of trim condition could be encountered when the AP is disconnected.)</td><td rowspan="6">MONITOR
airspeed and attitude throughout the recovery and ANNOUNCE any continued divergence</td></tr>
<tr><td>2.</td><td>AUTOTHRUST/AUTOTHROTTLE – OFF (if required)
(If the autothrust/autothrottle is responding correctly, it may not be appropriate to decrease the level of automation while assessing if the divergence is being stopped.)</td></tr>
<tr><td>3.</td><td>RECOVERY from stall if required</td></tr>
<tr><td>4.</td><td>ROLL – ADJUST (if required) in the shortest direction to wings level. (It is important to reduce the g-loading while attempting to roll the wings level by applying forward control pressure to improve roll effectiveness and decrease the asymmetric load of the airplane)</td></tr>
<tr><td>5.</td><td>THRUST and DRAG – ADJUST (if required)</td></tr>
<tr><td>6.</td><td>RECOVER to level flight
(Avoid the secondary stall due premature recovery or excessive g-loading.)</td></tr>
<tr><td colspan="3">NOTE:
1) Recovery to level flight may require use of pitch trim.
2) WARNING: Excessive use of pitch trim or rudder may aggravate the upset situation or may result in high structural loads</td></tr>
</table>

GM-4 CAR OPS-1.945 & 1.965 Operator Conversion Training and Checking & Recurrent Training and Checking

FFS QUALIFIED FOR THE UPSET RECOVERY TRAINING TASK

(a) The FFS used for the upset recovery training should be qualified to ensure the training task objectives can be achieved and negative transfer of training is avoided.

(b) A level C or D FFS is qualified for the upset recovery training task, such as the approach-to-stall exercises.

(c) Full aerodynamic stall or other exercises outside the validated training envelope (VTE) should not be conducted.

(d) A level B FFS may become qualified for the upset recovery training task if equivalency to at least level C for the specific features needed for the task can be demonstrated in accordance with certification, approval and associated FSTD validation tests as required under CAR-ORA (SUBPART-FSTD).

(e) FSTD operators may achieve such demonstration of equivalency through the conduct of a special evaluation by the Authority. Once the level B FFS is deemed to be qualified, the competent Authority should enter the additional capability on the certificate using the wording ‘upset recovery training’. FSTD Operators are reminded that the individual FFS used must be approved for the training by the Authority.

(f) Equivalency to at least level C for the specific features needed for the training task may be demonstrated using the following guidance and list in Table 1 of minimum objective and subjective functional test.

(g) General

(1) Refer to CAR-ORA.FSTD.210 Flight Simulation and Flight Training Devices Approvals and for the scope of the qualification basis;

(2) A six-degrees-of-freedom motion system should be provided; and

(3) The response to control inputs should not be greater than 150 ms more than that experienced on the aeroplane.

GM-5 CAR OPS-1.945 & 1.965 Operator Conversion Training and Checking & Recurrent Training and Checking

PERSONNEL PROVIDING FSTD UPSET PREVENTION AND RECOVERY TRAINING (UPRT)

(a) It is of paramount importance that personnel providing UPRT in FSTDs have the specific competence to deliver such training, which may not have been demonstrated during previous instructor qualification training.

(b) Operators should, therefore, have a comprehensive training and standardisation programme in place, and may need to provide FSTD instructors with additional training to ensure such instructors have and maintain complete knowledge and understanding of the UPRT operating environment, and skill sets.

(c) Standardisation and training should ensure that personnel providing FSTD UPRT:

(1) Emphasise the importance of the upset prevention strategies in all training and checking events;

(2) are able to demonstrate the correct upset recovery techniques for the specific aeroplane type;

(3) understand the importance of applying type-specific Original Equipment Manufacturers (OEMs) procedures for recovery manoeuvres;

(4) are able to distinguish between the applicable SOPs and the OEMs recommendations (if available);

(5) understand the capabilities and limitations of the FSTD used for UPRT;

(6) are aware of the potential of negative transfer of training that may exist when training outside the capabilities of the FSTD;

(7) understand and are able to use the IOS of the FSTD in the context of effective UPRT delivery;

(8) understand and are able to use the FSTD instructor tools available for providing accurate feedback on flight crew performance;

(9) understand the importance of adhering to the FSTD UPRT scenarios that have been validated by the training programme developer; and

(10) understand the missing critical human factor aspects due to the limitations of the FSTD and convey this to the flight crew receiving the training.

AMC OPS-1.965(c) Line checks

(See CAR OPS-1.965(c))

(1) Where a pilot is required to operate as pilot flying and pilot non-flying, he should be checked on one sector as pilot flying and on another sector as pilot non-flying.

(2) However, where an operator’s procedures require integrated flight preparation, integrated cockpit initialisation and that each pilot performs both flying and non-flying duties on the same sector, then the line check may be performed on a single sector.

AMC OPS-1.965(d) Emergency and Safety Equipment Training

(See CAR OPS-1.965(d))

(1) The successful resolution of aeroplane emergencies requires interaction between flight crew and cabin crew and emphasis should be placed on the importance of effective co-ordination and two-way communication between all crew members in various emergency situations.
(2) Emergency and Safety Equipment training should include joint practice in aeroplane evacuations so that all who are involved are aware of the duties other crew members should perform. When such practice is not possible, combined flight crew and cabin crew training should include joint discussion of emergency scenarios.
(3) Emergency and safety equipment training should, as far as is practicable, take place in conjunction with cabin crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight deck and the cabin.

GM OPS-1.965 Recurrent training and checking

(See CAR OPS-1.965)

(1) Line checks, route and aerodrome competency and recent experience requirements are intended to ensure the crew member's ability to operate efficiently under normal conditions, whereas other checks and emergency and safety equipment training are primarily intended to prepare the crew member for abnormal/emergency procedures.
(2) The line check is performed in the aeroplane. All other training and checking should be performed in the aeroplane of the same type or an STD or, an approved flight simulator or, in the case of emergency and safety equipment training, in a representative training device. The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the aeroplane type operated by the flight crew member.
(3) Line checks
    (a) The line check is considered a particularly important factor in the development, maintenance and refinement of high operating standards, and can provide the operator with a valuable indication of the usefulness of his training policy and methods. Line checks are a test of a flight crew member's ability to perform a complete line operation satisfactorily, including preflight and post-flight procedures and use of the equipment provided, and an opportunity for an overall assessment of his ability to perform the duties required as specified in the Operations Manual. The route chosen should be such as to give adequate representation of the scope of a pilot's normal operations. When weather conditions preclude a manual landing, an automatic landing is acceptable. The line check is not intended to determine competence on any particular route. The commander, or any pilot who may be required to relieve the commander, should also demonstrate his ability to 'manage' the operation and take appropriate command decisions.
(4) Proficiency Training and Checking
    (a) When an STD is used, the opportunity should be taken, where possible, to use Line Oriented Flying Training (LOFT).
    (b) Proficiency training and checking for System Panel Operators should, where practicable, take place at the same time a pilot is undergoing proficiency training and checking.

GM OPS 1.965(b)(2) Pilot Proficiency

(See CAR-OPS 1.965(b)(2))

(a) The six (6) calendar months in addition to the remainder of the month means if the pilot performs the proficiency check on 5th January 2013, the validity will expire by 23:59 hrs on 31 July 2013.
(b) If the applicant performs the proficiency check three (3) months before the expiry (31 July 2013), the next proficiency check will expire by 31st January 2014 at 23:59 hrs.

Appendix 1 to CAR–OPS 1.965 Recurrent training and checking – Pilots

(See AMC OPS-1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))
(See IEM OPS-1.943/1.945(a)(9)/1.955(b)(6)/ 1.965(e))
(See AMC OPS-1.965(d)) (See AMC to Appendix 1 to CAR OPS-1.965(b)(1)(iv))

(a) Recurrent Training – Recurrent training shall comprise:
- (1) Ground and refresher training
  - i. The ground and refresher training programme shall include:
    - A. Aeroplane systems;
    - B. Operational procedures and requirements including ground de/anti-icing (See AC OPS-1.345) and pilot incapacitation (See AMC to Appendix 1 to CAR OPS-1.965(b)(1)(iv)); and
    - C. Accident/Incident and occurrence review.
  - ii. Knowledge of the ground and refresher training shall be verified by a questionnaire or other suitable methods.
- (2) Training using Simulator Training Devices
  - i. The STD training programme shall be established such that all major failures of aeroplane systems and associated procedures will have been covered in the preceding three (3) year period.
  - ii. When engine-out manoeuvres are carried out in an aeroplane, the engine failure shall be simulated.
  - iii. STD training may be combined with the operator proficiency check.
- (3) Emergency and Safety Equipment Training
  - i. Emergency and safety equipment training may be combined with emergency and safety equipment checking and shall be conducted in a suitable alternative training device.
  - ii. Every year the emergency and safety equipment training programme must include the following:
    - A. Actual donning of a lifejacket where fitted;
    - B. Actual donning of protective breathing equipment where fitted;
    - C. Actual handling of fire extinguishers;
    - D. Instruction on the location and use of all emergency and safety equipment carried on the aeroplane;
    - E. Instruction on the location and use of all types of exits; and
    - F. Security procedures.
  - iii. Every three (3) years the programme of aircraft crew member training must include the following:
    - A. Actual operation of all types of exits;
    - B. Demonstration of the method used to operate a slide where fitted;
    - C. Actual fire-fighting using equipment representative of that carried in the aeroplane on an actual or simulated fire except that, with Halon extinguishers, an alternative method acceptable to the Authority may be used;

D. The effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;
E. Actual handling of pyrotechnics, real or simulated, where fitted; and
F. Demonstration in the use of the life-raft(s) where fitted.

(4) Crew Resource Management (CRM)

i. Elements of CRM shall be integrated into all appropriate phases of recurrent training; and
ii. A specific modular CRM training programme shall be established such that all major topics of CRM training are covered over a period not exceeding 3 years, as follows:
A. Human error and reliability, error chain, error prevention and detection;
B. Company safety culture, SOPs, organisational factors;
C. Stress, stress management, fatigue and vigilance;
D. Information acquisition and processing, situation awareness, workload management;
E. Decision making;
F. Communication and co-ordination inside and outside the cockpit;
G. Leadership and team behaviour, synergy;
H. Automation and philosophy of the use of Automation (if relevant to the type);
I. Specific type-related differences;
J. Case based studies;
K. Additional areas which warrant extra attention, as identified by the accident prevention and flight safety programme (see CAR OPS1.037(f)).

(b) **Recurrent checking.** Recurrent checking shall comprise:

(1) Operator proficiency checks

i. Where applicable, operator proficiency checks shall include the following manoeuvres:
A. Rejected take-off when a Flight Simulator is available to represent that specific aeroplane, otherwise touch drills only;
B. Take-off with engine failure between V1 and V2 or as soon as safety considerations permit;
C. Precision instrument approach to minima with, in the case of multiengine aeroplanes, one engine inoperative;
D. Non-precision approach to minima;
E. Missed approach on instruments from minima with, in the case of multi-engine aeroplanes, one engine inoperative; and
F. Landing with one engine inoperative. For single-engine aeroplanes, a practice forced landing is required.

ii. When engine out manoeuvres are carried out in an aeroplane, the engine failure must be simulated.
iii. In addition to the checks prescribed in sub-paragraphs (i)(A) to (F) above, the requirements applicable to the revalidation or renewal of the aircraft Type or Class Rating must be completed every twelve (12) months and may be combined with the operator proficiency check.
iv. Pilot incapacitation

Note: See AMC OPS-1.965(b)(1)(iv) pilot incapacitation

v. For a pilot operating VFR only, the checks prescribed in sub-paragraphs (i)(C) to (E) above may be omitted except for an approach and go-around in a multi-engine aeroplane with one engine inoperative.

vi. Operator proficiency checks must be conducted by a Type Rating Examiner.

(2) **Emergency and safety equipment checks.** The items to be checked shall be those for which training has been carried out in accordance with sub-paragraph (a)(3) above.

(3) **Line checks**;

i. Line checks must establish the ability to perform satisfactorily a complete line operation including pre-flight and post-flight procedures and use of the equipment provided, as specified in the Operations Manual.

ii. The flight crew must be assessed on their CRM skills in accordance with a methodology acceptable to the AUTHORITY and published in the Operations Manual. The purpose of such assessment is to:

A. Provide feedback to the crew collectively and individually and serve to identify retraining; and

B. Be used to improve the CRM training system.

iii. CRM assessments alone shall not be used as a reason for a failure of the line check.

iv. When pilots are assigned duties as pilot flying and pilot non-flying, they must be checked in both functions.

v. Line checks must be completed in an aeroplane.

vi. Line checks must be conducted by commanders nominated by the operator and acceptable to the Authority. The person conducting the line check, who is described in CAR OPS-1.965(a)(4)(ii), shall be trained in CRM concepts and the assessment of CRM skills and shall occupy an observer's seat where installed. In the case of long-haul operations where additional operating flight crew are carried, the person may fulfil the function of a cruise relief pilot and shall not occupy either pilot's seat during take-off, departure, initial cruise, descent, approach and landing. His CRM assessments shall solely be based on observations made during the initial briefing, cabin briefing, cockpit briefing and those phases where he occupies the observer's seat.

AMC to Appendix 1 to CAR OPS-1.965(b)(1)(iv) Pilot incapacitation training

(See Appendix 1 to CAR OPS-1.965(b)(1)(iv))

(1) Procedures should be established to train flight crew to recognise and handle pilot incapacitation. This training should be conducted every year and can form part of other recurrent training. It should take the form of classroom instruction, discussion or video or other similar means.

(2) If a Flight Simulator is available for the type of aeroplane operated, practical training on pilot incapacitation should be carried out at intervals not exceeding three (3) years.

Appendix 2 to CAR OPS-1.965 Recurrent training and checking – System Panel Operators

(a) The recurrent training and checking for System Panel Operators shall meet the requirements for pilots and any additional specific duties, omitting those items that do not apply to System Panel Operators.

(b) Recurrent training and checking for System Panel Operators shall, whenever possible, take place concurrently with a pilot undergoing recurrent training and checking.

(c) A line check shall be conducted by a commander nominated by the operator and acceptable to the Authority or by a System Panel Operator Type Rating Instructor or Examiner.

Appendix 1 to CAR OPS-1.968 Pilot qualification to operate in either pilot's seat

(a) Commanders whose duties also require them to operate in the right-hand seat and carry out the duties of co-pilot, or commanders required to conduct training or examining duties from the right-hand seat, shall complete additional training and checking as specified in the Operations Manual, concurrent with the operator proficiency checks prescribed in CAR OPS1.965(b). This additional training must include at least the following:
   (1) An engine failure during take-off;
   (2) A one engine inoperative approach and go-around; and
   (3) A one engine inoperative landing.

(b) When engine-out manoeuvres are carried out in an aeroplane, the engine failure must be simulated.

(c) When operating in the right-hand seat, the checks required by CAR OPS-1 for operating in the left-hand seat must, in addition, be valid and current.

(d) A pilot relieving the commander shall have demonstrated, concurrent with the operator proficiency checks prescribed in CAR OPS-1.965(b), practice of drills and procedures which would not, normally, be the relieving pilot's responsibility. Where the differences between left and right seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.

(e) A pilot other than the commander occupying the left-hand seat shall demonstrate practice of drills and procedures, concurrent with the operator proficiency checks prescribed in CAR OPS1.965(b), which would otherwise have been the commander's responsibility acting as pilot non-flying. Where the differences between left and right seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.

AMC OPS-1.970 Recency

(See CAR OPS-1.970)

When using a Flight Simulator for meeting the landing requirements in CAR OPS1.970(a)(1) and (a)(2), complete visual traffic patterns or complete IFR procedures starting from the Initial Approach Fix should be flown.

IEM OPS-1.970(a)(2) Co-pilot proficiency

(See CAR OPS-1.970(a)(2))

A co-pilot serving at the controls means that that pilot is either pilot flying or pilot non-flying. The only required take-off and landing proficiency for a co-pilot is the operator's and type-rating proficiency checks.

AMC OPS-1.975 Route and Aerodrome Competence Qualification

(See CAR OPS-1.975)

(1) ***Route competence***
   (a) Route competence training shall include knowledge of:
      i. Terrain and minimum safe altitudes;
      ii. Seasonal Meteorological conditions;
      iii. Meteorological, communication, Surveillance and air traffic management (CNS/ATM), and security aspects;
      iv. Search and rescue procedures; and
      v. Navigational facilities associated with the route along which the flight is to take place.

(b) Depending on the complexity of the route, as assessed by the operator, the following methods of familiarisation shall be used:
   i. For the less complex routes, familiarisation by self-briefing with route documentation, or by means of programmed instruction; and
   ii. For the more complex routes, in addition to sub-paragraph (1)(b))(i) above, inflight familiarisation as a commander, co-pilot or observers under supervision, or familiarisation in a Synthetic Training Device using a database appropriate to the route concerned.

(2) ***Aerodrome competence:***
   (a) The Operations Manual shall specify a method of categorisation of aerodromes and specify the requirements necessary for each of these categories. If the least demanding aerodromes are Category A, Category B and C would be applied to progressively more demanding aerodromes. The Operations Manual shall specify the parameters, which qualify an aerodrome to be considered Category A and then provide a list of those aerodrome categorised as B or C.
   (b) All aerodromes to which an operator operates shall be categorised in one of these three categories. The operator's categorisation shall be acceptable to the Authority.

(3) ***Category A.*** An aerodrome which satisfies all of the following requirements:
   (a) An approved instrument approach procedure;
   (b) At least one runway with no performance limited procedure for take-off and/or landing; (c) Published circling minima not higher than 1,000 feet above aerodrome level; and (d) Night operations capability.

(4) ***Category B.*** An aerodrome which does not satisfy the Category A requirements or which requires extra considerations such as:
   (a) Non-standard approach aids and/or approach patterns; or
   (b) Unusual local weather conditions; or
   (c) Unusual characteristics or performance limitations; or
   (d) Any other relevant considerations including obstructions, physical layout, lighting etc.
   (e) Prior to operating to a Category B aerodrome, the commander shall be briefed, or selfbriefed by means of programmed instruction, on the Category B aerodrome(s) concerned and shall certify that he has carried out these instructions.

(5) ***Category C.*** An aerodrome, which requires additional considerations to a Category B aerodrome:
   (a) Prior to operating to a Category C aerodrome, the commander shall be thoroughly briefed and visit the aerodrome as an observer and/or (as deemed appropriate by the operator's safety risk assessment for the aerodrome) undertake instruction in a Flight Simulator. This instruction shall be certified by the operator.

(6) ***Information related to RFFS*** (Rescue and Fire Fighting Services) shall be described in the operations manuals for aerodrome information against aircraft Fire Fighting required.

GM CAR OPS-1.975(a) Route and aerodrome competence qualification

ENVIRONMENTAL KNOWLEDGE RELATED TO THE PREVENTION OF AEROPLANE UPSETS

The knowledge should include understanding of:

(a) the relevant environmental hazards, such as: – Clear Air Turbulence (CAT),
   – Intertropical Convergence Zone (ITCZ),
   – thunderstorms,
   – microbursts,
   – wind shear,

– icing,
– mountain waves,
– wake turbulence, and
– temperature changes at high altitude;

(b) the evaluation and management of the associated risks of the relevant hazards in (a); and
(c) the available mitigating procedures for the relevant hazards in (a) related to the specific route, route area, or aerodrome used by the operator.

AC OPS-1.978 Terminology

(See CAR OPS 1.978 and Appendix 1 to CAR OPS-1.978)

(1) Terminology

(a) *Line Oriented Evaluation (LOE).* LOE is an evaluation methodology used in the ATQP to evaluate trainee performance, and to validate trainee proficiency. LOEs consist of flight simulator scenarios that are developed by the operator in accordance with a methodology approved as part of the ATQP. The LOE should be realistic and include appropriate weather scenarios and in addition should fall within an acceptable range of difficulty. The LOE should include the use of validated event sets to provide the basis for event-based assessment. See paragraph 1.4 below.

(b) *Line Oriented Quality Evaluation (LOQE).* LOQE is one of the tools used to help evaluate the overall performance of an operation. LOQEs consist of line flights that are observed by appropriately qualified operator personnel to provide feedback to validate the ATQP. The LOQE should be designed to look at those elements of the operation that are unable to be monitored by FDM or Advanced FDM programmes.

(c) *Skill based training.* Skill based training requires the identification of specific knowledge and skills. The required knowledge and skills are identified within an ATQP as part of a task analysis and are used to provide targeted training.

(b)*Event based Assessment.* This is the assessment of flight crew to provide assurance that the required knowledge and skills have been acquired. This is achieved within an LOE. Feedback to the flight crew is an integral part of event-based assessment.

Appendix 1 to CAR OPS-1.978 Alternative Training and Qualification Programme (ATQP)

(See AC-1 to Appendix 1 to CAR OPS-1.978(b)(1))
(See AC-2 to Appendix 1 to CAR OPS-1.978(b)(2))
(See AC-3 to Appendix 1 to CAR OPS-1.978(b)(3))
(See AC-4 to Appendix 1 to CAR OPS-1.978(b)(4))
(See AC-5 to Appendix 1 to CAR- OPS-1.978(b)(5))
(See AC-6 to Appendix 1 to CAR OPS-1.978(b)(6))
(See AC-7 to Appendix 1 to CAR OPS-1.978(b)(9))
(See AC-8 to Appendix 1 to CAR OPS 1.978(c)(1)(i))

(a) An operator's ATQP may apply to the following requirements that relate to training and qualifications:
  (1) CAR OPS-1.450 and Appendix 1 to CAR OPS-1.450 - Low Visibility Operations – Training and Qualifications;
  (2) CAR OPS-1.945 Conversion training and checking and Appendix 1 to CAR OPS-1.945;
  (3) CAR OPS-1.950 Differences training and familiarisation training;
  (4) CAR OPS-1.955 paragraph (b) - Nomination as commander;
  (5) CAR OPS-1.965 Recurrent training and checking and Appendices 1 and 2 to CAR OPS-
  1.965;

(6) CAR OPS-1.980 Operation on more than one type or variant and Appendix 1 to CAR- OPS 1.980.

(b) Components of the ATQP - An Alternative Training and Qualification Programme shall comprise the following:

(1) Documentation that details the scope and requirements of the programme;

(2) A task analysis to determine the tasks to be analysed in terms of:

i. knowledge;

ii. the required skills;

iii. the associated skill-based training; and,

iv. where appropriate, the validated behavioural markers.

(3) Curricula – the curriculum structure and content shall be determined by task analysis, and shall include proficiency objectives including when and how those objectives shall be met. The process for curriculum development shall be acceptable to the Authority;

(4) A specific training programme for:

i. each aeroplane type/class within the ATQP;

ii. the instructors (CRI/SFI/TRI), and other personnel undertaking flight crew instruction;

iii. the examiners (CRE/SFE/TRE); to include a method for the standardization of the instructors and examiners;

(5) A feedback loop for the purpose of curriculum validation and refinement, and to ascertain that the programme meets its proficiency objectives;

(6) A method for the assessment of flight crew both during conversion and recurrent training and checking. The assessment process shall include event-based assessment as part of the LOE. The method of assessment shall comply with the provisions of CAR OPS-1.965;

(7) An integrated system of quality control, that ensures compliance with all the requirements processes and procedures of the programme;

(8) A process that describes the method to be used if the monitoring and evaluation programmes do not ensure compliance with the established proficiency and qualification standards for flight crew;

(9) A Data Monitoring/Analysis programme.

(c) Implementation – The operator shall develop an evaluation and implementation strategy acceptable to the Authority; the following requirements shall be fulfilled:

(1) The implementation process shall include the following stages:

i. A safety case that substantiates the validity of:

A. The revised training and qualification standards when compared with the standards achieved under CAR OPS-1 prior to the introduction of ATQP.

B. Any new training methods implemented as part of ATQP.

Note: If approved by the Authority the operator may establish an equivalent method other than a formal safety case.

ii. Undertake a task analysis as required by paragraph (b)(2) above in order to establish the operator's programme of targeted training and the associated training objectives.

iii. A period of operation whilst data is collected and analysed to ensure the efficiency of the safety case or equivalent and validate the task analysis. During this period the operator shall continue to operate to the pre- ATQP CAR OPS-1 requirements. The length of this period shall be agreed with the Authority;

(2) Authority: The operator may then be approved to conduct training and qualification as specified under the ATQP**.**

AC-1 to Appendix 1 to CAR OPS-1.978(b)(1) Requirements, Scope and Documentation of the Programme

(See Appendix 1 to CAR OPS-1.978(b)(1))

(1) The documentation should demonstrate how the operator should establish the scope and requirements of the programme. The documentation should include:
   (a) How the ATQP should enable the operator to establish an alternative training programme that substitutes the requirements as listed in CAR OPS-1 Subparts E and N. The programme should demonstrate that the operator is able to improve the training and qualification standards of flight crew to a level that exceeds the standard prescribed in CAR OPS-1.
   (b) The operator's training needs and established operational and training objectives.
   (c) How the operator defines the process for designing of and gaining approval for the operator's flight crew qualification programmes. This should include quantified operational and training objectives identified by the operator's internal monitoring programmes. External sources may also be used. (d) How the programme will:
      i. Enhance safety;
      ii. Improve training and qualification standards of flight crew;
      iii. Establish attainable training objectives;
      iv. Integrate CRM in all aspects of training;
      v. Develop a support and feedback process to form a self-correcting training system;
      vi. Institute a system of progressive evaluations of all training to enable consistent and uniform monitoring of the training undertaken by flight crew;
      vii. Enable the operator to be able to respond to the new aeroplane technologies and changes in the operational environment;
      viii. Foster the use of innovative training methods and technology for flight crew instruction and the evaluation of training systems;
      ix. Make efficient use of training resources, specifically to match the use of training media to the training needs.

AC-2 to Appendix 1 to CAR OPS-1.978(b)(2) Task Analysis

(See Appendix 1 to CAR OPS-1.978(b)(2))

(1) For each aeroplane type/class to be included within the ATQP the operator should establish a systematic review that determines and defines the various tasks to be undertaken by the flight crew when operating that type(s)/class.
(2) Data from other types/class may also be used. The analysis should determine and describe the knowledge and skills required to complete the various tasks specific to the aeroplane type/class and/or type of operation.
(3) In addition, the analysis should identify the appropriate behavioural markers that should be exhibited. The task analysis should be suitably validated in accordance with Appendix 1 to CAR OPS-1.978(c)(iii).
(4) The task analysis, in conjunction with the data gathering programme(s) permit the operator to establish a programme of targeted training together with the associated training objectives described in AC to Appendix 1 to CAR OPS-1.978(b)(3) paragraph (2)(c)(iii) below.

AC-3 to Appendix 1 to CAR OPS-1.978(b)(3) Training Programme

(See Appendix 1 to CAR OPS-1.978(b)(3))

(1) The training programme should have the following structure:
- (a) Curriculum.
- (b) Daily lesson plan.

(2) The curriculum should specify the following elements:
- (a) Entry requirements: A list of topics and content, describing what training level will be required before start or continuation of training.
- (b) Topics: A description of what will be trained during the lesson;
- (c) Targets/Objectives
  - i. Specific target or set of targets that have to be reached and fulfilled before the training course can be continued.
  - ii. Each specified target should have an associated objective that is identifiable both by the flight crew and the trainers.
  - iii. Each qualification event that is required by the programme should specify the training that is required to be undertaken and the required standard to be achieved. (See paragraph (1)(d) below)

(3) Each lesson/course/training or qualification event should have the same basic structure. The topics related to the lesson have to be listed and the lesson targets should be unambiguous.

(4) Each lesson/course or training event whether classroom, CBT or simulator should specify the required topics with the relevant targets to be achieved.

AC-4 to Appendix 1 to CAR OPS-1.978(b)(4) Training Personnel

(See Appendix 1 to CAR OPS-1.978(b)(4))

(1) Personnel who perform training and checking of flight crew in an operator's ATQP should receive the following additional training on:
- (a) ATQP principles and goals;
- (b) Knowledge/skills/behaviour as learned from task analysis;
- (c) LOE/ LOFT Scenarios to include triggers / markers / event sets / observable behaviour;
- (d) Qualification standards;
- (e) Harmonisation of assessment standards;
- (f) Behavioural markers and the systemic assessment of CRM;
- (g) Event sets and the corresponding desired knowledge/skills and behaviour of the flight crew;
- (h) The processes that the operator has implemented to validate the training and qualification standards and the instructor's part in the ATQP quality control; and (i) LOQE.

AC-5 to Appendix 1 to CAR OPS-1.978(b)(5) Feedback Loop

(See Appendix 1 to CAR OPS-1.978(b)(5))

(1) The feedback should be used as a tool to validate that the curricula are implemented as specified by the ATQP; this enables substantiation of the curriculum, and that proficiency and training objectives have been met. The feedback loop should include data from operations flight data monitoring, advanced FDM programme and LOE/LOQE programmes. In addition, the evaluation process shall describe whether the overall targets/objectives of training are being achieved and shall prescribe any corrective action that needs to be undertaken.

(2) The programmes established quality control mechanisms should at least review the following:
- (a) Procedures for approval of recurrent training;
- (b) ATQP instructor training approvals;
- (c) Approval of event set(s) for LOE/LOFT;
- (d) Procedures for conducting LOE and LOQE

AC-6 to Appendix 1 to CAR OPS-1.978(b)(6) Crew Performance Measurement and Evaluation

(See Appendix 1 to CAR OPS-1.978(b)(6))

(1) The qualification and checking programmes should include at least the following elements:
- (a) A specified structure;
- (b) Elements to be tested/examined;
- (c) Targets and/or standards to be attained;
- (d) The specified technical and procedural knowledge and skills, and behavioural markers to be exhibited.

(2) An LOE event should comprise of tasks and sub-tasks performed by the crew under a specified set of conditions. Each event has one or more specific training targets/objectives, which require the performance of a specific manoeuvre, the application of procedures, or the opportunity to practice cognitive, communication or other complex skills. For each event the proficiency that is required to be achieved should be established. Each event should include a range of circumstances under which the crews' performance is to be measured and evaluated.

(3) The conditions pertaining to each event should also be established and they may include the prevailing meteorological conditions (ceiling, visibility, wind, turbulence etc.); the operational environment (navigation aid inoperable etc.); and the operational contingencies (non-normal operation etc.).

(4) The markers specified under the operator's ATQP should form one of the core elements in determining the required qualification standard. A typical set of markers are shown in the table below:

EVENT	MARKER
Awareness of Aeroplane Systems:	1. Monitors and reports changes in automation status.
	2. Applies closed loop principle in all relevant situations.
	3. Uses all channels for updates.
	4. Is aware of remaining technical resources.

(5) The topics / targets integrated into the curriculum have to be measurable and progression on any training/course is only allowed if the targets are fulfilled.

AC-7 to Appendix 1 to CAR OPS-1.978(b)(9) Data Monitoring/Analysis Programme

(See Appendix 1 to CAR OPS-1.978(b)(9))

(1) The data analysis programme should consist of:
- (a) *A Flight Data Monitoring (FDM) programme:* This programme should include systematic evaluation of operational data derived from equipment that is able to record the flight profile and relevant operational information during flights conducted by the operator's aeroplane. Data collection should reach a minimum of 60% of all relevant flights conducted by the operator before ATQP approval is granted. This proportion may be increased at the discretion of the Authority.
- (b) *An Advanced FDM when an extension to the ATQP is requested:* An advanced FDM programme is determined by the level of integration with other safety initiatives implemented by the operator, such as the operator's Quality System. The programme should include both systematic evaluations of data from an FDM programme and flight crew training events for the relevant crews. Data collection should reach a minimum of 80% of all relevant flights and training conducted by the operator. This proportion may be varied at the discretion of the Authority.

(2) The purpose of either an FDM or advanced FDM programme is to enable the operator to:
   (a) Provide data to support the programmes implementation and justify any changes to the ATQP;
   (b) Establish operational and training objectives based upon an analysis of the operational environment;
   (c) Monitor the effectiveness of flight crew training and qualification.
(3) Data Gathering.
   (a) FDM programmes should include a system that captures flight data, and then transforms the data into an appropriate format for analysis. The programme should generate information to assist the operations safety personnel in analysing the data. The analysis should be made available to the ATQP post-holder.
   (b) The data gathered should:
      i. Include all fleets that plan to operate under the ATQP;
      ii. Include all crews trained and qualified under the ATQP;
      iii. Be established during the implementation phase of ATQP; and
      iv. Continue throughout the life of the ATQP.
(4) Data Handling.
   (a) The operator should establish a process, which ensures the strict adherence to any data handling protocols, agreed with flight crew representative bodies, to ensure the confidentiality of individual flight crew members.
   (b) The data handling protocol should define the maximum period of time that detailed FDM or advanced FDM programme data, including exceedances, should be retained. Trend data may be retained permanently.
(5) An operator that has an acceptable operations flight data monitoring programme prior to the proposed introduction of ATQP may, with the approval of the Authority, use relevant data from other fleets not part of the proposed ATQP.

AC-8 to Appendix 1 to CAR OPS-1.978(c)(1)(i) Safety Case

(See Appendix 1 to CAR OPS-1.978(c)(1)(i))

(1) Safety Case
   (a) A documented body of evidence that provides a demonstrable and valid justification that the programme (ATQP) is adequately safe for the given type of operation. The safety case should encompass each phase of implementation of the programme and be applicable over the lifetime of the programme that is to be overseen.
   (b) The safety case should:
      i. Demonstrate the required level of safety;
      ii. Ensure the required safety is maintained throughout the lifetime of the programme;
      iii. Minimise risk during all phases of the programme's implementation and operation.
(2) Elements of a Safety Case:
   (a) Planning: Integrated and planned with the operation (ATQP) that is to be justified;
   (b) Criteria: Develop the applicable criteria – see paragraph (3) below;
   (c) Documentation: Safety related documentation – including a safety checklist;
   (d) Programme of implementation: To include controls and validity checks;
   (e) Oversight: Review and audits.

(3) Criteria for the establishment of a Safety Case.
   (a) The Safety Case should:
      i. Be able to demonstrate that the required or equivalent level of safety is maintained throughout all phases of the programme, including as required by paragraph (c) below;

ii. Be valid to the application and the proposed operation (ATQP);
iii. Be adequately safe and ensure the required regulatory safety standards or approved equivalent safety standards are achieved;
iv. Be applicable over the entire lifetime of the programme;
v. Demonstrate Completeness and Credibility of the programme;
vi. Be fully documented;
vii. Ensure integrity of the operation and the maintenance of the operations and training infra-structure;
viii. Ensure robustness to system change;
ix. Address the impact of technological advance, obsolescence and change;
x. Address the impact of regulatory change.

(4) In accordance with Appendix 1 to CAR OPS-1.978 paragraph (c) the operator may develop an equivalent method other than that specified above.

AMC-1 OPS-1.980 Operation on more than one type or variant

(See CAR OPS-1.980)

(1) Terminology

(a) The terms used in the context of the requirement for operation of more than one type or variant have the following meaning:

i. Base aeroplane. An aeroplane, or a group of aeroplanes, designated by an operator and used as a reference to compare differences with other aeroplane types/variants within an operator's fleet.
ii. Aeroplane variant. An aeroplane, or a group of aeroplanes, with the same characteristics but which have differences from a base aeroplane which require additional flight crew knowledge, skills, and or abilities that affect flight safety.
iii. Credit. The acceptance of training, checking or recent experience on one type or variant as being valid for another type or variant because of sufficient similarities between the two types or variants.
iv. Differences training. See CAR OPS 1.950(a)(1).
v. Familiarisation training. See CAR OPS 1.950(a)(2).
vi. Major change. A change, or changes, within an aeroplane type or related type, which significantly affect the flight crew interface with the aeroplane (e.g. flight characteristics, procedures, design/number of propulsion units, change in number of required flight crew).
vii. Minor change. Any change other than a major change.
viii. Operator Difference Requirements (ODRs). A formal description of differences between types or variants flown by a particular operator.

(b) Training and checking difference levels

i. Level A

A. Training. Level A training can be adequately addressed through self-instruction by a crew member through page revisions, bulletins or differences handouts. Level A introduces a different version of a system or component which the crew member has already shown the ability to use and understand. The differences result in no, or only minor, changes in procedures.

B. Checking. A check related to differences is not required at the time of training. However, the crew member is responsible for acquiring the knowledge and may be checked during proficiency checking.

ii. Level B

A. Training. Level B training can be adequately addressed through aided instruction such as slide/tape presentation, computer-based instruction which may be interactive, video or classroom instruction. Such training is typically used for part-task systems requiring knowledge and training with, possibly, partial application of procedures (e.g. fuel or hydraulic systems etc.).

B. Checking. A written or oral check is required for initial and recurrent differences training.

iii. Level C

A. Training. Level C training should be accomplished by use of "hands on" FSTDs qualified according to CAR-ORA (Subpart FSTD). The differences affect skills, abilities as well as knowledge but do not require the use of "real time" devices. Such training covers both normal and non-normal procedures (for example for flight management systems).

B. Checking. An STD used for training level C or higher is used for a check of conversion and recurrent training. The check should utilise a "real time" flight environment such as the demonstration of the use of a flight management system. Manoeuvres not related to the specific task do not need to be tested.

iv. Level D

A. Training. Level D training addresses differences that affect knowledge, skills and abilities for which training will be given in a simulated flight environment involving, "real time" flight manoeuvres for which the use of an FSTD qualified according to CAR-ORA (Subpart-FSTD).110 would not suffice, but for which motion and visual clues are not required. Such training would typically involve an STD as defined in CAR-ORA (Subpart-FSTD).

B. Checking. A proficiency check for each type or variant should be conducted following both initial and recurrent training. However, credit may be given for manoeuvres common to each type or variant and need not be repeated. Items trained to level D differences may be checked in STDs qualified according to CAR-ORA (Subpart-FSTD). Level D checks will therefore comprise at least a full proficiency check on one type or variant and a partial check at this level on the other.

v. Level E

A. Training. Level E provides a realistic and operationally oriented flight environment achieved only by the use of Level C or D Flight Simulators or the aeroplane itself. Level E training should be conducted for types and variants which are significantly different from the base aeroplane and/or for which there are significant differences in handling qualities.

B. Checking. A proficiency check on each type or variant should be conducted in a level C or D Flight Simulator or the aeroplane itself. Either training or checking on each Level E type or variant should be conducted every 6 months. If training and checking are alternated, a check on one type or variant should be followed by training on the other so that a crew member receives at least one check every 6 months and at least one check on each type or variant every twelve (12) months.

AMC-2 OPS-1.980(b) Methodology - Use of Operator Difference Requirement (ODR) Tables

(See CAR OPS-1.980(b))
(See also IEM OPS-1.980(b))

(1) General

(a) Use of the methodology described below is acceptable to the Authority as a means of evaluating aeroplane differences and similarities to justify the operation of more than one type or variant, and when credit is sought.

(2) ODR Tables

(a) Before requiring flight crew members to operate more than one type or variant, operators should first nominate one aeroplane as the Base Aeroplane from which to show differences with the second aeroplane type or variant, the 'difference aeroplane', in terms of technology (systems), procedures, pilot handling and aeroplane management. These differences, known as Operator Difference Requirements (ODR), preferably presented in tabular format, constitute part of the justification for operating more than one type or variant and the basis for the associated differences/familiarisation training for the flight crew.

(3) The ODR Tables should be presented as follows:

Table 1 – ODR 1 – General

BASE AEROPLANE:		DIFFERENCE AEROPLANE:		COMPLIANCE METHOD		
GENERAL	**DIFFERENCES**	**FLT CHAR**	**PROCEDURE CHANGES**	**Training**	**Checking**	**Recent Experience**
General description of aircraft (dimensions weight, limitations, etc.)	Identification of the relevant differences between the base aeroplane and The difference aeroplane.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

Table 2 – ODR 2 – Systems

BASE AEROPLANE:		DIFFERENCE AEROPLANE:		COMPLIANCE METHOD		
SYSTEM	**DIFFERENCE S**	**FLT CHAR**	**PROCEDURE CHANGES**	**TRAINING**	**CHECKING**	**Recent Experience**
Brief description of systems and Sub-systems classified according to the ATA 100 index.	list of differences for each relevant subsystem between the base aeroplane and the difference aeroplane.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

Table 3 – ODR – Manoeuvres

BASE AEROPLANE:		DIFFERENCE AEROPLANE:		COMPLIANCE METHOD		
MANOEUVRES	**DIFFERENCES**	**FLIGHT CHARACTERISTICS**	**PROCEDURE CHANGES**	**TRAINING**	**CHECKING**	**Recent Experience**
Described according to phase of flight (gate, taxi, flight, taxi, gate)	List of relevant differences for each manoeuvre between the base aeroplane and the difference aeroplane.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

(4) Compilation of ODR Tables

(a) ODR 1 – Aeroplane general

i. The general characteristics of the difference aeroplane should be compared with the base aeroplane with regard to:

A. General dimensions and aeroplane design;
B. Flight deck general design;
C. Cabin layout;
D. Engines (number, type and position);
E. Limitations (flight envelope).

(b) ODR 2 – Aeroplane systems

i. Consideration should be given to differences in design between the difference aeroplane and the base aeroplane. This comparison should be completed using the ATA 100 index to establish system and subsystem classification and then an analysis performed for each index item with respect to main architectural, functional and/or operations elements, including controls and indications on the systems control panel.

(c) ODR 3 - Aeroplane manoeuvres (operational differences)

i. Operational differences encompass normal, abnormal and emergency situations and include any change in aeroplane handling and flight management. It is necessary to establish a list of operational items for consideration on which an analysis of differences can be made. The operational analysis should take the following into account:

A. Flight deck dimensions (e.g. size, cut-off angle and pilot eye height);
B. Differences in controls (e.g. design, shape, location, function);
C. Additional or altered function (flight controls) in normal or abnormal conditions;
D. Procedures;
E. Handling qualities (including inertia) in normal and abnormal configurations;
F. Performance in manoeuvres;
G. Aeroplane status following failure;
H. Management (e.g. ECAM, EICAS, navaid selection, automatic checklists).

(d) Once the differences for ODR 1, ODR 2 and ODR 3 have been established, the consequences of differences evaluated in terms of Flight Characteristics (FLT CHAR) and Change of Procedures (PROC CHNG) should be entered into the appropriate columns.

(e) Difference Levels – crew training, checking and currency

i. The final stage of an operator’s proposal to operate more than one type or variant is to establish crew training, checking and currency requirements. This may be established by applying the coded difference levels from Table 4 to the Compliance Method column of the ODR Tables.

(5) Differences items identified in the ODR systems as impacting flight characteristics, and/or procedures, should be analysed in the corresponding ATA section of the ODR manoeuvres. ***Normal, abnormal and emergency situations should be addressed accordingly.***

(6) Differences Level versus Training.

Table 4 - Difference Levels versus training

Difference Level	Method/Minimum Specification for Training Device
A: Represents knowledge requirement.	Self-Instruction through operating bulletins or differences handouts
B: Aided instruction is required to ensure crew understanding, emphasise issues, aid retention of information, or aided instruction with partial application of procedures	Aided instruction e.g. computer based training (CBT), class room Instruction or video tapes. Interactive CBT
C: For variants having part task differences affecting skills or abilities as well as knowledge. Training device required to ensure attainment and retention of crew skills	STD (CAR-ORA (SUBPART-FSTD)
D: Full task differences affecting knowledge, skills and/or abilities using STDs capable of performing flight manoeuvres.	STD (CAR-ORA (SUBPART-FSTD)
E: Full tasks differences requiring high fidelity environment to attain and maintain knowledge skills and abilities.	STD (CAR-ORA (SUBPART-FSTD)

Note: Levels A and B require familiarisation training, levels C, D and E require differences training. For Level E, the nature and extent of the differences may be such that it is not possible to fly both types or variants with a credit in accordance with Appendix 1 to CAR OPS-1.980, subparagraph (d)(7).

Appendix 1 to CAR OPS-1.980 Operation on more than one type or variant

(See AMC-1 OPS-1.980)

(a) When a flight crew member operates more than one aeroplane class, type or variant listed in CAR FCL and associated procedures for class-single pilot and/or CAR FCL and associated procedures for class type-single pilot, but not within a single license endorsement, an operator must comply with the following:
   (1) A flight crew member shall not operate more than:
      i. Three piston engine aeroplane types or variants; or
      ii. Three turbo-propeller aeroplane types or variants; or
      iii. One turbo-propeller aeroplane type or variant and one piston engine aeroplane type or variant; or.
      iv. One turbo-propeller aeroplane type or variant and any aeroplane within a particular class.
   (2) CAR OPS-1.965 for each type or variant operated unless the operator has demonstrated specific procedures and/or operational restrictions which are acceptable to the AUTHORITY.

(b) When a flight crew member operates more than one aeroplane type or variant within one or more license endorsement as defined by CAR FCL and associated procedures for type - multi-pilot, an operator shall ensure that:
   (1) The minimum flight crew complement specified in the Operations Manual is the same for each type or variant to be operated;
   (2) A flight crew member does not operate more than two aeroplane types or variants for which a separate license endorsement is required; and
   (3) Only aeroplanes within one license endorsement are flown in any one flight duty period unless the operator has established procedures to ensure adequate time for preparation.

Note: In cases where more than one license endorsement is involved, see sub-paragraphs (c) and (d) below.

(c) When a flight crew member operates more than one aeroplane type or variant listed in CARFCL and associated procedures for CAR FCL and associated procedures for type - single pilot and type - multi pilot, but not within a single license endorsement, an operator must comply with:

(1) Subparagraphs (b)(1), (b)(2) and (b)(3) above; and

(d) Subparagraph (d) below. When a flight crew member operates more than one aeroplane type or variant listed in CAR FCL and associated procedures for type - multi pilot, but not within a single license endorsement, an operator must comply with the following:

(1) Subparagraphs (b)(1), (b)(2) and (b)(3) above;

(2) Before exercising the privileges of two (2) license endorsements:

i. Flight crew members must have completed two consecutive operator proficiency checks and must have 500 hours in the relevant crew position in commercial air transport operations with the same operator.

ii. In the case of a pilot having experience with an operator and exercising the privileges of two (2) license endorsements, and then being promoted to command with the same operator on one of those types, the required minimum experience as commander is six (6) months and 300 hours, and the pilot must have completed two (2) consecutive operator proficiency checks before again being eligible to exercise two (2) license endorsements.

(3) Before commencing training for and operation of another type or variant, flight crew members must have completed three (3) months and 150 hours flying on the base aeroplane which must include at least one proficiency check.

(4) After completion of the initial line check on the new type, fifty (50) hours flying or twenty (20) sectors must be achieved solely on aeroplanes of the new type rating.

(5) Notwithstanding CAR OPS-1.970, for each type operated unless credits have been allowed by the Authority in accordance with sub-paragraph (7) below.

(6) The period within which line flying experience is required on each type must be specified in the Operations Manual.

(7) Where credits are sought to reduce the training and checking and recent experience requirements between aeroplane types, the operator must demonstrate to the Authority which items need not be repeated on each type or variant because of similarities:

i. CAR OPS-1.965(b) requires two operator proficiency checks every year. When credit is given in accordance with sub-paragraph (7) above for operator proficiency checks to alternate between the two types, each operator proficiency check revalidates the operator proficiency check for the other type. Provided that the period between proficiency checks for revalidation or renewal of type rating does not exceed that prescribed in CAR-FCL for each type, the CAR-FCL requirements will be satisfied. In addition, relevant and approved recurrent training must be specified in the Operations Manual.

ii. CAR OPS-1.965(c) requires one line check every year. When credit is given in accordance with sub-paragraph (7) above for line checks to alternate between types or variants, each line check revalidates the line check for the other type or variant.

iii. Annual emergency and safety equipment training and checking must cover all requirements for each type.

(8) CAR OPS-1.965 (Recurrent training and checking) for each type or variant operated unless credits have been allowed by the Authority in accordance with sub-paragraph (7) above.

(e) When a flight crew member operates combinations of aeroplane types or variants as defined by CAR FCL and associated procedures for type - multi-pilot, an operator must demonstrate that specific procedures and/or operational restrictions are approved in accordance with CAR OPS-1.980.

IEM OPS-1.980(b) Operation on more than one type or variant – Philosophy and Criteria

(See CAR OPS-1.980(b))

(1) Philosophy

(a) The concept of operating more than one type or variant depends upon the experience, knowledge and ability of the operator and the flight crew concerned.

(b) The first consideration is whether or not the two aeroplane types or variants are sufficiently similar to allow the safe operation of both.

(c) The second consideration is whether or not the types or variants are sufficiently similar for the training, checking and recent experience items completed on one type or variant to replace those required on the similar type or variant. If these aeroplanes are similar in these respects, then it is possible to have credit for training, checking and recent experience. Otherwise, all training, checking and recent experience requirements prescribed in Subpart N should be completed for each type or variant within the relevant period without any credit.

(2) Differences between aeroplane types or variants

(a) The first stage in any operator's submission for crew multi-type or variant operations is to consider the differences between the types or variants. The principal differences are in the following three areas:

i. Level of technology. The level of technology of each aircraft type or variant under consideration encompasses at least the following design aspects:

A. Flight deck layout (e.g. design philosophy chosen by a manufacturer);
B. Mechanical versus electronic instrumentation;
C. Presence or absence of Flight Management System (FMS);
D. Conventional flight controls (hydraulic, electric or manual controls) versus fly-by-wire;
E. Side-stick versus conventional control column;
F. Pitch trim systems;
G. Engine type and technology level (e.g. jet/turboprop/piston, with or without automatic protection systems.

ii. Operational differences. Consideration of operational differences involves mainly the pilot machine interface, and the compatibility of the following:

A. Paper checklist versus automated display of checklists or messages (e.g. ECAM, EICAS) during all procedures;
B. Manual versus automatic selection of navaids;
C. Navigation equipment;
D. Aircraft weight and performance.

iii. Handling characteristics. Consideration of handling characteristics includes control response, crew perspective and handling techniques in all stages of operation. This encompasses flight and ground characteristics as well as performance influences (e.g. number of engines). The capabilities of the autopilot and auto-thrust systems may affect handling characteristics as well as operational procedures.

(3) Training, checking and crew management. Alternating training and proficiency checking may be permitted if the submission to operate more than one type or variant shows clearly that there are sufficient similarities in technology, operational procedures and handling characteristics.

(4) An example of completed ODR tables for an operator's proposal for flight crews to operate more than one type or variant may appear as follows:

Table 1 – ODR 1 – AEROPLANE GENERAL

BASE AEROPLANE: 'X' DIFFERENCE AEROPLANE: 'Y'				COMPLIANCE METHOD		
GENERAL	**DIFFERENCES**	**Flight Characteristics**	**Procedure Changes**	**Training**	**Checking**	**Recent Experience**
Flight Deck	Same flight deck arrangement, 2 observer's seats on 'Y'	NO	NO	A	/	/
Cabin	'Y' max certificated passenger capacity: 335, 'X': 179	NO	NO	A	/	/

Table 2 – ODR 2 – SYSTEMS

BASE AEROPLANE: 'X' DIFFERENCE AEROPLANE: 'Y'				COMPLIANCE METHOD		
Systems	**Differences**	**Flight Characteristics**	**Procedure Changes**	**Training**	**Checking**	**Recent Experience**
21 Air Conditioning	- Trim air system -packs - cabin temperature	NO NO NO	YES NO YES	B	B	B
22 Auto flight	- FMGS architecture - FMGES functions - reversion modes	NO NO NO	NO YES YES	B C D	B C D	B B D
23 Communications						

Table 3 – ODR 3 – MANOEUVERS

BASIC AEROPLANE: 'X' DIFFERENCE AEROPLANE: 'Y'				COMPLIANCE METHOD		
Manoeuvers	**Differences**	**Flight Characteristics**	**Procedure Changes**	**Training**	**Checking**	**Recent Experience**
Taxi	- Pilot eye height, turn radius, - two engine taxi (1&4)	YES NO	NO NO	D A	D /	/ /
Take-off	Flight Characteristics in ground law	YES	NO	E	E	E
Rejected takeoff	Reverser actuation logic	YES	NO	D	D	D
Take-off engine failure	- V1/Vr split - Pitch attitude/ lateral control	YES (P)* YES (H)*	NO NO	B E	B E	B

*P = Performance, *H = Handling

IEM OPS-1.985 Training records

(See CAR OPS-1.985)

A summary of training should be maintained by the operator to show a flight crew member's completion of each stage of training and checking.

SUBPART O – CABIN CREW

CAR OPS-1.988 Applicability

(a) The operator shall establish, to the satisfaction of the Authority, the minimum number of cabin crew required for each type of aeroplane, based on seating capacity or the number of passengers carried, in order to affect a safe and expeditious evacuation of the aeroplane, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation. The operator shall assign these functions for each type of aeroplane.

(b) An operator shall ensure that all cabin crew members comply with the requirements of this Subpart and any other safety requirements applicable to cabin crew.

(c) For the purpose of this Regulation, “cabin crew member” means an appropriately qualified crew member, other than a flight crew member, who performs, in the interests of safety of passengers, duties assigned to him/her by the operator or the commander in the cabin of an aeroplane.

CAR OPS-1.989 Identification

(See GM OPS-1.989)

(a) An operator shall ensure that all cabin crew members wear the operator’s cabin crew uniform and are clearly identifiable to the passengers as a cabin crew member.

(b) The uniform to be worn by operating cabin crew shall be such as not to impede the performance of their duties, as required for the safety of passengers and flight during operations, and shall allow passengers to identify the operating cabin crew in an emergency situation.

(c) Other personnel, such as medical staff, security staff, child minders, escorts, technical staff, entertainers, interpreters, who undertake tasks in the cabin, shall not wear a uniform which might identify them to passengers as a cabin crew member, unless they comply with the requirements of this Subpart and any other applicable requirements of this Regulation.

CAR OPS-1.990 Determining the Number and composition of cabin crew

(See IEM OPS-1.990, GM 1 OPS-1.990, GM 2 OPS-1.990, AMC OPS-1.1000(e))

(a) An operator shall not operate an aeroplane with a maximum approved passenger seating configuration of more than nineteen (19), when carrying one or more passengers, unless at least one cabin crew member is included in the crew for the purpose of performing duties, specified in the Operations Manual, in the interests of the safety of passengers.

(b) When complying with sub-paragraph (a) above, an operator shall ensure that the minimum number of cabin crew is the greater of:

   (1) One cabin crew member for every fifty (50), or fraction of fifty (50), passenger seats installed on the same deck of the aeroplane; or

   (2) The number of cabin crew who actively participated in the aeroplane cabin during the relevant emergency evacuation demonstration, or who were assumed to have taken part in the relevant analysis, except that, if the maximum approved passenger seating configuration is less than the number evacuated during the demonstration by at least fifty (50) seats, the number of cabin crew may be reduced by one (1) for every whole multiple of fifty (50) seats by which the maximum approved passenger seating configuration falls below the certificated maximum capacity.

(c) During ground operations only, the minimum number of cabin crew shall be determined by the number of floor level exits on aircraft types in the operator’s fleet to provide the most effective response in the event of an emergency situation unless otherwise approved by the Authority to operate with a reduced cabin crew complement.

(d) The Authority may under exceptional circumstances require an operator to include in the crew, additional cabin crew members.

(e) In unforeseen circumstances the required minimum number of cabin crew may be reduced provided that:

    (1) The number of passengers has been reduced in accordance with procedures specified in the Operations Manual; and
    (2) A report is submitted to the Authority after completion of the flight.

(f) An operator shall ensure that when engaging the services of cabin crew members who are self-employed and/or working on a freelance or part-time basis, the requirements of Subpart O are complied with. In this respect, particular attention must be paid to the total number of aircraft types or variants that a cabin crew member may fly for the purposes of commercial air transportation, which must not exceed the requirements in CAR OPS-1.1030, including when his services are engaged by another operator.

(g) When scheduling cabin crew for a flight, an operator should establish procedures which take account of the experience of each cabin crew member such that the required cabin crew includes a minimum of two (2) cabin crew members of which one (1) shall have more than twelve (12) months type approval operating experience as a cabin crew member and the second senior cabin crew member shall have at least three (3) months experience as an operating cabin crew member

CAR OPS-1.995 Minimum requirements

(See GM OPS-1.995(g))

An operator shall ensure that each cabin crew member:

(a) Is at least 18 years of age;
(b) Has passed a medical examination or assessment at regular intervals as required by the Authority so as to check the medical fitness to discharge his/her duties;
(c) Has successfully completed initial training in accordance with CAR OPS-1.1005 and holds an attestation of safety training;
(d) Has completed the appropriate conversion and/or differences training covering at least the subjects listed in CAR OPS-1.1010;
(e) Shall undergo recurrent training in line with the provisions of CAR OPS-1.1015;
(f) Is competent to perform his/her duties in accordance with procedures specified in the Operations Manual.
(g) The ability to read, speak, write and understand English (to an acceptable level stated within the Operations Manual, approved by the CAA) that shall ensure the appropriate communication with other cabin crew members, flight crew and passengers.
(h) The ability to retrieve safety and emergency equipment and open and close overhead bins on the aircraft;
(i) The ability and strength to operate equipment/systems, as applicable to the operator’s procedures during normal, abnormal and emergency situations and to the aircraft type(s) to which the cabin crew member will be assigned duties;

CAR OPS-1.1000 In-charge cabin crew members

(See AMC OPS-1.1000(e)) AMC OPS-1.1025)

(a) When more than one cabin crew member is assigned to a flight, the operator shall nominate one cabin crew member as the in-charge cabin crew member to be responsible to the commander.
(b) The In-charge cabin crew member shall have responsibility to the commander for the conduct and coordination of normal and emergency procedure(s), including discontinuing non-safety related duties for the continued safety or security of the flight as specified in the Operations Manual.

(c) During turbulence, in the absence of any instructions from the flight crew, the In-charge cabin crew member shall be entitled to discontinue non-safety related duties and advise the flight crew of the level of turbulence being experienced and the need for the fasten seat belt signs to be switched on. This should be followed by the cabin crew securing the passenger cabin and other applicable areas, unless otherwise advised by the commander.

(d) Where required by CAR OPS-1.990 to carry more than one cabin crew member, an operator shall appoint a person to the post of In-charge cabin crew member who has at least:

(1) one year's experience as an operating cabin crew member; and
(2) has undergone at least (1) one line check as per CAR OPS-1.1025 (a); and
(3) has successfully completed the "In-charge Training course"; and

The In-charge training programme shall cover the following as a minimum

A. Operating as a leader (leadership skills):
   i. One crew concept;
   ii. Team building and maintenance; and
   iii. Planning and workload management.

B. Flight preparation – Pre-Flight Briefing:
   i. allocation of cabin crew stations and responsibilities;
   ii. confirm operational knowledge of crew member responsibilities associated with that allocated position;
   iii. consideration of the particular flight, including
      a. aeroplane type,
      b. equipment,
      c. area and type of operation, and
      d. categories of passengers with particular attention to disabled, infants and stretcher cases; and

C. Cooperation within the crew:
   i. discipline, responsibilities and chain of command,
   ii. importance of coordination and communication,
   iii. security threats
   iv. announcements,
   v. pilot and cabin crew incapacitation.

D. Review of operator's and regulatory requirements:
   i. passenger safety briefing,
   ii. safety information cards,
   iii. Passenger compliance to seat belts (signage and PA) and infant seat belt or child restraint device,
   iv. securing of galleys, lavatories and cabin,
   v. stowage of cabin baggage,
   vi. electronic equipment,
   vii. procedures when fuelling with passengers on board,
   viii. turbulence,
   ix. documentation; including cabin logbook entries

E. Familiarization flight supervision requirements and assessment training.
F. Human factors and crew resource management; and
G. Accident and incident reporting; and
H. Flight and duty time limitations and rest requirements.

(e) An operator shall establish procedures to select the next most suitably qualified cabin crew member to operate as in-charge cabin crew member in the event of the in-charge cabin crew member becoming unable to operate. Such procedures must be acceptable to the Authority and take account of the cabin crew member's operational experience.

(f) *CRM Training:* An operator shall ensure that all relevant elements in Appendix 2 to CAR OPS 1.1005/1.1010/1.1015 Table 1, Column (a) are integrated into the training and covered to the level required by Column (f), In-charge Cabin Crew Course.

(1) CRM Training programme for In-ChargeCabin Crew Member provides specialized competencies and skills relevant to becoming a qualified cabin crew in-charge. It is an enhanced training programme which is specific to the duties and responsibilities of an in-charge cabin crew. The training provides him/her with competencies and skills required to assume this role.

(2) This shall include the application of knowledge gained in previous CRM training and operational experience relevant to the specific duties and responsibilities of In-Charge Cabin Crew Member.

(3) The In-Charge cabin crew member shall demonstrate the ability to manage all areas of operations within the aircraft (except Flight Crew duties) and take the appropriate leadership/management decisions during the day-to-day operations and normal, abnormal and emergency situations in order to participate in the safe operation of the flight.

CAR OPS-1.1002 Single cabin crew member operations

An operator shall ensure that each cabin crew member who does not have previous comparable experience completes the following, before operating as a single cabin crew member.

(1) Training in addition to that required by CAR OPS-1.1005 and CAR OPS-1.1010 shall include particular emphasis on the following to reflect single cabin crew member operations:

i. responsibility to the commander for the conduct of cabin safety and emergency procedure(s) specified in the Operations Manual;
ii. importance of coordination and communication with the flight crew, management of unruly or disruptive passengers;
iii. review of operator's requirements and legal requirements;
iv. documentation;
v. accident and incident reporting;
vi. flight and duty time limitations

(a) An operator shall ensure, the cabin crew member assigned to operate as a single cabin crew member, is competent to perform his/her duties in accordance with the procedures specified in the Operations Manual.

(b) Suitability for single cabin crew operations shall be addressed in the criteria for cabin crew selection, recruitment, training and assessment of competence.

(c) Cabin crew members shall complete a recurrent training programme annually. (See CAR OPS1.1015 and Appendix 1 to CAR OPS-1.1015)

(d) Cabin crew members shall complete the training with familiarisation flights as per CAR OPS1.1012.

CAR OPS-1.1005 Initial safety training

(See Appendix 1 to CAR OPS-1.1005 and Appendix 3 to CAR OPS-1.1005/1.1010/1.1015. See CAR OPS 1.1039 and CAR OPS 1.1040)

(a) An operator shall ensure that initial training for each cabin crew member is conducted by suitably qualified persons, on the following, but not limited to:

(1) Aviation indoctrination;
(2) Cabin crew tasks;
(3) Normal, abnormal and Emergency procedures;
(4) Aircraft type rating;
(5) Dangerous goods;
(6) Human performance (CRM);
(7) Cabin health and first aid;

(8) Aviation security;
(9) Identifying and responding to trafficking in persons.

Note: See additional required subjects listed in Appendix 1 to CAR OPS-1.1005.

(b) Training courses shall, at the discretion of the Authority, and subject to its approval, be provided: either
(1) by the operator
i. directly, or
ii. indirectly through a training organisation acting on behalf of the operator; or
(2) by an approved training organisation.
(c) The programme and structure of the initial training courses shall be in accordance with the applicable requirements and shall be subject to prior approval of the Authority.
(d) At the discretion of the Authority, the operator or the approved training organisation providing the training course, shall deliver an attestation of safety training if applicable to a cabin crew member after he has completed the initial safety training and successfully passed the check referred to in AMC OPS-1.1025.
(e) Where the Authority authorises an operator or an approved training organisation to deliver the attestation of safety training if applicable, to a cabin crew member, such attestation shall clearly state a reference to the acceptance granted by the Authority.
(f) All instructors who provide cabin crew training (SEP, First Aid, CRM, DGR and In-flight Cabin Security) shall be monitored and accepted by CAA prior to conduct of safety training.

CAR OPS-1.1007 Training Facilities

(See AMC OPS 1.1007 and GM OPS-1.1007)

(a) Training facilities shall comprise of classroom and or representative training devices provided with the appropriate furnishings, audio visuals and training aids.
(b) The range of recommended space for each adult in a classroom varies from 1.4 m^2 to 6.7 m^2 in order to provide a conducive learning environment as approved by the CAA.

Note: The wide range in recommended figures is due to the different classroom environments envisioned by designers, or the variance in allocation for certain spaces within the classroom, such as aisles and front setback. (See ICAO Doc 10002 – Cabin Crew Training Chapter 15).

CAR OPS-1.1010 Conversion and Differences training

(See Appendix 1 to CAR OPS-1.1010 and IEM to Appendix 1 to CAR OPS-1.1010/1015)
(a) An operator shall ensure that each cabin crew member has completed appropriate training, as specified in the Operations Manual, before undertaking assigned duties as follows:
(1) *Conversion training;* A conversion course shall be completed before being:
i. First assigned by the operator to operate as a cabin crew member; or
ii. Assigned to operate another aeroplane type; and
(2) *Differences training.* Differences training shall be completed before operating:
i. On a variant of an aeroplane type currently operated; or
ii. With different safety equipment, safety equipment location, or normal and emergency procedures on currently operated aircraft types or variants.
(b) An operator shall determine the content of the conversion or differences training taking account of the cabin crew member's previous training as required by CAR OPS-1.1035.
(c) An operator shall ensure that:
(1) Conversion training is conducted in a structured and realistic manner, in accordance with Appendix 1 to CAR OPS-1.1010;
(2) Differences training is conducted in a structured manner; and
(3) Conversion training, and if necessary, differences training, includes the use of all safety equipment, normal and emergency procedures applicable to the type or

variant of aircraft and involves training and practice on a representative aircraft type training device.

(d) Conversion and Differences training programmes, in accordance with Appendix 1 to CAR OPS1.1010, shall be approved by the Authority.

(e) An operator shall ensure that each cabin crew member before being first assigned to duties, completes the Operator's CRM Training and Aeroplane Type Specific CRM, in accordance with Appendix 1 to CAR OPS-1.1010 subparagraph (j) and Familiarisation flights as per para (k).

CAR OPS-1.1012 Familiarisation

(See AMC OPS-1.1012)

An operator shall ensure that, following completion of initial training, each cabin crew member undertakes familiarisation flights. The supervised familiarization flight experience is part of the cabin crew initial qualification process before being assigned unsupervised duties as a cabin crew member prior to operating as one of the minimum numbers of cabin crew required by CAR OPS-1.990. Supervised line flight experience shall be completed as below and shall require a cabin crew member to demonstrate an understanding of all responsibilities and competency to perform the duties and execute the procedures associated with cabin operations

(a) Familiarisation flying of a minimum twelve (12) hours or six (6) sectors whichever is first achieved.

Note: For example, this may be 12 hours flying over four (4) sectors or 9 hours over six (6) sectors.

(b) Familiarisation flights shall be conducted under the supervision of a suitably qualified in-charge cabin crew member on the aeroplane type to be operated.

(c) The person conducting the supervision has received training and understands the responsibilities for the cabin crew position(s) being observed as approved by the CAA.

(d) The familiarisation flights shall be conducted within fourteen (14) days from completion of the training course of issuance of licence.

CAR OPS-1.1015 Recurrent training

(See Appendix 1 to CAR OPS–1.1015) (See AMC to Appendix 1 to CAR OPS-1.1005(e)(3))

(See AMC-1 OPS-1.1005/1.1010/1.1015) (See IEM to AMC-1 OPS-1.1005/1.1010/1.1015/1.1020)

(a) An operator shall ensure that each cabin crew member undergoes recurrent training, every twelve (12) months to ensure maintenance of competency, knowledge, skills through a series of practical exercises, oral and or written exam, assigned to each crew member in normal and emergency procedures relevant to the type(s) and/or variant(s) of aircraft on which they operate in accordance with Appendix 1 to CAR OPS-1.1015.

(b) An operator shall ensure that the recurrent training and checking programme, approved by the Authority, includes theoretical and practical instruction, together with individual practice, as prescribed in Appendix 1 to CAR OPS-1.1015 and will include the following:

  (1) Annual first aid, emergency and safety equipment training and checking must cover all requirements for each type.

(c) These training programmes shall ensure that each person:

  (1) Continues to meet the standards of proficiency to execute safety duties and functions assigned to the cabin crewmember in the event of an emergency or in a situation requiring emergency evacuation. They may also acquire new competency necessary to perform his or her duties.

  (2) Is able to maintain competency in the use of emergency and life-saving equipment required to be carried, such as life jackets, life rafts, evacuation slides, emergency exits, portable fire extinguishers, oxygen equipment, first-aid and universal precaution kits and automated external defibrillators;

(3) Is knowledgeable with regards to the effect of lack of oxygen and, in the case of pressurized aircrafts, on physiological phenomena accompanying a loss of pressurization; when serving on aircrafts operated above 3 000 m (10 000 ft.),
(4) aware of other crew members' assignments and functions in the event of an emergency as it is necessary for the fulfilment of the cabin crew member's own duties;
(5) general awareness of the types of dangerous goods which may, and may not, be carried in a passenger cabin;
(6) Knowledgeable about human performance as related to passenger cabin safety duties including flight crew/cabin crew coordination.

(d) The period of validity of recurrent training and the associated checking required by CAR OPS1.1025 shall be twelve (12) calendar months in addition to the remainder of the month of issue. If issued within the final three (3) calendar months of validity of a previous check, the period of validity shall extend from the date of issue until twelve (12) calendar months from the expiry date of that previous check.

CAR OPS-1.1020 Refresher training

(See Appendix 1 to CAR OPS-1.1020) (See AMC OPS-1.1020)

(See AMC-1 OPS-1.1005/1.1010/1.1015/1.1020)

(a) An operator shall ensure that each cabin crew member who has been absent from all flying duties for more than 180 Days and still remains within the period of validity of the previous check required by CAR OPS-1.1025(b)(3) completes refresher training specified in the Operations Manual as prescribed in Appendix 1 to CAR OPS-1.1020 (See AMC OPS-1.1020).
(b) The operator may replace refresher training by recurrent training if the reinstatement of the cabin crew member's flying duties commences within the validity period of the last recurrent training and checking. If that validity period has expired, refresher training may only be replaced by aircraft type specific and operator conversion training as specified in CAR OPS-1.1010.
(c) An operator shall ensure that when a cabin crew member has been on flying duties, but has not, for a period greater than ninety (90) days and less than 180 days, undertaken duties on another specific type of aeroplane as required by CAR OPS-1.990 (b). Before undertaking such duties on that specific type, the cabin crew member, either:
  (1) Completes refresher training on that type; or
  (2) Operates two (2) re-familiarisation sectors as defined in AMC OPS-1.1012 para(c).

CAR OPS-1.1025 Checking

(See AMC OPS-1.1025, GM 1 OPS 1.1025)

(a) An operator shall develop an annual periodic line check programme to ensure that each cabin crew member is continuously competent to perform their duties during line operations after initial qualification as follows:
  (1) Minimum requirement of (1) one line check every year on either a wide bodied or narrow-bodied aircraft.
  (2) The annual periodic line check conducted shall include a verbal competency check on the differences between types.
  (3) Each line check revalidates the line check for the other variants.
  (4) These checks must be performed by personnel acceptable to the Authority.
(b) An operator shall ensure that each cabin crew member undergoes checks covering the training received in order to verify his proficiency in carrying out normal and emergency safety duties as follows:
  (1) ***Initial training.*** All Cabin crew trainees shall complete the training programme as listed in Appendix 1 to CAR OPS-1.1005 before being assigned duties as a cabin crewmember.
  (2) ***Conversion and Differences training.*** The items listed in Appendix 1 to CAR OPS-

1.1010; and

(3) ***Recurrent training.*** The items listed in Appendix 1 to CAR OPS-1.1015 as appropriate.

(4) ***Refresher training.*** The items listed in Appendix 1 to CAR OPS-1.1020.

(c) Competency and checking records for checks conducted under para (a):

(1) The Operator shall maintain accurate and up-to-date records of all competency assessments and testing including annual perodic line check for every person who may be or assigned duty as a crewmember on an aeroplane.

(2) For each person whom the Operator maintains a competency and testing record in accordance with paragraph (1) above, the record shall include the following details:

i. The date that the competency test or assessment including annual periodic line check was carried out;

ii. The details of the check or assessment including annual periodic line check if completed;

iii. The name and qualifications of the qualified assessor responsible for carrying out the check or assessment;

iv. The Operator shall determine remedial measures on crew who is found incompetent.

CAR OPS-1.1030 Operation on more than one type or variant

(See AC OPS-1.1030)

(a) An operator shall ensure that each cabin crew member does not operate on more than three aeroplane types except that, with the approval of the AUTHORITY, the cabin crew member may operate on four aeroplane types, provided that for at least two of the types:

(1) Non-type specific normal and emergency procedures are identical; and

(2) Safety equipment and type specific normal and emergency procedures are similar.

(b) For the purposes of sub-paragraph (a) above, variants of an aeroplane type are considered to be different types if they are not similar in each of the following aspects:

(1) Emergency exit operation;

(2) Location and type of portable safety equipment; and

(3) Type specific emergency procedures.

CAR OPS-1.1035 Training records

(See IEM OPS-1.1

(a) An operator shall:

(1) Maintain records of all training and checking required by CAR OPS-1.1005, 1.1010, 1.1015, 1.1020 and 1.1025; and

(2) Retain a copy of the attestation of safety training if applicable conducted by another operator or an approved training organization; and

(3) Keep the training records and records of medical examinations or assessments up to date, showing in the case of the training records the dates and contents of the conversion, differences and recurrent training received; and

(4) Make the records of all initial, conversion and recurrent training and checking available, on request, to the applicable cabin crew and/or to the Authority.

CAR OPS-1.1037 Safety & Emergency Procedures (SEP) Examiner and First Aid Examiner

(See Appendix 1 to CAR OPS-1.1037, AMC-1 OPS-1.1037 & AMC-2 OPS-1.1037)

Note: The Authority will designate and authorise as examiners, suitably qualified persons of integrity to conduct on its behalf examinations and competency checks. The Authority will determine the number of examiners required, against the number of crew members employed.

(a) Operators in the Sultanate of Oman under the Civil Aviation Authority (CAA), may nominate suitably qualified personnel of recognized integrity as a Safety & Emergency Procedures (SEP) Examiner and First Aid Examiner to evaluate training conducted within this section.

(b) All candidates shall hold a cabin crew qualification with the exception of First Aid Examiner, for which the privilege to examine is being sought. These approvals are conditional on continuing employment with the same operator.

(c) Designated Examiners must be constantly aware that they perform their checking duties as delegates of the CAA.

(d) The number of Designated Examiners, and their conduct of tests and checks, are closely monitored by, and at the option of the Authority.

(e) The Operator shall forward the following information for each nominee to the Authority:
   (1) the Nominee background;
   (2) experience and copies of his/her license(s);
   (3) medical certificate; and
   (4) copies of the last two years Certificate of Test reports.

(f) SEP and or First Aid Examiner minimum qualification include the following:
   (1) Served for a minimum of two (2) years as a Senior SEP or Senior First Aid Instructor, unless waived by the CAA
   (2) An SEP nominee has or has had been an operating in-Charge Crew member for a minimum of three (3) years or have demonstrated the ability and knowledge which provides an equivalent level of experience.
   (3) Demonstrate thorough knowledge of the contents and interpretation of the Civil Aviation Regulations.
   (4) Demonstrate a thorough knowledge of the contents of the Operator's operation manual, First Aid manual and cabin safety manual.
   (5) Demonstrate familiarity and conversant with the Operator's approved procedures.
   (6) Have achieved and maintained a favourable record as a crewmember.

(g) The SEP and or First Aid Examiner shall ensure:
   (1) Reports and CAA documentation are duly completed and accurate before submission to the Authority;
   (2) The checks conducted are covering the required areas of expertise (SME) as per the Operator's checklist;
   (3) Conducting of checks is fair and in conformance with the standards and procedures stipulated in Operation Manual;
   (4) They are representing and acting within the limits of the Authority.
   (5) Brief, evaluate, debrief and motivate the SEP or First Aid Instructor being checked
   (6) Attend and observed all safety theoretical and practical related classes. Identify challenges and provide solutions which the operator will submit as a report annually, to the Authority
   (7) Evaluate and submit the detailed performance reports for all Cabin Safety or First Aid instructors not exceeding twelve (12) months.
   (8) SEP or First Aid (FA) Examiners shall monitor the SEP /FA Instructor's training is adhering to the syllabus-information delivered.
   (9) SEP or First Aid Examiner must ensure all documents pertaining to new introductions, review manuals updates, bulletins in respect to the changes are being communicated to the respective Custodian for scrutiny on a regular basis.
   (10) SEP or First Aid Examiner must ensure all examination papers are regularly updated. Examinations may include a combination of multiple choice and written questions.
   (11) Any other instructions and directions given by the Authority to implement accordingly.

(h) The Authority shall observe the Designated SEP/FA Examiner performance and proficiency every twelve (12) months and revalidate or revoke the designated examiner's approval.

(i) All Designated examiner authorisation's expire three (3) years from the last day of the month on which they were effective. The following procedures will be followed for the Periodic Renewal of Authorised SEP/ First Aid Examiner Designations:

(1) At least one (1) month prior to the expiration date of a particular designation, the operator must submit to the CAA a letter requesting renewal of that designation.

(2) Attached to the renewal request will be a numerical record of checks that the designated examiner has:

i. conducted during the preceding twelve (12) months as per para (g)(6); and

ii. a copy of the Approved Examiner's Current license(s) or approved examiner authorisation and medical certificate (if license held).

(3) The Operator shall specify in the letter as to when the designated examiner will be available for observation during the next thirty (30) days in the course of conducting a check. At least one primary and alternative date should be provided.

(4) CAA will review the letter and attached documentation, giving particular attention to the number of checks that the designated examiner has conducted within the designation sought over the previous year.

(5) CAA will schedule an inspector to observe the designated examiner conduct the type of check for which renewal is sought.

(6) In the event the renewal evaluation of the designated examiner's performance is found to be unsatisfactory, the Designated Examiner and Operator shall be informed immediately with a letter of disapproval within seven (7) days from the date of performance check.

(7) The Authority shall retain the right to revoke the privilege of Examiner in the event of a breach of any statutory penal code promulgated by the Sultanate of Oman.

Note 1: In this case, as with the original authorised examiner designation, the CAA inspector must then approve or disapprove the check which is in progress for the purpose of evaluating the Designated Examiner.

Note 2: Revalidation is the administrative action taken by an Examiner within the period of validity of a rating that allows the holder to continue to exercise the privileges of a rating or authorisation for a further period, consequent upon the fulfillment of specified revalidation requirements.

(j) Validity of SEP/First Aid Examiner authorisation

(1) SEP/First Aid Examiner authorisation will be invalid whenever one of the following conditions apply:

i. More than twelve (12) calendar months have lapsed since completion of an SEP /First Aid Examiner refresher course or workshop conducted by, or acceptable, to the Authority, such a workshop shall cover assessments, standards and practices, SEP/FA syllabus requirements and current regulations; or

ii. More than twelve (12) calendar months have elapsed since the SEP Examiner has been monitored by the Authority, or by the approved Designated SEP Examiner as approved by the Authority; or

iii. The SEP/FA Examiner authorization is withdrawn by the Authority.

(k) Withdrawal of Designated Examiner Privileges

(1) Designated Examiner privileges may be withdrawn by the Authority, in part or in whole, for due cause. In these cases, the CAA Flight Safety Department will issue a written notification of withdrawal of examiner privileges to the Designated Examiner concerned, and also inform the applicable Operator(s). Where there is an immediate threat to safety, this privilege will be withdrawn immediately.

(2) The Authority may withdraw a Designated Examiner’s Authority if evidence shows that an Examiner has acted in a manner which is in contravention of the guidelines contained within this regulation:

i. Placed a personal interest, or the interest of the company, ahead of the interest of the Authority, and the travelling public;

ii. Failed to attend the required refresher training

iii. Failed to follow the applicable instructions to maintain the required standards, or to follow proper procedures;

iv. Fraudulently miss-used Designated Examiner Authority, or acted in any other way that would discredit the Authority;

v. Breached the Civil Aviation Rules and Regulations of the Sultanate of Oman;

vi. During the course of a Proficiency Check, Skill Test or DE Monitor Check, failed to meet the required CAA Standards. The Designated Examiner will be informed verbally, immediately upon completion of the Proficiency Check or Skill Test, or the Inspector may discontinue the check based on unsatisfactory performance;

vii. Exercised poor judgment in assessing a candidate's performance, in relation to the standards contained herein; or

viii. Failed to represent the CAA in a manner acceptable to the Authority.

ix. Except where there is an immediate threat to safety, the Authority, prior to making a final decision in the matter of withdrawal of a Designated Examiner's Authority, shall ensure:

A. The matter has been investigated thoroughly; and

B. The Designated Examiner and, where applicable, the concerned Operator, have been given a formal opportunity to respond to the allegations in writing.

CAR OPS-1.1039 Cabin Safety and Emergency Procedures (SEP) Instructor

(See AMC OPS-1.1039)

(a) The following pre-requisite qualifications are required prior to the acceptance granted by the Authority to perform the duties of SEP instructor:

(1) Applicable Cabin Crew line operational experience for a minimum of five (5) years' in the capacity of an In-Charge Cabin crew; or

i. a minimum of continuous three (3) years' experience in a training role within the aviation industry.

(2) Recognized relevant qualification in Training (Train the Trainer), or preferably holds an instructor qualification in Cabin Crew CRM and/or Human Factors.

(3) Have achieved and maintained a favourable record as a crewmember.

(4) Proven training background experience in course development, delivery and assessment.

(5) Proficient in computer skills and the ability to use multimedia as a training tool including experience in course design.

(6) High standard of written and spoken English (preferably ICAO Level 5 or higher) and a high level of interpersonal skills.

(7) Having good knowledge and skills in line with aviation industry standards and Civil Aviation Regulations.

SEP Instructor Responsibilities:

(1) Conducts initial, aircraft type training, aircraft visit, differences training, recurrent and In-Charge cabin crew promotion training.

(2) Responsible to impart effective and efficient SEP training to flight and cabin crew members.

(3) Responsible for the instructional design of training courses, including their delivery, development, regulatory compliances, standards, remedial, devices and training material.

(4) Conducting a training needs analysis on the effectiveness of the course material to the Training Manager.

(5) Ensure completion of required documentation and maintaining accurate records of all trainees.

(b) Continuation of SEP Instructor acceptance authorisation

(1) This training should consist of a minimum of thirty-five (35) hours of training classes within the twenty-four (24) month period;

(2) Training personnel shall remain conversant with in the latest revision of the CAR's, AMC's, Guidance Material and CAN's.

(3) They shall also be conversant with the relevant parts of the Operations Manual and associated training procedures.

(4) The organizations shall ensure that personnel training records, including records of qualifications, training update and experience is retained for each Instructor.

(5) When a new aircraft type is added to the operator's AOC use of special resources for introduction may be required, such as:

i. Cabin Safety Instructors rated on the aircraft from the manufacturer;

ii. Cabin Safety Instructor from another operator using the same type of aircraft;

iii. Other instructing personnel (e.g. Ground instructor):

A. Being authorised as SEP, compliance with the requirements stated in paras (a) and (b) above tailored to the operator's needs as required;

B. Proof of qualifications and training shall be reported to the CAA;

C. An operator's Cabin Safety Instructor may extend the function to the new aircraft type after having undergone training according to CAR OPS1.1010 Conversion and Differences Training.

(c) Cabin Safety Instructor changing operator while maintaining aeroplane type:

(1) A Cabin Safety Instructor who is changing operator with the same aeroplane type with the intention to continue the Cabin Safety Instructor activity must undergo the regular training according to CAR OPS-1.995, 1.1010, 1.1012 and 1.1030 for changing operator.

(d) Cabin Safety Instructor changing operator and aeroplane type**:**

(1) A Cabin Safety Instructor who is changing operator and aircraft type with the intention to continue the Cabin Safety Instructor activity must undergo the regular training according CAR OPS-1 Subpart O for changing operator and aircraft type.

CAR OPS-1.1040 Aviation Medical and First Aid Instructor Requirements

(a) The following pre-requisite qualifications are required prior to the granting of acceptance granted by the Authority to perform the duties of Aviation Medical and First Aid Instructor:

(1) Hold an acceptable Registered Nurse Certificate,

(2) Hold a recognized First Aid Instructor Certificate, preferably in Aviation medicine; or

(3) Evidence of previous possession of a license stating they have operated as a first responder EMT, Paramedic or nurse;

(b) The following skills are required in addition to the qualifications stated above:

(1) Proficient in computer skills and the ability to use multimedia as a training tool including experience in course design.

(2) Hold an OJT certification.

(3) High standard of written and spoken English (preferably ICAO Level 5 or higher) and a high level of interpersonal skills.

(4) Having good knowledge and skills in line with aviation industry standards and Civil Aviation Regulations.

(5) Additional advantage is to have a recognized Bachelor Degree of Nursing (recognised or accepted within Oman)

(6) To attend a cabin crew initial and conversion training to have exposure of the working environment

(c) The Aviation Medical and First Aid Instructor and or FA Examiner responsibilities include:

(1) To provide training on general first aid and aviation medicine relevant to the flight and cabin crew in accordance with regulatory requirements.

(2) To design, develop and update training materials.

(3) To review all inflight medical emergencies and update training accordingly.

(4) The FA examiner shall review instructional methods and techniques annually, especially lifesaving procedures in compliance to the internationally recognized Aviation Medical practices.

(5) To monitor and assess the performance of the Cabin Crew continuous competence and skills to apply first aid and lifesaving procedures during recurrent training.

(6) Upon completion of each training session, all required documentation shall be completed accurately for all trainees.

SECTION 2 – SUBPART O – CABIN CREW

ADVISORY CIRCULARS, ACCEPTABLE MEANS OF COMPLIANCE AND INTERPRETATIVE/ EXPLANATORY MATERIAL (AMC & IEM)

GM OPS-1.989 Identification

(a) In the event that there is a similarity of uniforms between the technical crew and the cabin crew then it is recommended that identifying Velcro patches are worn clearly identifying the status of the crew member;

(b) The wearing of sharp metal objects (such as pins) without shielding of the needle point should be avoided at all times;

IEM OPS-1.990 Determining the Number and Composition of Cabin Crew

(See CAR OPS-1.990, GM 1 OPS-1.990, GM 2 OPS-1.990, AMC OPS-1.1000(e))

(a) The demonstration or analysis referred to in CAR OPS-1.990(b)(2) should be that which is the most applicable to the type, or variant of that type, and the seating configuration used by the operator.

(b) With reference to CAR OPS-1.990(b), the Authority may require an increased number of cabin crew members in excess of the requirements of CAR OPS-1.990 on certain types of aeroplane or operations. Factors which should be taken into account include:

   (1) The number of exits;
   (2) The type of exits and their associated slides;
   (3) The location of exits in relation to cabin crew seats and the cabin layout, special interior features e.g. suite installation, monument relocation which may impede the evacuation route;
   (4) The seating layout which uses new types of seats (oblique-facing seats, side-facing seats, etc.).
   (5) The location of cabin crew seats taking into account cabin crew duties in an emergency evacuation including:
      i. Opening floor level exits and initiating stair or slide deployment;
      ii. Assisting passengers to pass through exits; and
      iii. Directing passengers away from inoperative exits, crowd control and passenger flow management;
   (6) Actions required to be performed by cabin crew in ditching, including the deployment of slide-rafts and the launching of life-rafts.
   (7) Cabin management during designated in-flight crew rest.
   (8) Flights operated with special categories of passengers on board; and
   (9) Cabin crew incapacitation

(c) The role of the cabin crew member involves much more than being prepared to respond in an evacuation. First aid, safety, security-related duties, customer service and other commercial responsibilities.

   (1) Workload should be taken into consideration when establishing minimum crew requirements as their role has become increasingly challenging and includes, but is not limited to:
      i. Applying safety procedures, including continuous surveillance of the cabin, unstaffed galleys, lavatories, and catering supplies;
      ii. Managing and assisting passengers, for example during in-flight medical emergencies;

iii. Preventing and managing incidents from escalating in the cabin, such as smoke or fire;
iv. Informing the flight crew of abnormal situations observed in the cabin or relating to the aircraft, such as pressurization problems, engine anomalies, and contamination of critical surfaces; and
v. Preventing unlawful interference and managing events that can compromise safety and security of the flight, such as hijackings or unruly passengers.

(d) When establishing the minimum number of cabin crew members required, the operator should have procedures for cabin crew to manage the following potential situations while carrying out their duties and responsibilities: -

(1) monitor conditions inside and outside of the aircraft (maintain situational awareness);
i. respond to an emergency situation (e.g. fire or smoke);
ii. manage an evacuation;
iii. manage a medical situation on board;
iv. manage an unruly passenger event;
v. attend to special categories of passengers on board;
vi. verify that passengers comply with “no-smoking” regulations and portable electronic devices (PED) usage requirements;
vii. apply communication protocols with flight and ground crew;
viii. conduct lavatory and/or stowaway checks; and
ix. perform security-related duties.

(e) The operator should have procedures for cabin crew members to manage the following situations while carrying out their duties and responsibilities covering the following ground operations:

(1) Passenger boarding:
i. monitor carry-on baggage and stowage; and
ii. verify that exits, aisles and cross aisles are clear of obstructions;
iii. monitor passengers who may display suspicious behavior and raise security concerns, may be under the influence of psychoactive substances or display unruly behavior.

(2) Disembarkation:
i. verify that all passengers have disembarked; and
ii. perform security checks;

(3) Transit stops:
i. control access to stairs and aerobridge, as applicable;
ii. perform security checks; and
iii. manage disembarkation and boarding processes.
iv. refueling with passengers on board.

(f) The operator should have procedures for cabin crew members to manage the following potential situations during aircraft refueling with passengers on board:
(1) monitor conditions inside and outside of the aircraft (maintain situational awareness);
i. report the smell of fuel vapor; and
ii. manage an evacuation in the event of fire or significant fuel spillage
iii. conduct safety announcements;
(2) ensure that passengers:
i. are seated with their seat belts unfastened;

ii. do not smoke;
iii. keep aisles and exits clear; and
iv. do not use PEDs, when indicated;
v. maintain clear area adjacent to designated emergency exit;

(g) When the number of cabin crew is reduced below the minimum required by CAR OPS-1.990(b), for example in the event of incapacitation or non-availability of cabin crew, the procedures to be specified in the Operations Manual should result in consideration being given to at least the following:
  (1) Reduction of passenger numbers;
  (2) Re-seating of passengers with due regard to exits and other applicable aeroplane limitations; and
  (3) Relocation of cabin crew and any change of procedures.

GM-1 OPS-1.990 Determining the Number and Composition of Cabin Crew

(a) When an operator is required to operate a non-revenue flight e.g. ferry flight, maintenance flight with personnel on board (e.g. aircraft maintenance technicians). The flight may allow non-commercial operations be conducted without cabin crew members on board aircraft where they are otherwise required for commercial passenger flights on the same aircraft type. The State should only provide relief from minimum cabin crew requirements if the operator meets specific conditions: -
  (1) establish procedures for the transport of persons on board non-revenue flights;
  (2) ensure authorized persons carried have unobstructed access to the flight deck or to an emergency exit from their seats;
  (3) provide a means of two-way communication between persons carried in the cabin and the flight crew members;
  (4) verify that the pilot-in-command has a means of notifying persons in the cabin when seat belts must be fastened;
  (5) ensure that a crew member provides a safety briefing to all persons travelling in the cabin before every take-off, and in accordance with national regulations; and
  (6) establish who will be responsible for:
    i. the arming/disarming of doors;
    ii. safety checks (safety and emergency equipment);
    iii. securing the cabin and galley; and
    iv. opening exits during normal operations and in the event of an emergency.

GM-2 OPS-1.990 Determining the Number and Composition of Cabin Crew

An operator should establish procedures to address non-commercial operations (i.e. non-revenue flights), including the specifics of the kind of persons who may be carried on such flights. Non-commercial operations include the following:
(a) flight crew training/instructional flights;
(b) test flights (design/approval tests, acceptance checks, post maintenance functional checks);
(c) relocation flights (ferry, delivery, positioning, recovery);
(d) flying displays; and
(e) demonstration flights.

GM OPS-1.995(g) Minimum requirements

(a) ICAO decreed that all operational crew members shall be proficient using the English language in general.
(b) This was implemented to increase safety standards and help pilots and cabin crew to understand each other.

Note: Lack of the comprehension of the language has been cited as a contributing factor in incidents/accidents where miscommunication happened between flight crew /cabin crew.

(c) Oral language proficiency refers to:
   (1) reproduction or display of learned knowledge;
   (2) the performance of a complex skill resulting from the integration in real time of a number of subskills constituting communicative competence.
   (3) These subskills include (among others):
      i. the activation of stored words and phrases belonging to the language's lexicon;
      ii. the application of learned grammatical rules;
      iii. the perception and articulation of the sounds and tones that constitute a meaningful sound-stream; and
      iv. the adjustment, in the context of interactive communication, to numerous discourse, social, cultural and professional norms.

Note: See ICAO Doc 9835, Manual on the Implementation of ICAO Language Proficiency Requirements Chapter 2, para 2.3.1.2

(d) The successful integration of these subskills constitutes communicative competence, which is very closely linked to, and to a great extent built upon, general knowledge and general skills (social, occupational, cultural, etc.).
(e) Language proficiency does not exist in isolation from other abilities.

AMC OPS-1.1000(e) Replacement of incapacitated or unavailability of In-Charge Cabin Crew member

(a) Replacement of incapacitated or unavailable In-charge cabin crew member
   (1) An In-charge cabin crew member, who becomes incapacitated during a flight or series of flights, or unavailable at a stopover (layover) point, should be replaced without undue delay by another qualified cabin crew member (second in-charge) on the concerned aircraft type/variant. He should be assigned to act as an In-charge cabin crew in order to reach a base of the operator.
   (2) If during the series of flights, the aircraft transits via a base of the operator, the assigned second in-charge shall be replaced by an In-charge cabin crew member.
(b) Replacement of incapacitated or unavailable In-charge cabin crew member by another qualified cabin crew ~~me~~
   (1) To ensure that In-charge cabin crew member is assigned without undue delay, the operator should take appropriate measures. These include, but are not limited to, the following:
      i. to ensure that a flight or series of flights do not depart from an aerodrome where an In-charge cabin crew is available or can be made available, the operator may:
         A. appoint an In-charge cabin crew member originally assigned to another flight and who is available at the concerned base or stopover (layover) point if the reporting time for that flight provides sufficient time to find a replacement; or
         B. assign an In-charge cabin crew member who is on standby to operate the flight or to position to the destination where the In-charge cabin crew has become incapacitated or unavailable to operate;
      ii. the operator should utilize another qualified cabin crew member that is among the operating crew on the same flight;
      iii. in case of unavailable In-charge cabin crew member, the operator should use the available time and resources to replace him/her at the stopover (layover) point with another qualified cabin crew member;
      iv. the operator should consider including the identification of the most

appropriately qualified cabin crew member in pre-flight briefings.

(c) Most appropriately qualified cabin crew

(1) Selection of the most appropriately qualified cabin crew member should take into account if the individual's experience as operating cabin crew member is adequate for the conduct of duties required of an In-charge cabin crew member. The selected cabin crew member should have operational experience on the concerned aircraft type/variant.

Appendix 1 to CAR OPS-1.1005 Initial Training

(See IEM-1 & IEM-2 to Appendix 1 to CAR OPS-1.1005/1.1010/1.1015/1.1020)
(See AMC to Appendix 1 to CAR OPS-1.1005(e)(3))
(See Appendix 3 to CAR OPS-1.1005/1.1010/1.1015)

The subjects that must be covered as a minimum by a course of initial safety training referred to in CAR OPS-1.1005 are:

(b) ***Safety and Emergency Training***. An operator shall ensure that the following training includes:

(1) Pilot incapacitation. An operator shall ensure that, unless the minimum flight crew is more than two, each cabin crew member is trained in the procedure for flight crew member incapacitation and shall operate the seat and harness mechanisms. Training in the use of flight crew members' oxygen system and use of the flight crew members' check lists, where required by the operator's SOP's, shall be conducted by a practical demonstration.

(2) Touch-drills by each cabin crew member for opening normal and emergency exits for passenger evacuation,

(3) The location and handling of emergency equipment, including oxygen systems, and the donning by each cabin crew member of lifejackets, portable oxygen and protective breathing equipment (PBE);

(4) Incident and accident review;

(5) Operation and opening of exits

(6) Demonstration of the operation of all other exits;

(7) Demonstration in the use of life rafts and slide rafts.

(8) Pyrotechnic

(9) Emergency exit training, covering:

i. Normal and emergency exit door operations (Including failure of power assist systems where fitted) and action and forces required to operate and deploy evacuation slides in an aeroplane or representative training device and flight deck windows (where fitted) or other escape hatch;

ii. Evacuation slide training: descends an evacuation slide in an aeroplane or a representative training device from a height representative of the aeroplane main deck sill height;

iii. Use of pyrotechnics (Actual or representative devices); and

iv. Demonstration of the use of the life-raft, or slide-raft, where fitted.

(c) ***Fire and Smoke Training.*** An operator shall ensure that fire and smoke training includes:

(1) Emphasis on the responsibility of cabin crew to deal promptly with emergencies involving fire and smoke and, in particular, emphasis on the importance of identifying the actual source of the fire;

(2) The importance of informing the flight crew immediately, as well as the specific actions necessary for co-ordination and assistance, when fire or smoke is discovered;

(3) The necessity for frequent checking of potential fire-risk areas including toilets, and the associated smoke detectors;

(4) The classification of fires and the appropriate type of extinguishing agents and procedures for particular fire situations, the techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space; and

(5) The general procedures of ground-based emergency services at aerodromes.

(c) ***Water Survival Training.*** An operator shall ensure that water survival training includes the actual donning and use of personal flotation equipment in water by each cabin crew member. Before first operating on an aeroplane fitted with life-rafts or other similar equipment, training must be given on the use of this equipment, as well as actual practice in water.

(d) ***Survival Training.*** An operator shall ensure that survival training is appropriate to the areas of operation, (e.g. polar, desert, jungle or sea).

(e) ***Medical aspects and First Aid.*** An operator shall ensure that medical and first aid training includes: *(See Appendix 3 to CAR OPS-1.1005/1.1010/1.1015 Medical Aspects and First aid training)*

(1) Instruction on first aid and the use of first-aid kits;
(2) First aid associated with survival training and appropriate hygiene; and
(3) The physiological effects of flying and with particular emphasis on hypoxia;
(4) Procedure for the crew to evaluate a passenger with a suspected communicable disease, based on the presence of a fever and certain other signs or symptoms.

(f) ***Passenger handling.*** An operator shall ensure that training for passenger handling includes the following:

(1) Advice on the recognition and management of passengers who are, or become, intoxicated with alcohol or are under the influence of drugs or are aggressive;
(2) Methods used to motivate passengers and the crowd control necessary to expedite an aeroplane evacuation;
(3) Regulations covering the safe stowage of cabin baggage (including cabin service items) and the risk of it becoming a hazard to occupants of the cabin or otherwise obstructing or damaging safety equipment or aeroplane exits;
(4) The importance of correct seat allocation with reference to aeroplane mass and balance. Particular emphasis shall also be given on the seating of disabled passengers, and the necessity of seating able-bodied passengers adjacent to unsupervised exits;
(5) Duties to be undertaken in the event of encountering turbulence including securing the cabin;
(6) Precautions to be taken when live animals are carried in the cabin;
(7) Dangerous Goods training as prescribed in Subpart R and CAR-92; and
(8) Security procedures, including the provisions of Subpart S.
(9) Identifying and responding to human trafficking.

(g) ***Communication.*** An operator shall ensure that, during training, emphasis is placed on the importance of effective communication between cabin crew and flight crew including technique, common language (English – to the acceptable level stated in the Operations Manual approved by the CAA) and terminology.

(h) ***Discipline and responsibilities.*** An operator shall ensure that each cabin crew member receives training on:

(1) The importance of cabin crew performing their duties in accordance with the Operations Manual;
(2) Continuing competence and fitness to operate as a cabin crew member with special regard to flight and duty time limitations and rest requirements;
(3) An awareness of the aviation regulations relating to cabin crew and the role of the Authority;
(4) General knowledge of relevant aviation terminology, theory of flight, passenger distribution, meteorology and areas of operation;
(5) Pre-flight briefing of the cabin crew and the provision of necessary safety information with regard to their specific duties;
(6) The importance of ensuring that relevant documents and manuals are kept up-to-date with amendments provided by the operator;
(7) The importance of identifying when cabin crew members have the Authority and responsibility to initiate an evacuation and other emergency procedures; and

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

(i) ***Crew Resource Management.*** An operator shall ensure that CRM training satisfies the requirements of Table 1 in Appendix 2 to CAR OPS-1.1005, 1.1010 & 1.1015.

IEM-1 to Appendix 1 to CAR OPS-1.1005/1.1010/1.1015/1.1020 Training Methods

(See Appendix 1 to CAR OPS-1.1005/1.1010/1.1015/1.1020)

Training may include the use of mock-up facilities, including all training equipment/tools and complemented by audio visual presentations, computer-based training and any other types of training (e.g. e-learning or online training). A reasonable balance between the different training methods should be achieved.

IEM-2 to Appendix 1 to CAR OPS-1.1005/1.1010/1.1015/1.1020 Passenger and Crowd Control

(See Appendix 1 to CAR OPS-1.1005/1.1010/1.1015/1.1020)

(1) Passenger and Crowd control

(a) Operators should provide training on the practical aspects of passenger preparation and handling, as well as crowd control, in various emergency situations as applicable to the Operator's specific cabin configuration and will cover the following:

i. Communications between flight crew and cabin crew and use of all communications equipment, including the difficulties of co-ordination in a smoke-filled environment;
ii. Verbal commands;
iii. The physical contact that may be needed to encourage people out of a door/exit and onto a slide;
iv. The re-direction of passengers away from unusable doors/exits;
v. The marshalling of passengers away from the aeroplane;
vi. The evacuation of disabled passengers; and
vii. Authority and leadership.

AMC to Appendix 1 to CAR OPS-1.1005(e)(3) Medical aspects and first aid training

1.0 Management of on-board medical events.

The crew shall have the ability to perform duties and responsibilities related to the management of on-board medical events and cabin health issues as below:

(a) Monitor the cabin to identify ill passengers;

(1) identify ill or injured passengers. This may include, but is not limited to, a person:

i appearing obviously unwell;
ii with persistent cough;
iii frequently going to the washroom;
iv with breathing difficulties;
v vomiting;
vi with a visible rash;
vii bleeding;
viii with confusion; and
ix having a seizure;

(2) apply active listening and seek additional information. This may include, but is not limited to:

i. being attentive and receptive to comments from passengers regarding their or other passenger's health status; and
ii. asking additional questions about passenger's health history, (e.g. allergies, medications, their last meal and events leading up to illness);

(b) Recognize an on-board medical event

i. determining if the event is life-threatening;
ii. identifying typical presenting signs and/or symptoms of illness in-flight;
iii. recognizing ways that passengers may signal an in-flight medical event in themselves or others;
iv. recognizing medical events which can be immediately life-threatening (e.g. obstructed airway, cardiac arrest, and loss of consciousness).

(c) Determine if the event is life-threatening;
i assessing airway/breathing;
ii performing CPR, if required;
iii performing abdominal thrusts;
iv controlling bleeding;
v administering oxygen;
vi immobilizing a fracture; and
vii applying burn dressing;

(d) Respond immediately to a life-threatening on-board medical event;
(1) demonstrate the use of available medical equipment appropriate to the event, as applicable. This may include, but is not limited to:
i. AED; and
ii. artificial respiration masks;

(e) Respond to other non-life-threatening events using appropriate first-aid techniques;
(1) assess and manage potential communicable disease. This may include, but is not limited to:
i. demonstrating knowledge and use of universal precautions e.g. personal protective equipment, cleaning up spilled body fluids, etc.;
ii. demonstrating how to elicit proper information from the ill passenger;
iii. demonstrating how to take body temperature with a thermometer if available, or by other means if not available;
iv. describing the signs and symptoms compatible with a communicable disease;
v. describing when a face mask will be offered to an ill passenger, to other passengers, and to one or more cabin crew;
vi. describing basic advice to a passenger with gastrointestinal symptoms (e.g. vomiting, diarrhoea);
vii. isolating a lavatory for the use of the ill passenger, if possible;
viii. showing when and where to move a passenger suspected of having a communicable disease; and
ix. advising the pilot-in-command;

(f) Assess and manage suspect cases of communicable disease;

(g) Apply communication procedures;
(1) This may include, but is not limited to:
i. describing communication procedure with in-charge cabin crew and/or pilot-in-command;
ii. describing procedure for obtaining assistance from:
A. qualified on-board health professional, if available;
B. other crew members; and
C. ground-based medical assistance provider, if available;
iii. describing crew coordination procedures;
iv. describing how to reassure an ill passenger and any accompanying family members;

(h) Apply procedures for seeking ground-based medical and/or on-board volunteer health professional assistance

(i) Use first-aid and medical equipment, as appropriate;

(1) retrieving FAK, EMK, UPK, **BFK** telemedicine device, or AED as appropriate;
(2) operating the telemedicine device and/or the AED, if available; and
(3) describing the main contents of the EMK;

(j) Manage assistance from an on-board volunteer health professional, if available. This may include, but is not limited to:
(1) demonstrating how to elicit credentials of the volunteer health professional if it is company policy;
(2) advising the volunteer health professional of the equipment available on board;
(3) stating the airline's indemnity/liability provisions for the volunteer health professional;
(4) staying with the volunteer health professional to provide assistance;
(5) requesting contact details and clinical notes from the volunteer health professional; and
(6) applying operator policy on **"Do Not Resuscitate"** (DNR), if required; and

(k) Support the on-board volunteer health professional, as appropriate;

(l) Apply operator policy on "Do Not Resuscitate" (DNR), if appropriate;

(m) Manage a death procedure on board. This may include, but is not limited to:
(1) describing how to recognize death;
(2) stating who can pronounce someone dead;
(3) describing the situations in which CPR may be ceased;
(4) describing the communication procedure with the pilot-in-command;
(5) describing the company policy on how to take care of a dead;
(6) describing the communication procedure for an accompanying person(s).

(n) Complete the applicable documentation.

1.1 Knowledge:

To develop knowledge, skills and competencies in the management of the above is further enhanced by the below:

(a) difference between a sign and a symptom;
(b) common signs and symptoms of passenger illness in-flight;
(c) signs and symptoms of immediately life-threatening medical events, e.g. signs of choking, collapse, unconsciousness, severe allergic reaction;
(d) general first-aid principles;
(e) signs and symptoms of hyperventilation;
(f) signs and symptoms of panic attack;
(g) precautions before giving any medication to passengers with alcohol intoxication;
(h) signs and symptoms of communicable diseases;
(i) regulations concerning communicable diseases, e.g. World Health Organization (WHO) International Health Regulations (IHR 2005);
(j) policies concerning a death on board; contents of First-Aid Kit, EMK, and UPK or Body Fluid Kit (BFK);
(k) contents of first-aid kit, EMK, and UPK;
(l) operator indemnity/liability provisions; and
(m) Procedures for completing the applicable documentation, such as an incident report form.

1.2 Skills

(a) Communications;
(b) teamwork and leadership;
(c) workload and time management;
(d) decision-making;
(e) situational awareness;
(f) delegation (for in-charge cabin crew member);
(g) empathy (for in-charge cabin crew member); and
(h) planning and coordinating resources (for in-charge cabin crew member).

2.0 Food safety and sanitation

Procedures for food safety and sanitation

(a) Minimize or prevent the contamination of food and related service items;
(b) Ensure safe practices for food safety;
(c) Manage suspected food poisoning;
(d) Complete the applicable documentation;
(e) Practical scenario:
    (1) simulated exercise in a representative training device capable of reproducing the appropriate environment/equipment characteristics (e.g. galley) where the cabin crew will apply procedures for recognizing unsafe/safe practices.

2.1 Performance standard

(a) Describe ways to minimize or prevent the contamination of food and related service items. This may include, but is not limited to:
    (1) food and beverage service operations should be conducted in accordance with operator policies to minimize contamination;
    (2) perishable food and beverages should be maintained at appropriate cold or hot temperatures; and
    (3) galleys, pantries, and other places where food is prepared, served, or stored should be clean to maintain their surfaces in a sanitary condition;
(b) recognize unsafe practices that can affect food safety;
(c) assess possible food poisoning. This may include, but is not limited to:
    (1) describing the symptoms of possible food poisoning;
    (2) describing the information to be collected from the ill passenger(s); and
    (3) describing the basic criteria for considering airline catering as a suspected cause of food poisoning (i.e. if during a reasonably long flight, more than one person having consumed food served on board have similar symptoms, food poisoning from catering can be suspected);
(d) assist the ill passenger(s) as described in the first-aid response; and
(e) preserve evidence. This may include, but is not limited to:
    (1) describing the procedure for preserving and storing passenger and/or crew meal(s) for subsequent testing; and
    (2) describing appropriate actions to take if the airline catering is the suspected cause of the illness.

***2.2 Knowledge*:**

(a) general principles of food contamination prevention;
(b) signs of food contamination;
(c) signs and symptoms of food poisoning;
(d) criteria by which food poisoning can be suspected (e.g. multiple passengers becoming ill after eating the same meal choice);
(e) Principles of first aid to manage suspected food poisoning; and
(f) Details of food poisoning protocol.

2.3 Skills

(a) Situational awareness;
(b) decision-making;
(c) communication; and
(d) teamwork and leadership.

3.0 Cabin dis-insection

Applying procedures for cabin dis-insection, if applicable:

(a) Advise passengers on dis-insection procedures, if applicable
(b) Carry out dis-insection, as per operator procedures.

Training requirement

(a) Hands -on exercise on retrieving the first-aid kit (FAK), emergency medical kit (EMK), universal precautions kit (UPK) or Body Fluid Kit (BFK), automated external defibrillator (AED), and telemedicine device, as available;
(b) video or demonstration of proper handling and spraying technique.
(c) discuss how to advise passengers on dis-insection, as per the operator procedures, if

applicable;

(d) carry out dis-insection procedures, if applicable. This may include, but is not limited to:
  (1) discussing how to correctly spray dis-insectant, as per operator procedures; and
  (2) discussing proper hygiene for cabin crew members following dis-insection (e.g. hand washing).

Knowledge:

(a) definition of dis-insection and the difference between dis-insection and disinfection;
(b) reasons for dis-insection of aircraft cabins;
(c) who sets the requirements for dis-insection (e.g. national authorities);
(d) description of the operator's procedures for dis-insection, including when, where, how to spray and the potential effect on smoke detectors;
(e) understanding that while dis-insection should not cause undue discomfort to any person, or injury to his/her health, some dis-insection procedures may cause health complaints from individuals who have a possible predisposition or assumed hypersensitivity to chemicals; and
(f) description of ways in which crew or passengers can limit their exposure to chemical dis-insectants.

Training scenarios

Training related to on-board medical events and their management may be more effective if classroom instructions are concurrently augmented by hands-on exercises and simulated exercises. Practicing scenario-based event management and first-aid techniques during training is very valuable and facilitates retention.

When participating in simulated exercises, trainees may be evaluated individually or as part of a team as to ensure competency required for the duties and responsibilities.

The operator shall ensure that the following training includes:

(a) hands-on exercise on retrieving the first-aid kit (FAK), emergency medical kit (EMK), universal precautions kit (UPK), automated external defibrillator (AED), and telemedicine device, as available;
(b) hands-on exercise on using the FAK;
(c) hands-on exercise on retrieving and using the portable oxygen bottle;
(d) hands-on exercise on using the EMK, UPK, telemedicine device, if applicable;
(e) hands-on exercise on demonstrating cardiopulmonary resuscitation (CPR) and operating the AED, if applicable;
(f) simulated exercise of an ill passenger/crew member where the cabin crew member demonstrates that he/she can recognize and respond to the situation using the appropriate first-aid techniques to the specific illness or injury; and
(g) simulated exercise in a representative training device capable of reproducing the appropriate environment/equipment characteristics (e.g. cabin, flight deck, crew rest area) where the cabin crew will apply the operator's procedures for responding to an in-flight medical event

In addition to the requirements stated in Appendix 3 to CAR OPS-1.1005/1.1010/1.1015 *Medical aspects and first aid training*, the following subjects shall be included:

(1) Aeromedical emergencies in aviation including:
  i. choking;
  ii. heart attacks;
  iii. shock; and
  iv. hyperventilation;

(2) Practical cardio-pulmonary resuscitation by each cabin crew member having regard to the aeroplane environment and using a specifically designed dummy;

(3) Basic aeromedical first aid and survival training including care of:
  i. the unconscious;
  ii. burns;
  iii. wounds; and
  iv. fractures and soft tissue injuries;

(4) Travel health and hygiene including reporting of infectious diseases, protection from infection and avoidance of water-borne and food-borne illness:

i. Procedure for the crew to evaluate a passenger with a suspected communicable disease, based on the presence of a fever and certain other signs or symptoms.

Appendix 2 to CAR OPS-1.1005/1.1010/1.1015 CRM Training

(See AMC-1 OPS-1.1005/1.1010/1.1015)

(a) The CRM training syllabi, together with CRM methodology and terminology, shall be included in the Operations Manual.

(b) Table 1 below indicates which elements of CRM shall be included in each type of training.

Table 1. – CRM Training

<table>
<tr><th>Training Elements
(a)</th><th>Operator's Initial CRM Training
(b)</th><th>Operator's Conversion CRM Training (c)</th><th>Aeroplane Type Specific CRM
(d)</th><th>Annual Recurrent CRM Training
(e)</th><th>In-Charge Cabin Crew Course
(f)</th></tr>
<tr><td colspan="6">General Principles</td></tr>
<tr><td>Human factors in aviation,
General instructions on CRM principles and objectives</td><td rowspan="2">In depth</td><td rowspan="2">Not required (covered under Operator's SOPs)</td><td rowspan="2">Required</td><td rowspan="2">Required</td><td rowspan="2">Required</td></tr>
<tr><td>Human performance & limitations Threat and error
management</td></tr>
<tr><td colspan="6">Relevant to the individual cabin crew member</td></tr>
<tr><td>Personality awareness, human error and reliability, attitudes and behaviours, self-assessment and self- critique</td><td rowspan="5">In depth</td><td rowspan="5">Not required (covered under Operator's SOPs)</td><td rowspan="5">Required</td><td rowspan="5">Required (3 year cycle)</td><td rowspan="5">Required</td></tr>
<tr><td>Stress and stress management</td></tr>
<tr><td>Fatigue and vigilance</td></tr>
<tr><td>Assertiveness and</td></tr>
<tr><td>Situation awareness Information acquisition and processing</td></tr>
<tr><td colspan="6">Relevant to the entire aircraft crew</td></tr>
<tr><td>Shared situation awareness, information acquisition and processing</td><td rowspan="7">Not required</td><td rowspan="6">In-depth</td><td rowspan="6">Required when relevant to the type(s)</td><td rowspan="6">Required (3-year cycle)</td><td rowspan="6">In-depth</td></tr>
<tr><td>Workload management</td></tr>
<tr><td>Effective communication and coordination between all crew members including the flight crew as well as inexperienced cabin crew members,</td></tr>
<tr><td>Leadership, cooperation, synergy, decision-making, delegation,</td></tr>
<tr><td>Cultural differences
Identification and management of the passenger human factors, crowd control, passenger stress, conflict management, medical factors</td></tr>
<tr><td>Resilience development, Surprise and startle effect</td></tr>
<tr><td>Specifics related to aeroplane types (narrow/ wide bodies, single/ multi deck), flight crew and cabin crew composition and number of passengers)</td><td>Required</td><td>In-depth</td><td>Required (3-year cycle)</td><td>In-depth</td></tr>
</table>

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(e)</th><th>In-Charge Cabin Crew Course
(f)</th></tr>
<tr><td colspan="6">Relevant to the Operator and Organisation</td></tr>
<tr><td>Operator’s safety culture and company culture, SOPs, organisational factors, factors linked to the type of operation</td><td rowspan="2">Not required</td><td rowspan="3">In-depth</td><td rowspan="3">Required when relevant to the type(s)</td><td rowspan="3">Required
(3-year cycle)</td><td rowspan="3">In-depth</td></tr>
<tr><td>Effective communication and coordination with other operational personnel and ground services</td></tr>
<tr><td>Participation in cabin safety incident and accident reporting</td><td>Not required</td></tr>
<tr><td>Case Studies (See note 2)</td><td></td><td>In-depth</td><td>Required when relevant to the type(s)</td><td>In-depth</td><td>In-depth</td></tr>
</table>

*Note 1: **CRM training requirements***

(1) Table 1 above, specifies which CRM training subjects should be covered in each type of training.

(2) The levels of training in Table 1 can be described as follows:

(a) ‘required’ means training that should be instructional or group activity (being interactive in style) to meet the objectives specified in the CRM training programme or to refresh and strengthen knowledge gained from previous training.

(b) ‘in-depth’ means training that should be instructive or group participation (being interactive in style) taking full advantage of group discussions, team task analysis, team task simulation, etc., for the acquisition or consolidation of knowledge, skills and attitudes.

(3) The CRM training elements should be tailored to the specific needs of the training phase being undertaken.

*Note 2: **Case Studies***

(1) CRM training should cover aircraft type – specific case studies, based on the information available within the operator’s management system, including:

(a) Accident and serious incident reviews to analyze and identify any associated non-technical casual and contributory factors and instances of examples of lack of CRM; and

(b) Analysis of occurrences that were well managed.

(2) If relevant aircraft type-specific or Operator - specific case studies are not available, the Operator should consider other case studies relevant to the scale and scope of its operations.

Appendix 3 to CAR OPS-1.1005/1.1010/1.1015 Medical Aspects and First Aid Training

(See Appendix 1 to CAR-OPS1.1005) (See Appendix 1 to CAR-OPS1.1010)

(See Appendix 1 to CAR-OPS1.1015) (See AMC to Appendix 1to CAR OPS-1.1005(e)(3))

The provisions described herein are applicable only to commercial air transport operators and not private operators or operators involved in commercial activities defined General Aviation. Operators that are excluded, however, shall submit the first aid training details, commensurable with their type of operations, for CAA acceptance.

(a) Medical aspects and first aid training shall include the following subjects:
 (1) Physiology of flight including oxygen requirements and hypoxia;
 (2) First Aid Response Process including Basic Management;
 (3) Request for Medical Support;
 (4) Use of Medical Kits and their contents on board the aircraft;
 (5) Primary and Secondary Assessment;
 (6) Personal Protective Equipment (PPE);
 (7) Managing life threatening conditions:
  (i) Unconscious Not Breathing Casualty (CPR for Adult/Child infant with AED);
  (ii) Airway Problem (Choking Casualty);
  (iii) Breathing Difficulties;
  (iv) Severe Bleeding
  (v) Medical Shock
 (8) Sudden Illness:
  (i) Chest Pain/Heart Attacks
  (ii) Asthma
  (iii) Rapid Breathing (Hyperventilation)
  (iv) Hypoxia
  (v) Stroke
  (vi) Seizure
  (vii) Mild and Severe Allergic Reaction
  (viii) Temporary loss of consciousness (Fainting)
  (ix) Psychoactive substance overdose
  (x) Communicable disease
 (9) Sudden Injury
  (i) Wounds
  (ii) Burns
  (iii) Fractures and soft tissue injuries
  (iv) Swollen, Painful or deformed limb
 (10) Emergency Child Birth
 (11) Managing Death on Board
 (12) Practical Skills:
  (i) Cardio Pulmonary Resuscitation (CPR) + AED.
  (ii) Primary and Secondary Assessment.
  (iii) Control of Severe Bleeding.
 (13) Other Medical emergencies such as:
  (i) Stress reactions and allergic reactions;
  (ii) Epilepsy;
  (iii) Diabetes;
  (iv) Barotrauma/Air sickness;
  (v) Gastrointestinal disturbances;
  (vi) Temperature/environmental related emergencies; and
 (14) Travel health and hygiene including:
  (i) The risk of contact with infectious diseases especially when operating into tropical and subtropical areas. Reporting of infectious diseases protection from infection and avoidance of waterborne and foodborne illness. Training shall include the means to reduce such risks;
   A. Hygiene on board;
   B. Handling of clinical waste;
   C. Aircraft disinfection; and
   D. Alertness management, physiological effects of fatigue, sleep physiology, circadian rhythm and time zone changes;
   E. The use of appropriate aeroplane equipment including first aid kits, emergency medical kits, first aid oxygen and emergency medical

equipment.

Initial training would generally include all of the subject areas listed above.

(ii) Recurrent training should include a yearly review of the first aid response process, request for medical support, use of medical kits, primary and secondary assessment and PPE.

(iii) Refresher training would include, at a minimum, all subject areas that are addressed in the recurrent training.

(b) Medical aspects and first aid training shall be delivered by a qualified trainer and the following requirement shall be met:

(1) The training center shall be managed by a person who will be responsible for:

(i) Ensuring that all First Aid Instructors adhere to the standards and guidelines contained in this CAR

(ii) Ensuring that all First Aid Instructors or equivalent and Senior First Aid Instructors or equivalent are properly qualified, accepted and authorized by the CAA.

(iii) Ensuring that appropriate equipment is available in sufficient quantities to allow the student adequate hands-on practice of required psychomotor skills.

(iv) Ensuring adherence to health and safety measures to prevent injury and minimize the risk of disease transmission.

(v) Ensure First Aid Instructors are not involved in dishonest, unprofessional, unethical or illegal conduct, including but not limited to, issuing unearned certificate or withholding properly earned certificate and notify the CAA of the removal of any instructor.

(2) The training center shall have policies and procedures that address, at a minimum:

(i) The means to comply with the applicable regulation developed in accordance with Appendix 3 to CAR-OPS 1.1005/1.1010/1.1015;

(ii) Certificate and final exam security

(iii) Classroom and Instructor quality assurance

(iv) Equipment maintenance and decontamination

(v) Professional conduct

(3) The training center shall have comprehensive and legally sound document retention practices to protect their employees and managers in case of litigation or investigation; retain all records pertaining to all training center Instructors, courses and course evaluations for no less than three (3) years.

(4) All appropriate first aid and resuscitation training equipment shall be available clean, operable and ready for use in adequate quantities at each required course conducted. Equipment needed for the cabin crew training may include the following:

(i) Infant, child and adult CPR manikins with protective and sanitizing accessories.

(ii) CPR barrier devices (e.g.: face shields, masks)

(iii) Automated External Defibrillator trainer

(iv) Supplemental oxygen delivery devices.

(v) First aid kits and supplies

Note: Equipment needs may vary according to the airline protocol. The use of any equipment not listed above must be added to the organization/airline manual, and the cabin crew must be trained to use them (e.g. telemedicine, pulse oximeter, spacers).

(5) The training center shall acquire:

(i) An up-to-date version of the Aviation First Aid Provider Manual and provide it to each candidate prior to attending the course

(ii) An accepted version of the Aviation First Aid Instructor Manual

(iii) The training center shall ensure that each Instructor has access to the latest version of the operator's training center Instructor manual

(6) The training center shall have adequate facilities for effective learning with appropriate space for optimal learning. In general, the following parameters shall be adhered to:

(i) Classroom size of no less than 400 square feet (37 square metres).
(ii) Furniture to accommodate each participant and Instructor.
(iii) For courses involving CPR, appropriate equipment and furniture for practical training.
(iv) Appropriate audio-visual equipment
(v) Appropriate lighting, heating, cooling and ventilation

(7) The training center shall implement and maintain measures to ensure the health and safety of the participants and instructors
(i) Follow all manufacturer recommendations, or an equally acceptable procedure, for the cleaning and decontamination of training equipment.
(ii) Provide the participants access to personal protective equipment, including but not limited to face shields, masks and gloves. (iii) Practice and encourage hygiene.
(iv) Ensure universal manual handling practices are followed.
(v) Skills practice such as abdominal thrusts, rescue breathing, and chest compression must be performed on training manikins designed for that purpose.
(vi) Ensure that potential hazards are addressed and mitigated and should include the procedures to be followed in the event of an emergency. e.g.
A. Location of nearest telephone.
B. Location of fire/emergency exits, fire alarm pull stations and evacuation route.
C. The location of first aid kits, AEDs and fire extinguishers.

(8) The training center shall have at least one instructor who meets the compliance requirements of CAR OPS-1.1040.

(9) The training center shall pass an evaluation by the CAA to:
(i) Ensure that all instructors who deliver the cabin crew first aid training are appropriately trained and qualified
(ii) Ensure the continued integrity, credibility, and quality of training course and materials and compliance with these rules.
(iii) Ensure fair and consistent quality assurance practices.
(iv) Provide recommendations to the training center to improve their services.

(10) The training center may have at least one authorized Senior Aviation First Aid Instructor who shall be competent to teach, evaluate and certify Aviation First Aid instructors. A Senior Aviation First Aid Instructor shall meet the compliance requirements of CAR OPS1.1040.

AMC-1 OPS-1.1007 Training Facilities

(See CAR OPS-1.1007)

(a) **Safety and emergency equipment:**

(1) **‘Safety equipment’** means equipment installed/carried to be used during day-to-day normal operations for the safe conduct of the flight and protection of occupants (e.g. seat belts, child restraint devices, safety card, safety demonstration kit).

(2) ***‘Emergency equipment’*** means equipment installed/carried to be used in case of abnormal and emergency situations that demand immediate action for the safe conduct of the flight and protection of occupants, including life preservation (e.g. drop-down oxygen, crash axe, fire extinguisher, protective breathing equipment, manual release tool, slide-raft).

(3) Training for each piece of equipment should be based on the following:
i. General description
ii. Purpose of use
iii. Pre-flight serviceability check(s)
iv. Location(s)

v. Removal from stowage
vi. Operation
vii. Conditions for operation
viii. Operational limitations and duration of use
ix. Operation under adverse conditions
x. Precautions for use
xi. Post use procedures (including relocation of equipment, if applicable) and documentation

(b) Cabin emergency evacuation trainer shall be as follows:

(1) It is a partial life-sized mock-up model of an aircraft fuselage and wing;
(2) Be representative of the passenger cabin of the aircraft type in use;
(3) Contain seats for all of the evacuees participating in the demonstration;
(4) Be equipped with the same survival equipment that is installed on the aircraft type, including a life jacket for each evacuee participating in the demonstration;
(5) The direction of movement, associated forces and travel of all controls for all equipment, including the weight of emergency exits when operated without power assist, where applicable; and
(6) Have enough wing area installed outside the window emergency exits to simulate the portion of the wing of the aircraft type that would be used in a ditching scenario;
(7) The cabin training device should be able to provide realistic situations that can be used to enable realistic simulation of cabin crew duties without continuous need for use of actual aircraft training
(8) It is also able to provide effective training on safety and abnormal/emergency procedures e.g. creating a smoke filled cabin.
(9) The effectiveness of cabin crew communication using the communication system.
(10) The use of passenger safety seat belts and restraint systems, crew member safety belts and shoulder harness requirements.
(11) The cabin training device may also include the following:
i. Lavatories;
ii. Galleys;
iii. Attendant panels and
iv. Overhead bins.
v. Meal cart or trolleys
(12) Dials, handles, switches, restraint brackets, and mounting devices to be operated and the force required for their operation;

(c) Emergency door/ exit trainers should:

(1) Replicate the size, weight and operating characteristics of the exit of the aircraft type on which the cabin crew member will operate; (e.g. direction of movement of handles); and
(2) Be designed so that the representative exit can be operated in normal and emergency modes, particularly in relation to method of operation and forces required to operate them.
(3) When a representative training device does not replicate the actual aircraft exit operating characteristics, any differences between the operating characteristics of the actual aircraft exits and those of the emergency exit trainer shall be highlighted during training.

(d) Fire Fighting:

(1) A simulated fire-fighting exercise should be conducted in a confined area, to simulate cabin fire, and under the supervision of an instructor.
(2) This device used for a simulated fire-fighting exercise should include aircraft furnishings as found on board an aircraft, such as seats, galley units, lavatories, panels, overhead bins and waste bins.
(3) Fire-fighting equipment and the restraints used should be representative to those installed on an aircraft with respect to weight, dimensions, controls, types and

operations.

(4) Fire extinguishers used for live fire-fighting should be charged with the appropriate agent or with an environmentally friendly agent.

(5) Smoke evacuation training prepares the crew member for their duties in a smoke- filled environment with poor visibility e.g. in the cabin in which they will demonstrate effective communication while combatting a fire or guiding passengers to the nearest available exit.

(e) Water survival:

(1) When the operator is required by the Authority to conduct wet drills, these shall be carried out in a body of water or pool of sufficient depth to realistically perform the simulated exercise.

(2) A life raft exercise shall be conducted using life-saving equipment that is representative of that installed on the aircraft with respect to weight, dimensions, appearance, features and operation.

(3) The rafts may be substituted if the equipment used is similar with respect to weight, dimensions, appearance, and features. In such cases, training must address any differences in the operation of the raft.

(4) The crew member will receive theoretical and practical training in ditching procedures, including Survival procedures techniques in the water.

(5) Practical exercises in the water such as:

i. Use and management of raft
ii. Boarding the raft
iii. Rescue in water
iv. Demonstrate effective passenger management techniques.
v. Sea survival techniques

(f) Use of other operator or Approved Training Organisation (ATO) training devices

(1) Where an operator arranges to use training devices owned by another operator, or by an approved training organisation (ATO).

i. the training must comply with the approved training programme and operating procedures of the operator whose crew are being trained.
ii. if significant differences exist in terms of cabin layout and equipment, such training should be restricted accordingly.

(g) Trainee to instructor ratio:

(1) When facilitating computer-based training, the trainee to instructor ratio may be more flexible. A maximum of thirty (30) trainees per instructor is recommended, assuming that the presence of the instructor is limited to providing support.

(2) The trainee to instructor ratio shall be more restrictive when conducting practical instruction such as hands-on exercises, to allow for better supervision. This also includes in assessing and evaluating a trainee's competency. The maximum number of students undergoing practical training or evaluation during any training course shall not exceed ten (10) per instructor or examiner.

(3) When conducting hands-on type exercise training, such as Pilot incapacitation, first aid, CPR, safety and emergency equipment, these group simulated exercises will prompt an adjustment of the proposed trainee to instructor ratio should not exceed a 4:1 ratio, except for CRM training, a maximum of twenty (20) trainees is permitted.

(4) To provide sufficient supervision and control for theoretical training, a maximum of fifteen (15) trainees per instructor in a classroom environment.

(h) Maintenance of training facilities and equipment

(1) Safety equipment installed or carried on aircraft depicted for use within any training device shall be maintained in working order and applicable maintenance checks conducted to an established maintenance program to ensure the following:

i. A safe training environment;
ii. Equipment is in working order;
iii. Equipment used in water training are stowed in a manner that will allow

ventilation for drying.

iv. Fixed equipment on training devices e.g. doors, emergency hatches etc. shall be serviced and maintained in full working order

GM-1 OPS-1.1007 Training Facilities

(See CAR OPS-1.1007)

(a) The training facilities provided should include the following but not limited to:
   (1) the temperature should be comfortable;
   (2) ventilation should be adequate;
   (3) lighting should be of adequate level for work or viewing;
   (4) distracting sound should be kept to a minimum;
   (5) work areas should be visually pleasing;
   (6) work stations, including chairs, should be comfortable;
   (7) work space should be adequate;
   (8) work area should be clean;
   (9) training equipment should be adequate and in good condition;
   (10) visual media should be visible from all angles and seats;
   (11) audio media should be audible to all present.
   (12) Security of storage for the trainee's personal belongings.
   (13) Training practical examination area.
   (14) Examination rooms adequate for purpose.

(b) Representative training devices include:
   (1) Safety and emergency equipment
   (2) Cabin emergency evacuation trainer (for each aircraft type)
   (3) Emergency exit trainers
   (4) Facilities used for firefighting and smoke evacuation
   (5) Water survival training.

(c) Mockup/Cabin Emergency Evacuation Trainer *(*CEET)/Door Trainer Records, to include but not limited to:
   (1) Maintenance records
   (2) Technical logs
   (3) Maintenance programs

(d) The approval procedure should begin once documentation is submitted by the Operator advising that an emergency evacuation trainer will be required for their training program. Prior to granting approval, the emergency evacuation trainer or mock-up shall be inspected to ensure that the aeroplane type is accurately represented and the requirements of the Authority are met.

GM-2 OPS-1.1007 Training Facilities Renewal Process

(a) Applications for re-approval must be submitted a minimum sixty (60) working days before the expiry of the existing approval. This is to allow adequate time for the CAA to complete the renewal process which includes a pre-audit of the facilities to the same level of compliance as required for Initial Application Procedure – Inspection Phase (see AMC-2 OPS-1.1007) (b) The audit inspector will focus on:
   (1) The conduct of training and the quality of theoretical knowledge, as applicable to the courses offered.
   (2) The quality of cabin crew trainees' task completion and achievement in conjunction with the approved training programme.
   (3) Coaching, facilitation and mentoring of individual trainee needs and flexibility of Instructor.
   (4) Training facilities to be fully functional with updated maintenance records
   (5) Action taken on any non-conformances raised at the previous audit findings;
   (6) The operation of the organization's quality system;
   (7) Any changes to the training management team and the current numbers of training staff;

(8) The training task since the last inspection and forecasts for the next approval period;
(9) Changes to the location of training facilities;
(10) Course structure and training aids;
(11) A Training Center/Organization must not commence, conduct or continue training courses requiring approval unless it has the relevant approval documentation in its possession.
(12) A Training Center/Organization Certificate remains valid for a period of two (2) years, or as stated on the certificate and will only be renewed provided there is a demonstrated compliance with the applicable CAA regulations.

(b) Revocation, Suspension or Variation Of Approval. The CAA may at any time in accordance with its procedures take action to limit, suspend or revoke authorizations and approvals when:
(1) The training centre or Organization suffers financial failure or a serious noncompliance issue occurs, revocation action may be taken in conjunction with the legal department.
(2) Should there be a failure to meet the requirements or standards, the training centre or organization will be formally notified of the non-conformances and, if necessary, a restricted approval document issued to permit the remedial action to be taken within a specified time.

Appendix 1 to CAR-OPS 1.1010 Conversion and Differences training

(See IEM-1 to Appendix 1 to CAR-OPS-1.1005/1.1010/1.1015/1.1020)

(a) ***General.*** An operator shall ensure that:
(1) Conversion and differences training is conducted by suitably qualified persons; and
(2) During conversion and differences training, training is given on the location, removal and use of all safety and survival equipment carried on the aeroplane, as well as all normal and emergency procedures related to the aeroplane type, variant and configuration to be operated.

(b) ***Fire and smoke training.*** An operator shall ensure that:
(1) Each cabin crew member is given realistic and practical training in the use of all firefighting equipment including protective clothing representative of that carried in the aeroplane. This training must include:
i. Each cabin crew member extinguishing a fire characteristic of an aeroplane interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and
ii. The donning and use of protective breathing equipment by each cabin crew member in an enclosed, simulated smoke-filled environment.

(c) ***Operation of doors and exits.*** An operator shall ensure that:
(1) Each cabin crew member operates and actually opens each type or variant of all normal and emergency exits for passenger evacuation in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted in an approved representative training device; and
(2) The operation of all other exits, such as flight deck windows is demonstrated.

(d) ***Evacuation slide training.*** An operator shall ensure that:
(1) Each cabin crew member descends an evacuation slide from a height representative of the aeroplane main deck sill height;
(2) The slide is fitted to an aeroplane or a representative training device.

(e) Evacuation procedures and other emergency situations. An operator shall ensure that:
(1) Emergency evacuation training includes the recognition of planned or unplanned evacuations on land or water. This training must include recognition of when exits are unusable or when evacuation equipment is unserviceable; and
(2) Each cabin crew member is trained to deal with the following:
i. An in-flight fire, with particular emphasis on identifying the actual source of the fire;
ii. Severe air turbulence;

iii. Sudden decompression, including the donning of portable oxygen equipment by each cabin crew member; and

iv. Other in-flight emergencies.

(f) ***Crowd control.*** An operator shall ensure that training is provided on the practical aspects of crowd control in various emergency situations, as applicable to the aeroplane type.

(g) ***Pilot incapacitation.*** An operator shall ensure that, unless the minimum flight crew is more than two, each cabin crew member is trained in the procedure for flight crew member incapacitation and shall operate the seat and harness mechanisms. Training in the use of flight crew members' oxygen system and use of the flight crew members' check lists, where required by the operator's SOP's, shall be conducted by a practical demonstration.

(h) ***Safety equipment.*** An operator shall ensure that each cabin crew member is given realistic training on, and demonstration of, the location and use of safety equipment including the following:

(1) Slides, and where non-self-supporting slides are carried, the use of any associated ropes;
(2) Life-rafts and slide-rafts, including the equipment attached to, and/or carried in, the raft (conduct practical training on a body of water);
(3) Lifejackets, infant lifejackets and flotation cots;
(4) Dropout oxygen system;
(5) First-aid oxygen;
(6) Fire extinguishers;
(7) Fire axe or crow-bar;
(8) Emergency lights including torches;
(9) Communications equipment, including megaphones;
(10) Survival packs, including their contents;
(11) Pyrotechnics (Actual or representative devices);
(12) First-aid kits, their contents and emergency medical equipment; and
(13) Other cabin safety equipment or systems where applicable.

(i) ***Passenger Briefing/Safety Demonstrations.*** An operator shall ensure that training is given in the preparation of passengers for normal and emergency situations in accordance with CAR OPS-1.285 and;

(1) An operator shall ensure that all appropriate CAR–OPS requirements are included in the training of cabin crew members.

(j) ***Crew Resource Management.*** An operator shall ensure that:

(1) Each cabin crew member completes the Operator's CRM Training covering the training elements in Appendix 2 to CAR-OPS 1.1005/1.1010/1.1015 Table 1, Column (a) to the level required in Column (c) before undertaking subsequent Aeroplane Type Specific CRM and/or recurrent CRM Training.
(2) When a cabin crew member undertakes a conversion course on another aeroplane type, the training elements in Appendix 2 to CAR-OPS 1.1005/1.1010/1.1015 Table 1, Column (a) shall be covered to the level required in Column (d), Aeroplane Type Specific CRM.
(3) The Operator's CRM Training and Aeroplane Type Specific CRM shall be conducted by a least one cabin crew CRM instructor.

(k) ***Familiarisation flights.*** An operator shall ensure that on completion of the conversion course that cabin crew member shall complete two (2) supervised line flights before being assigned online duty.

IEM to Appendix 1 to CAR OPS-1.1010/1.1015 Conversion and recurrent training

(See Appendix 1 to CAR OPS-1.1010/1.1015)

(1) A review should be carried out of previous initial training given in accordance with CAR OPS1.1005 in order to confirm that no item has been omitted. This is especially important for cabin crew members first transferring to aeroplanes fitted with life-rafts or other similar equipment.

(2) Fire and smoke training requirements:

Training requirement/ interval	Required activity		Notes
First conversion to aeroplane type (e.g. new entrant)	Actual firefighting and handling equipment		(Note 1)
Every year during recurrent training	Handling equipment		
Every 3 years during recurrent training	Actual firefighting and handling equipment		(Note 1)
Subsequent a/c conversion	(Note 1)	(Note 1)	(Notes 2 & 3)
New firefighting equipment	Handling equipment		

NOTES:

1. *Actual firefighting during training must include use of at least one fire extinguisher and extinguishing agent as used on the aeroplane type. An alternative extinguishing agent may be used in place of Halon.*
2. *Firefighting equipment is required to be handled if it is different to that previously used.*
3. *Where the equipment between aeroplane types is the same, training is not required if within the validity of the three (3) year check.*

Appendix 1 to CAR OPS-1.1015 Recurrent training

(a) An operator shall ensure that recurrent training is conducted by suitably qualified persons.

(b) An operator shall ensure that every twelve (12) calendar months the programme of practical training includes the following:

(1) Emergency procedures including pilot incapacitation;

(2) Evacuation procedures including crowd control techniques;

(3) Full simulation using approved training devices by each cabin crew member for opening normal and emergency exits for passenger evacuation;

(4) The location and handling of emergency equipment, including oxygen systems, and the donning by each cabin crew member of lifejackets, portable oxygen and protective breathing equipment (PBE);

(5) First aid and the contents of the first-aid kit(s);

(6) Stowage of articles in the cabin;

(7) Security procedures;

(8) Incident and accident review; and

(9) Awareness of the effects of surface contamination and the need to inform the flight crew of any observed surface contamination, and

(10) *Crew Resource Management*. An operator shall ensure that CRM training satisfies the following:

i. the training elements in Appendix 2 to OPS 1.1005, 1.1010 & 1.1015 Table 1, Column (a) shall be covered within a three-year cycle to the level required by Column (d), Annual Recurrent CRM Training;

ii. the definition and implementation of this syllabus shall be managed by in crew CRM instructor;

iii. iii.when CRM training is provided by stand-alone modules, it shall be conducted by at least one cabin crew CRM.

(c) An operator shall ensure that, at intervals not exceeding three (3) years, recurrent training includes:
   (1) Each cabin crew member operating and actually opening each type or variant of normal and emergency exit in the normal and emergency modes. This can be conducted in a representative training device;
   (2) All Emergency training scenarios, covering failure of power assist systems where fitted, and including the action and forces required to operate and deploy evacuation slides. This training shall be conducted in a representative training device;
   (3) Demonstration of the operation of all other exits including flight deck windows (This can be conducted in a representative training device);
   (4) Each cabin crew member being given realistic and practical training in the use of all fire- fighting equipment, including protective clothing, representative of that carried in the aeroplane. This training must include:
      i. Each cabin crew member extinguishing a fire characteristic of an aeroplane interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and
      ii. The donning and use of protective breathing equipment by each cabin crew member in an enclosed, simulated smoke-filled environment.
   (5) Use of pyrotechnics (Actual or representative devices); and
   (6) Conduct practical training on the use of the life-raft, or slide-raft, where fitted (as per AMC-1 OPS-1.1007 para (e) and Appendix 1 to CAR OPS-1.1010 para (h)(2)).

(d) An operator shall ensure that all appropriate CAR OPS-1 requirements are included in the training of cabin crew members.

AMC-1 OPS-1.1005/1.1010/1.1015 Crew Resource Management Training

(See CAR OPS-1.1005/1.1010/1.1015 and Appendix 2 to CAR OPS-1.1005/1.1010/1.1015)

(1) **Introduction**

   (a) Crew Resource Management (CRM) shall be the effective utilisation of all available resources (e.g. crew members, aeroplane systems, and supporting facilities) to achieve safe and efficient operation.

   (b) The objective of CRM shall enhance communication and management skills of all the crew members, as well as the importance of effective co-ordination and two-way communication between all crew members.

   (c) CRM training shall reflect the culture of the operator, the scale and scope of the operation together with associated operating procedures and areas of operation which produce particular difficulties.

(2) **General principles for CRM Training for all Cabin Crew:**

   (a) Cabin crew CRM training shall focus on issues related to cabin crew duties, and therefore, will be different from flight crew CRM training. However, the co-ordination of the tasks and functions of flight crew and cabin crew shall be addressed.

   (b) Whenever it is practicable to do so, operators should provide combined training for flight crew and cabin crew, including feedback, as appropriate to Appendix 2 to CAR OPS1.1005/1.1010/1.1015 Table 1, Columns (c), (d) and (e). This is of particular importance for In-Charge cabin crew members.

   (c) Where appropriate, CRM principles shall be integrated into relevant parts of cabin crew training.

(d) CRM training will include group discussions and the review of accidents and incidents (case-based studies). (See Appendix 2 to CAR OPS-1.1005/1.1010/1.1015 Table 1).

(e) Whenever it is practicable to do so, relevant parts of CRM training shall form part of the training conducted in cabin training devices (See IEM to AMC-1 OPS-1.1005).

(f) The operator shall be responsible for the quality of all CRM training, including any training provided by sub-contractors/third parties (in accordance with CAR OPS-1.015 and AMC1 OPS-1.005/1010/1015, paragraph (5)(a)).

(g) CRM training for cabin crew shall include, Operator's CRM Training, and Aeroplane Type Specific CRM, all of which may be combined.

(3) **The following subjects for CRM Training shall be included for all Cabin Crew:**

(a) **Resilience development:**

The CRM training should address the main aspects of the following:

i. ***Mental flexibility.*** Cabin crew should be trained to:

A. Understand that mental flexibility is necessary to recognize critical changes;

B. Reflect on their judgement and adjust it to the current unique situation;

C. Avoid fixed prejudices and over-reliance on standard solutions; and

D. Remain open to changing assumptions and perceptions.

ii. ***Performance adaptation.*** Cabin crew should be trained to:

A. Mitigate frozen behaviours, overreactions and inappropriate hesitation; and

B. Adjust actions to current conditions.

(b) **Surprise and startle effect:**

Cabin crew should be trained to:

i. Address unexpected, unusual and stressful situations including interruptions and distractions.

ii. CRM training should be designed to prepare cabin crew to master sudden events and associated uncontrolled reactions – Damage recovery.

(c) **Cultural differences:**

CRM training should cover cultural differences of multinational and cross-cultural crew. This includes recognizing that:

i. Different cultures may have different communication specifics, ways of understanding and approaches to the same situation or problem;

ii. Difficulties may arise when crew members with different mother tongue communicate in a common language which is not their mother tongue; and

iii. Cultural differences may lead to different methods for identifying a situation and solving a problem.

(d) **Operator's safety culture and company culture:**

CRM training should cover the Operator's safety culture, its company culture, the type of operations and the associated procedures of the operator. This should include areas of operations that may lead to particular difficulties or involve unusual hazards.

(4) **Operator's CRM Training**

(a) Operator's CRM training should be the application of the knowledge gained within the applicable CRM Courses to enhance communication and co-ordination skills of cabin crew members relevant to the operator's culture and type of operation. (See Appendix 2 to CAR OPS-1.1005/1.1010/1.1015 Table 1)

(5) **Aeroplane Type Specific CRM**

(a) Aeroplane Type Specific CRM should be integrated into all appropriate phases of the operator's conversion training on the specific aeroplane type.
(b) Aeroplane Type Specific CRM should be the application of the knowledge gained in previous CRM training on the specifics related to aircraft type, including, narrow/wide bodied aeroplanes, single/multi deck aeroplanes, and flight crew and cabin crew composition.

(6) **Annual Recurrent Training**

(a) When a cabin crew member undergoes annual recurrent training, CRM training should be integrated into all appropriate phases of the recurrent training and may include stand-alone modules.
(b) When CRM elements are integrated into all appropriate phases of the recurrent training, the CRM elements should be clearly identified in the training syllabus.
(c) Annual Recurrent CRM Training should include realistic operational situations for joint flight and cabin crew CRM including simulated exercises on situations during normal operations, abnormal and emergency situations.
(d) Annual Recurrent CRM Training should include areas as identified by the operator's accident prevention and flight safety programme (see Appendix 2 to CAR OPS1.005/1010/1015 Table 1. "Participation in Cabin safety incident and accident reporting".).

(7) **CRM Training for In-Charge Cabin Crew**

(a) CRM training for In-Charge Cabin Crew Members should be the application of knowledge gained in previous CRM training and operational experience relevant to the specific duties and responsibilities of an In-Charge Cabin Crew Member.
(b) The In-Charge cabin crew member should demonstrate ability:
  i. to manage the operation; and
  ii. take appropriate leadership/management decisions.

(8) **CRM Training for single cabin crew operations.**

For single cabin crew operations, the relevant training elements should be applied with the following enhancement:
(a) Situation awareness
(b) Workload management
(c) Decision making
(d) Resilience development
(e) Surprise and startle effect
(f) Effective communication and coordination with
  i. The flight crew;
  ii. Other operational personnel and ground services.

(9) **Cabin Crew CRM Facilitator/ Instructor Qualifications.**

(a) The operator shall ensure that all personnel conducting relevant training are suitably qualified to integrate elements of CRM into all appropriate training programmes.
(b) A training and standardisation programme for CRM instructors shall be established.
(c) Cabin crew CRM Facilitator/Instructors shall:
  i. Have suitable experience of commercial air transport as a cabin crew member; and
  ii. Have completed training on Human Factors Performance Limitations (HPL); and
  iii. Have completed the applicable CRM Course and the Operator's CRM training; and

iv. Have received instructions in training skills in order to conduct the Cabin Crew CRM courses; and
v. Be supervised by suitably qualified Cabin Crew CRM Facilitator/Instructors when conducting their first CRM training course.
vi. Have received additional training in the fields of group management, group dynamics and personal awareness.
vii. Have demonstrated the knowledge, skills and credibility required to train the CRM Training elements in the non-operational environment, as specified in Table 1.

(d) An experienced non-cabin crew CRM Facilitator/ Instructor may continue to be a cabin crew CRM instructor, provided that the provisions of paragraph 9(c) (ii) to (vii) are satisfied and that a satisfactory knowledge has been demonstrated of the nature of the operation and the relevant specific aeroplane types. In such circumstances, the operator shall ensure the instructor has a suitable knowledge of the cabin crew working environment.
(e) Facilitators/Instructors integrating elements of CRM into conversion, recurrent training, or In-Charge Cabin Crew Member training, should have acquired relevant knowledge of human factors and have completed the appropriate CRM training.

(10) **Training of Cabin Crew CRM Facilitator/Instructor:**

Training of Cabin Crew CRM facilitator/Instructor should be both theoretical and practical. Practical elements should include the development of specific trainer skills, particularly the integration of CRM into day-to-day operations.
The basic training of Cabin Crew CRM facilitator/Instructor should include the training elements for cabin crew as specified in Table 1, Appendix 2 to CAR OPS-1.1005/1.1010/ 1.1015. In addition, the basic training should include the following:
(a) Introduction to CRM training;
(b) Operator's management system; and
(c) Characteristics as applicable;
i. Of the different types of CRM training (initial, recurrent, etc.);
ii. Of combined training (cabin crew and flight crew); and
iii. Related to the type of aircraft or operation
(d) The training of a nominated Cabin Crew CRM facilitator/instructor shall be conducted by a senior Cabin Crew CRM facilitator/ instructor with a minimum of three (3) years' experience.
(e) Assistance may be provided by experts in order to address specific areas.

(11) **Recency and renewal of qualification of Cabin Crew CRM Facilitator**

(a) For recency of the three (3) year validity period, the Cabin Crew CRM Facilitator should:
i. Conduct at least 2 CRM training classes in any twelve (12) month period;
ii. Be assessed within the last 12 months of the three (3) year validity period by the Operator; and
iii. Complete CRM Facilitator refresher training within the three (3) year validity period.
(b) The next three (3) year validity period should start at the end of the previous period.
(c) For renewal, when a Cabin Crew CRM Facilitator does not fulfil the provisions in para (a), they should, before resuming as a Cabin Crew CRM Facilitator:
i. Comply with the qualification stipulated (9) (c) and an assessment;
ii. Complete CRM Facilitator refresher training.

(12) **Assessment of the Cabin Crew CRM Facilitator**

(a) A Cabin Crew CRM Facilitator should be assessed by the Operator when conducting the first training course. This first assessment should be valid for a period of 3 years.
(b) Assessment is the process of observing, recording, interpreting and debriefing the Cabin Crew CRM Facilitator. The Operator should describe the assessment process in the Operations Manual. All personnel involved in the assessment must be credible and competent in their role.

(13) **Cabin Crew CRM Facilitator CRM minimum training time (hours)**

(a) Definition – "training hours" means actual training time excluding breaks.
(b) Cabin Crew CRM Facilitator basic training:
i. Eighteen (18) hours when the Operator can justify that the trainee already has received sufficient and suitable instruction on training skills in order to conduct CRM training courses; or
ii. Thirty (30)hours for trainees not fulfilling A; and
(c) Refresher training:
i. Six (6) hours and shall include new methodologies, procedures and lessons learned.

(14) **Co-ordination between flight crew and cabin crew training departments**

(a) There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew instructors to observe and provide feedback on the training module observed.

(b) Provision should be made for transfer of relevant knowledge and skills between flight crew and cabin crew CRM facilitators.

(c) Consideration should be given to creating flight deck scenarios on video for playback to all cabin crew during recurrent training, and to providing the opportunity for cabin crew, particularly In-Charge cabin crew, to participate in Flight Crew LOFT exercises.

(15) **Combined CRM training for flight crew and cabin crew**

(a) Whenever in a classroom, Operators should provide combined training for flight crew and cabin crew during recurrent CRM training.
(b) The combined training should address at least:
i. Effective communication, coordination of tasks and functions of flight crew and cabin crew; and
ii. Mixed multinational and cross-cultural flight crew and cabin crew, and their interaction, if applicable.
(c) Combined CRM training should be conducted by flight crew and or cabin crew CRM Facilitator.

IEM to AMC-1 OPS-1.1005/1.1010/1.1015/1.1020 Representative Training Devices

(See CAR OPS-1.1005/1.1010/1.1015/1.1020)

(1) An approved representative training device shall be used for the training of cabin crew.
(2) Ensure that those items relevant to the training and testing intended to be given, accurately represent the aeroplane in the following particulars:
(a) Layout of the cabin in relation to doors/exits, galley areas and stowage of safety and emergency equipment;
(b) Type and location of passenger and cabin crew seats;
(c) Doors/ exits in all modes of operation (particularly in relation to method of operation, their mass, balance and operating forces) including failure of power assist systems, where fitted.
(d) Safety and emergency equipment of the type provided in the aircraft (such equipment

may be 'training use only' items and, for oxygen and protective breathing equipment, units charged with or without oxygen may be used).

(3) Assess the following factors when determining whether an door/exit can be considered to be a variant of another type:
  (a) Door/Exit arming/disarming;
  (b) Direction of movement of the operating handle (Left and right side of aircraft);
  (c) Direction of exit opening (Left and right side of aircraft);
  (d) Power assist door mechanisms;
  (e) Escape means, e.g. evacuation slides and ropes

AMC OPS-1.1012 Familiarisation

(See CAR OPS-1.1012)

(a) New entrant cabin crew:
  (1) Each new entrant cabin crew member having no previous comparable operating experience should:
    i. Participate in a visit to the aeroplane to be operated; and
    ii. Participate in familiarisation flights as described in paragraph (c) below.

(b) Cabin crew operating on a subsequent aeroplane type:
  (1) A cabin crew member assigned to operate on a subsequent aeroplane type with the same operator should either:
    i. Participate in a familiarisation flight as described in paragraph (c) below; or
    ii. Participate in a visit to the aeroplane to be operated.

(c) Familiarisation Flights:
  (1) During familiarisation flights, the cabin crew member should be additional to the minimum number of cabin crew required by CAR OPS-1.990.
  (2) Familiarisation flights should be conducted under the supervision of the in-charge cabin crew member.
  (3) Familiarisation flights should be structured and involve the cabin crew member in the participation of safety related pre-flight, in-flight and post-flight duties.
  (4) Familiarisation flights shall be documented in the training record for each cabin crew member.
  (5) Familiarisation flights should be operated with the cabin crew member in uniform.

(d) Aeroplane visits
  (1) The purpose of aeroplane visits is to familiarise each cabin crew member with the aircraft environment and its equipment. Accordingly, aircraft visits shall be conducted by suitably qualified persons and in accordance with a syllabus described in the Operations Manual, Part D. The aircraft visit should provide an overview of the aircraft's exterior, interior and systems including the following:
    i. Interphone and public address systems;
    ii. Evacuation alarm systems;
    iii. Emergency lighting;
    iv. Smoke detection systems;
    v. Safety/emergency equipment;
    vi. Flight deck;
    vii. Cabin crew stations;
    viii. Toilet compartments;
    ix. Galleys, galley security and water shut-off;
    x. Cargo areas if accessible from the passenger compartment during flight;
    xi. Circuit breaker panels located in the passenger compartment;
    xii. Crew rest areas;
    xiii. Exit location and its environment.
  (2) An aircraft familiarisation visit may be combined with the conversion training required by CAR OPS-1.1010(c)(3).

AMC OPS-1.1020 Refresher training

(See CAR OPS-1.1020)

In developing the content of any refresher training programme prescribed in CAR OPS-1.1020, operators shall consider (in consultation with the Authority) whether, for aeroplanes with complex equipment or procedures, refresher training may be necessary for periods of absence that are more than 90 days but less than the 180 Days prescribed in CAR OPS-1.1020(a). These variations will be stated in the Operations Manual, Part D.

Appendix 1 to CAR OPS-1.1020 Refresher training

(See IEM-1 & IEM-2 to Appendix 1 to CAR–OPS 1.1005/1.1010/1.1015/1.1020 – Training Methods)

(a) An operator shall ensure that refresher training for each cabin crew member is conducted by suitably qualified persons and includes at least the following:
   (1) Emergency procedures including pilot incapacitation;
   (2) Evacuation procedures including crowd control techniques;
   (3) The operation and actual opening of each type or variant of normal and emergency exit in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted in an aeroplane or an Authority approved training device;
   (4) Demonstration of the operation of all other exits and the flight crew compartment security door in the normal and emergency modes; including flight deck door and windows; and
   (5) The location and handling of emergency equipment, including oxygen systems, and the donning of lifejackets, portable oxygen and protective breathing equipment.

AMC OPS-1.1025 Checking

(See CAR OPS-1.1025, GM 1 OPS-1.1025)

Checking is the method for evaluating crew demonstrating a required level of knowledge in a subject, and applying the knowledge and skills learned in instructional situations to practical situations.

(1) Elements of training which require individual practical participation should be combined with practical checks.
(2) Competency in use of safety/emergency equipment carried on the aircraft, the ability to demonstrate effective communication in simulated emergency scenarios.
(3) The checks required by CAR OPS-1.1025 should be accomplished by the method appropriate to the type of training, including:
   (a) Practical demonstration; and/or
   (b) Computer based assessment; and/or
   (c) Oral or written tests.
      i. Annual line In-flight checks: to maintain proficiency/operational competency of each cabin crew
(4) The following definitions apply for the purpose of training programmes, syllabi and the conduct of training and checking on equipment and procedures:
   (a) ***'Safety equipment'*** means equipment installed/carried to be used during day-to-day normal operations for the safe conduct of the flight and protection of occupants (e.g. seat belts, child restraint devices, safety card, safety demonstration kit).
   (b) ***'Emergency equipment'*** means equipment installed/carried to be used in case of abnormal and emergency situations that demand immediate action for the safe conduct of the flight and protection of occupants, including life preservation (e.g. drop-down oxygen, crash axe, fire extinguisher, protective breathing equipment, manual release tool, slide-raft).
   (c) ***'Normal procedures'*** means all procedures established by the operator in the

operations manual for day-to-day normal operations (e.g. pre-flight briefing of cabin crew, pre-flight checks, passenger briefing, securing of galleys and cabin, cabin surveillance during flight).

(d) ***'Emergency procedures'*** means all procedures established by the operator in the operations manual for abnormal and emergency situations. For this purpose, 'abnormal' refers to a situation that is not typical or usual, deviates from normal operation and may result in an emergency.

GM-1 OPS-1.1025 Checking

(See CAR OPS-1.1025)

ICAO had developed guidance for a competency-based approach to cabin crew safety training so that cabin crew members could be proficient to perform their tasks, and with the goal of establishing an international baseline for cabin crew competencies.

Note: - Guidance on development for competency based training and assessment including implementation of scenario based training for cabin crew members is contained in ICAO Doc. 10002 (Cabin Crew Safety Training Manual) and ICAO Doc 9868 Amendment 5 to the Procedures for Air Navigation Services (PANS TRG). It also provides guidance to transition from traditional to competency based assessment.

CAR OPS-1.1030 Operation on more than one type or variant

(See CAR OPS-1.1030)

(1) For the purposes of CAR OPS 1.1030(b)(1), when determining similarity of exit operation, the following factors should be assessed to justify the finding of similarity:
   (a) Exit arming/disarming;
   (b) Direction of movement of the operating handle;
   (c) Direction of exit opening;
   (d) Power assist mechanisms;
   (e) Assist means, e.g. evacuation slides.

Note: Self-help exits, for example Type III and Type IV exits, need not be included in this assessment.

(2) For the purposes of CAR OPS-1.1030(a)(2) and (b)(2), when determining similarity of location and type of portable safety equipment the following factors should be assessed to justify the finding of similarity:
   (a) All portable safety equipment is stowed in the same, or in exceptional circumstances, in substantially the same location;
   (b) All portable safety equipment requires the same method of operation;
   (c) Portable safety equipment includes:
      i. Fire-fighting equipment;
      ii. Protective Breathing Equipment (PBE);
      iii. Oxygen equipment;
      iv. Crew lifejackets;
      v. Torches;
      vi. Megaphones;
      vii. First aid equipment;
      viii. Survival equipment and signalling equipment; or
      ix. Other safety equipment where applicable.

(3) For the purposes of sub-paragraph of CAR OPS-1.1030(a)(2) and (b)(3), type specific emergency procedures include, but are not limited, to the following:
   (a) Land and water evacuation;
   (b) In-flight fire;
   (c) Decompression;
   (d) Pilot incapacitation.

(4) When changing aeroplane type or variant during a series of flights, the cabin crew safety briefing required by AMC OPS-1.210(a), should include a representative sample of type specific normal and emergency procedures and safety equipment applicable to the actual aeroplane type to be operated.

IEM OPS-1.1035 Training records

(See CAR OPS-1.1035)

An operator shall maintain a summary of training to show a trainee's completion of every stage of training and checking.

Appendix 1 to CAR OPS-1.1037 Safety & Emergency Procedure Examiner (SEP) and/or First Aid Examiner

(See AMC-2 to Appendix 1 to CAR OPS-1.1037)

(a) The Authority shall acknowledge the acceptability of each nominee.
(b) The nominated personnel shall then attend an examination to determine his/her knowledge, capability and competency are suitable for the examiner's role and to determine the person's motivation.
(c) The selection of an examiner shall also be based on criteria intended to define a proven capability in the subject for which he/she intends to examine or evaluate.
(d) Upon passing the exam, the successful nominee shall then proceed with the Examiner training course.
(e) The applicant will be issued an approval letter that contains the following information:
    (1) Designated examiner name;
    (2) CAA license number;
    (3) Specified aircraft;
    (4) Effective date of designation.
(f) In the event the nominated examiner is unsatisfactory, the Authority will advise in writing to the operator of disapproval.
(g) CAA may also nominate suitably qualified personnel employed by an Operator to act as Designated Examiner for the Operator's programme.
(h) SEP or First Aid Examiner in each organization shall be able to evaluate the competency level of all operating crew members, new and online categories of cabin crew with regard to cabin safety or First Aid procedures.
(i) The Examiner is able to ensure continuous improvement and effectiveness of training programmes, to check on trainees' knowledge, competency and skill set as per the syllabus, meeting the Authority's requirements.
(j) SEP or First Aid Examiner shall be entrusted to monitor, evaluate and assess the SEP or First Aid Instructor's tutorial to ensure compliance and adhering to the training syllabus.
(k) The Examiner shall be able to conduct a proficiency check of the SEP or First Aid Instructor's knowledge, delivery in theoretical as well as the practical training through the results of the checks.
(l) The SEP or First Aid Examiner must be thoroughly familiar and conversant with the operator's methods and procedures. This enables the SEP or First Aid Examiner to conduct a check, consistent with the operator's approved procedures and regulatory requirements.
(m) The nominated Senior SEP or First Aid Examiner shall monitor the overall performance of the SEP or First Aid Examiners to ensure there is no ***conflict of interest***.
(n) The nominated Senior SEP or First Aid Examiner's prime job function is to supervise the examiners and instructors working within the section and are responsible as the accountable person approved by the Authority.

AMC-1 OPS-1.1037 Designated SEP or First Aid Examiner

(a) The Designated SEP or First Aid Examiner shall focus on development of the competencies listed as below:
   (1) Upon completion of all Safety Emergency Training classes conducted by the SEP Instructors, a SEP or First Aid Examiner shall evaluate individual trainee proficiency through competency-based practical and written exams. Make recommendations for corrective action, if necessary.
   (2) The Designated SEP or First Aid Examiner shall be able to identify areas of weakness from the trainees, effectiveness of the training syllabus and shall be able to develop competency skill test measures that can be monitored against the objectives, that is having a highly qualified trained cabin crew members who are able to perform in a normal or in an emergency situation.
   (3) The implementation of a competency-based program shall enable operators to develop more effective training programs to improve operational safety.
   (4) Provide a continued evaluation of training programs to obtain quality training.
   (5) SEP or First Aid instructors shall upgrade their knowledge, maintain consistency and impart a high standard of competency level or skill sets to the trainees during theoretical and practical training.
   (6) All examination papers related to SEP and/or First Aid shall be prepared by the SEP or First Aid Examiner.
   (7) An examiner may terminate a test or check at any stage, if it is considered that the Cabin Crew's competency requires a complete re-test or re-check.

(b) Examiner Reliability shall ensure consistency in assessments conducted by Examiners:
   (1) When examiners use an assessment instrument, a process shall be implemented to ensure the consistency or stability of results given by a single examiner (intra-examiner reliability) to the same performances at different moments in time and the consistency or stability of results between different examiners (inter-examiner reliability).
   (2) If the examiners have to judge on competency-based training, the resultant outcome will determine if an effective recruitment selection process had been implemented.
   (3) An Examiner shall not conduct a competency check on a candidate for whom he has conducted the associated conversion course training, nor shall he conduct the re-check of a candidate who has failed a previous competency-based check, and for whom he has conducted the necessary remedial training.
   (4) An Examiner may conduct Recurrent or Remedial Training session conducted in conjunction with that check, for the same candidate(s).

(c) Conduct of an evaluation of Competency checks: -
(refer to CAR-OPS 1.1025 (b))
   (1) The trainee shall pass all sections of the competency check. If any item is assessed as UNSATISFACTORY on the first attempt, then training and re-sits may be conducted at the discretion of the Examiner, in order to restore and confirm proficiency.
   (2) Any trainee failing five (5) or less items shall only take the failed items.
   (3) Failure of more than five (5) items will require the trainee to take the entire Competency checks again.
   (4) Failure of more than five (5) items on the re-test/check including those items that have been passed at the previous attempt will require the trainee to take the entire Competency checks again.
   (5) The Examiner shall exercise his judgment in deciding how much additional training is appropriate to provide during the Competency checks, for a trainee having difficulty in achieving proficiency.
   (6) However, if more than two (2) re-sits are required for any one item, or the scheduled time for the check has elapsed and there is no further opportunity to complete necessary re-sits, the Examiner shall award an UNSATISFACTORY grade for the

applicable item(s), and rule the check as FAILED. Re-sits/repeats initiated by the crew as a result of their own decision making, shall be counted towards the maximum allowed.

(7) If the trainee's performance is such that several items need repeating, he is clearly not up to the required standard, and so the discretion to repeat should not be exercised any further.

(d) Renewal of Authorisation

(1) For an Instructor authorization to be renewed following expiry/withdrawal, the organisation shall implement a reinstating procedure that will cover the relevant training disciplines associated with the authorization concerned.

(2) The criteria for reinstating shall take into consideration the length of time the individual has been away from that specific training environment or discipline.

(3) Any Instructor who has passed a twenty-four (24) month period without exercising the privileges of this authorization, as a minimum, must comply with the table below.

Inactive Period	Recovery Action
24 to 30 months	35 hours training update + Continuation training + Training procedures and processes + monitored training sessions with another instructor.
30 months onwards	As above plus two sit-ins on the type course for the authorization being sought.

AMC-2 OPS-1.1037 Conflict of Interest

(See Appendix 1 to CAR OPS-1.1037 paragraph (m))

(a) Conflict of Interest is defined as any relationship that might influence a Designated Examiner to act, either knowingly or unknowingly, in a manner that does not hold the quality of training outcome that will affect the safety of the flying public as the primary and highest priority.

(b) In order to preclude an actual conflict of interest, the CAA shall, in conjunction with the Operator:

(1) investigate each nominee's background;

(2) character and motives; and

(3) resolve any conflict of interest found, prior to advising the acceptance of each nomination.

(c) In addition, each candidate shall declare on their resume, which accompanies their nomination form, any conflict of interest of which they have knowledge, and shall be prepared to discuss at each annual monitor thereafter any change to their status in this regard.

(d) The final Authority, for deciding whether there is any conflict of interest that might affect the Designated Examiner's ability to conduct tests and checks in an impartial manner, rests with the Authority.

(e) It must be emphasized that any effort by an Operator to influence or obstruct a Designated Examiner, in any way, in the course of fulfilling his obligations to the Authority, will result in the forfeiture of the Operator's Designated Examiner programme.

(f) The validity of any checks performed by the affected Designated Examiner will also be revoked.

(g) In the event, any Designated Examiner come into a situation of conflict of interest, a full report of the circumstances shall be immediately submitted to the Authority for review.

(h) Furthermore, the Operator shall review the status of each Designated Examiner once every calendar year, to ascertain that they are not in any conflict of interest, and shall record this Conflict-of-Interest Review on the Designated Examiner's file.

(i) The expiry of the Conflict-of-Interest Review shall be 31st December of the year following the latest review. This review will address all foreseeable issues, such as preferential scheduling of candidates with the examiner of their choice, family ties, business connections, etc.

AMC OPS-1.1039 Safety and Emergency Procedures (SEP) Instructor

(See CAR OPS-1.1039)

Acceptance process for Cabin SEP Instructor

(a) The candidates shall undergo a selection process by the Operator to assess that the individual’s knowledge, capability and competency are suitable for the instructor’s role and determine the person’s motivation. The successful candidate shall undergo the Operator’s training program.

(b) Prior to the issuance of an instructor qualification, all candidates shall successfully complete a formal competency assessment evaluated during the conducting of theoretical and practical training by the Authority. The final assessment of instructor competence shall be made against the following competency framework:
   (1) manage safety of the training environment;
   (2) prepare the training environment;
   (3) manage and support the trainee;
   (4) conduct training;
   (5) perform trainee assessment;
   (6) perform course evaluation; and
   (7) continuously improve performance

(c) All instructors shall receive yearly recurrent training and be re-assessed according to paragraph (b) using a documented training and assessment process acceptable to the Authority, implemented by the operator or approved training organisation.

(d) Recurrent Training Requirements
   (1) Applicants shall undergo:
      (i) Training in the area of “teaching and learning” as described in the Table 1.
      (ii) An operator internal training for operator specific elements according to Table2.
      (iii) An adequate syllabus for theoretical knowledge concerning teaching activity and learning behaviour of a Cabin Safety Instructor candidate should include at least:

AMC OPS-1.1040 Aviation Medical and First Aid Instructor.

(See CAR OPS-1.1040)

Refer to AMC OPS-1.1039 for the acceptance process for the Aviation Medical and First Aid Instructor.

Table 1 Elements on teaching activity and learning

Topic	Content
Learning Process	Motivation Perception and understanding Learning methods
Teaching Process	Elements of effective teaching Teaching methods Planning of instructional activity
Training Philosophy	Importance of a planned syllabus Integration of theoretical knowledge
Techniques for Supervision	The cabin environment In-flight situational awareness Briefing structure (topics and targets) Candidate’s self-assessment and self-critic

Topic	Content
Human Performance and Limitation	Physiological factors Psychological factors Human information processing behavioral attitudes
Feedback system	The drawing up of comments, recommendations and improvements The need of concise communication
Candidate's Evaluation	The role of a Cabin Crew Instructor during supervision and its analysis. Assessment of student performance Analysis of student's errors.

(i) Instructors shall undergo training update at least every twenty-four (24) months relevant to current technology, practical skills, human factors and the latest training techniques appropriate to the knowledge being trained or examined". (See Table 2)

Table 2. Operators' specific elements

Topic	Content
Requirements	Legal basis (OPS Subpart O etc.) Operator specific requirements (directives)
Training and Checking Administration	Records and Forms Control, analysis and storage of records Feedback system (Element of Quality system).
Handling of underperforming crew	Procedures to be applied in the event that candidates do not achieve or maintain the required standard.

SUBPART P – MANUALS, LOGS AND RECORDS

CAR OPS-1.1041 General Rules for Operations Manuals

(See IEM CAR OPS-1.1041(b)) & (See IEM CAR OPS-1.1041(c))

(a) An operator shall ensure that the Operations Manual contains all instructions and information necessary for operations personnel to perform their duties and all crew member have been trained in, and are proficient to perform their duties.

(b) An operator shall ensure that the contents of the Operations Manual, including all amendments or revisions, do not contravene the conditions contained in the Air Operator Certificate (AOC) or any applicable regulations and are acceptable to, or, where applicable, approved by, the Authority. (See IEM CAR OPS-1.1041(b))

(c) Unless otherwise approved by the Authority, or prescribed by national law, an operator must prepare the Operations Manual in the English language. In addition, an operator may translate and use that manual, or parts thereof, into another language. (See IEM OPS- 1.1041(c).)

(d) Should it become necessary for an operator to produce new Operations Manuals or major parts/volumes thereof, he must comply with sub-paragraph (c) above.

(e) An operator may issue an Operations Manual in separate volumes.

(f) An operator shall ensure that all operations personnel have easy access to a copy of each part of the Operations Manual which is relevant to their duties. In addition, the operator shall supply crew members with a personal copy of, or sections from, Parts A and B of the Operations Manual as are relevant for personal study.

(g) An operator shall ensure that the Operations Manual is amended or revised so that the instructions and information contained therein are kept up to date. The operator shall ensure that all operations personnel are made aware of such changes that are relevant to their duties.

(h) Each holder of an Operations Manual, or appropriate parts of it, shall keep it up to date with the amendments or revisions supplied by the operator.

(i) An operator shall supply the Authority with intended amendments and revisions in advance of the effective date. When the amendment concerns any part of the Operations Manual which must be approved in accordance with CAR OPS-1, this approval shall be obtained before the amendment becomes effective. When immediate amendments or revisions are required in the interest of safety, they may be published and applied immediately, provided that any approval required has been applied for.

(j) An operator shall incorporate all amendments and revisions required by the Authority.

(k) An operator must ensure that information taken from approved documents, and any amendment of such approved documentation, is correctly reflected in the Operations Manual and that the Operations Manual contains no information contrary to any approved documentation. However, this requirement does not prevent an operator from using more conservative data and procedures.

(l) An operator must ensure that the contents of the Operations Manual are presented in a form in which they can be used without difficulty The design of the Operations Manual shall observe Human Factors principles.

(m) An operator may be permitted by the Authority to present the Operations Manual or parts thereof in a form other than on printed paper. In such cases, an acceptable level of accessibility, usability and reliability must be assured.

(n) The use of an abridged form of the Operations Manual does not exempt the operator from the requirements of CAR OPS-1.130.

CAR OPS-1.1045 Operations Manual – Structure and Contents

(See Appendix 1 to CAR OPS-1.1045) (See AMC OPS-1.1045, IEM OPS-1.1045 (a) and 1.1045(c))

(a) The operator shall provide operations staff and flight crew with an aircraft operating manual, for each aircraft type operated, containing the normal, abnormal and emergency procedures relating to the operation of the aircraft. The manual shall include details of the aircraft systems and of the checklists to be used. The design of the manual shall observe Human Factors principles.
Note: Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

(b) An operator shall ensure that the main structure of the Operations Manual is as follows:

Part A. ***General/Basic***
This part shall comprise all non-type related operational policies, instructions and procedures needed for a safe operation.

Part B. ***Aeroplane Operating Matters***
This part shall comprise all type-related instructions and procedures needed for a safe operation. It shall take account of any differences between types, variants or individual aeroplanes used by the operator.

Part C. ***Route and Aerodrome Instructions and Information***
This part shall comprise all instructions and information needed for the area of operation.

Part D. ***Training***
This part shall comprise all training instructions for personnel required for a safe operation.

(c) An operator shall ensure that the contents of the Operations Manual are in accordance with Appendix 1 to CAR OPS-1.1045 and relevant to the area and type of operation.

(d) An operator shall ensure that the detailed structure of the Operations Manual is acceptable to the Authority. (See IEM OPS-1.1045(c)).

(e) Shall include Instructions and training requirements for the use of automatic landing systems, a HUD or equivalent display and EVS, SVS or CVS equipment as applicable.

CAR OPS-1.1050 Aeroplane Flight Manual

(a) An operator shall keep a current approved Aeroplane Flight Manual or equivalent document for each aeroplane that it operates.

(b) The operator shall ensure that Operations Manuals Part B that is referred to Manufacture documentation are kept up-to-date.

(c) The flight manual shall be updated by implementing changes made mandatory by the State of Registry.

CAR OPS-1.1055 Journey log

(a) An operator shall retain the following information for each flight in the form of a Journey Log:
  (1) Aeroplane nationality and registration;
  (2) Date;
  (3) Name(s) of crew member(s);
  (4) Duty assignment of crew member(s);
  (5) Place of departure;
  (6) Place of arrival;
  (7) Time of departure (off-block time);
  (8) Time of arrival (on-block time);

(9) Hours of flight;
(10) Nature of flight (private, aerial work, scheduled or non-scheduled);
(11) Incidents, observations (if any); and
(12) Commander's signature (or equivalent). (See IEM OPS-1.1055(a)(12))

(b) An operator may be permitted not to keep an aeroplane journey log, or parts thereof, by the Authority if the relevant information is available in other documentation. (See IEM OPS-1.1055(b))

(c) An operator shall ensure that all entries are made concurrently and that they are permanent in nature.

CAR OPS-1.1060 Operational flight plan

(a) An operator shall ensure that the operational flight plan used and the entries made during flight contain the following items:
(1) Aeroplane registration;
(2) Aeroplane type and variant;
(3) Date of flight;
(4) Flight identification;
(5) Names of flight crew members;
(6) Duty assignment of flight crew members;
(7) Place of departure;
(8) Time of departure (actual off-block time, take-off time);
(9) Place of arrival (planned and actual);
(10) Time of arrival (actual landing and on-block time);
(11) Type of operation (ETOPS, VFR, Ferry flight, etc.);
(12) Route and route segments with checkpoints/waypoints, distances, time and tracks;
(13) Planned cruising speed and flying times between check-points/waypoints. Estimated and actual times overhead;
(14) Safe altitudes and minimum levels;
(15) Planned altitudes and flight levels;
(16) Fuel calculations (records of in-flight fuel checks);
(17) Fuel on board when starting engines;
(18) Alternate(s) for destination and, where applicable, take-off and en-route, including information required in sub-paragraphs (12), (13), (14), and (15) above;
(19) Initial ATS Flight Plan clearance and subsequent re-clearance;
(20) In-flight re-planning calculations; and
(21) Relevant meteorological information.

(b) Items which are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.

(c) An operator must ensure that the operational flight plan and its use are described in the Operations Manual.

(d) An operator shall ensure that all entries on the operational flight plan are made concurrently and that they are permanent in nature.

CAR OPS-1.1065 Document storage periods

(See Appendix 1 CAR OPS-1.1065)

An operator shall ensure that all records and all relevant operational and technical information for each individual flight, are stored for the periods prescribed in Appendix 1 to CAR OPS-1.1065.

CAR OPS-1.1070 Operator's Continuous Airworthiness Management Exposition

An operator shall keep a current approved Continuous Airworthiness Management Exposition as prescribed in CAR M Subpart C.

CAR OPS-1.1071 Aeroplane Technical Log

An operator shall keep an aeroplane technical log as prescribed in Operator's technical log system in CAR–M.A.306.

SECTION 2 – SUBPART P – AC/AMC/IEM – MANUALS, LOGS AND RECORDS

IEM OPS 1.1041(b) Elements of the Operations Manual subject to approval

(See CAR OPS-1.1041(b))

(1) A number of the provisions of OPS require the prior approval of the Authority. As a consequence, the related sections of the Operations Manual should be subject to special attention. In practice, there are two possible options:

(a) The Authority approves a specific item (e.g. with a written response to an application) which is then included in the Operations Manual. In such cases, the Authority merely checks that the Operations Manual accurately reflects the content of the approval. In other words, such text has to be acceptable to the Authority; or

(b) An operator's application for an approval includes the related, proposed, Operations Manual text in which case, the Authority's written approval encompasses approval of the text.

(2) In either case, it is not intended that a single item should be subject to two separate approvals.

(3) The following tables lists those elements of the Operations Manual which require specific approval by the Authority as part of Administration and control of the operations manuals.

Table 1.

Ops Manual Section (App. 1 to CAR OPS-1.1045)	Subject	CAR OPS-1 Reference
A 2.4	Operational Control	1.195
A 5.2.6	Procedures for flight crew to operate on more than 1 type or variant	1.980
A 5.3.3	Procedures for cabin crew to operate on four airplane types	1.1030(a)
A 8.1.1	Method of determination of minimum flight attitudes	1.250(b)
A 8.1.4	En-route single engine safe forced landing area for land planes	1.542(a)
A 8.1.8 Mass & balance:	(i) Standard mass values other than those specified in Subpart J	1.620(g)
	(ii) Alternative documentation and related procedures	1.625(c)
	(iii) Omission of data from documentation	App. 1, 1.625, § (a)(1)(ii)
	(iv) Special standard masses for the traffic load	App. 1, 1.605, § (b)
A 8.1.11	Tech Log	CAR-M.A.306
A 8.4	Cat II/III Operations	1.440(a)(3), (b) & App. 1 to CAR OPS-1.455, Note

Ops Manual Section (App. 1 to CAR OPS 1.1045)	Subject	CAR OPS-1 Reference
A 8.5	ETOPS Approval	1.246
A 8.6	Use of MEL	1.030(a)
A 9	Dangerous Goods	CAR-92
A 8.3.2(b)	MNPS	1.243
A 8.3.2(c)	RNAV (RNP)	1.243
A 8.3.2(f)	RVSM	1.241
B 1.1(b)	Max. approved passenger seating configuration	1.480(a)(6)
B 2(g)	Alternate method for verifying approach mass (DH < 200ft) - Performance Class A	IEM CAR OPS-1.510(b)
B 4.1(h)	Steep Approach Procedures and Short Landing Operations - Performance Class B	1.515(a)(3) & (a)(4) & 1.550(a)
B 6(b)	Use of on-board mass and balance systems	App. 1 to CAR OPS-1.625, § (c)
B 9	MEL	1.030(a)
D 2.1	Cat II/III Training syllabus flight crew	1.450(a)(2)
	Recurrent training programme flight crew	1.965(a)(2)
	Advanced qualification, programme	1.978(a)
D 2.2	Initial training cabin crew	1.1005
	Recurrent training programme cabin crew	1.1015(b)
D 2.3(a)	Dangerous Goods	CAR-92

Table 2.

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
1	1.005 (e)	Approval	Approval of STD's used/ User Approval	
2	App. 1 to 1.005(a) (b)(23)(i)	Acceptance	Acceptance of other Take-off performance data produced by the operator and based on demonstration or documented experience	
3	App. 1 to 1.005(a) (b)(23)(i)	Acceptance	Acceptance of other Take-off performance, not conflicting with the Aeroplane Flight Manual, data relating to the special procedures, produced by the operator and based on demonstration or documented experience	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
4	App. 1 to 1.005(a) (b)(25)(i)	Acceptance	Acceptance of other Landing Destination and Alternate Aerodromes performance, not conflicting with the Aeroplane Flight Manual, data relating to the special procedures, produced by the operator and based on demonstration or documented experience	
5	App. 1 to 1.005(a) (b)(26)(i)	Acceptance	Acceptance of other Landing Dry Runways performance, not conflicting with the Aeroplane Flight Manual, data relating to the special procedures, produced by the operator and based on demonstration or documented experience	
6	App. 1 to 1.005(a) (b)(33)	Acceptance	Acceptance of abbreviated command course relevant to the type of operation conducted	
7	App. 1 to 1.005(a) (b)(35)(iii)	Acceptance	Acceptance of OPC conducted by a Type Rating Examiner, Class Rating Examiner or by a suitably qualified commander nominated by the operator trained in CRM concepts and the assessment of CRM skills.	
8	App. 1 to 1.005(a) (b)(46)	Acceptance	Acceptance of a self-study training programme for VFR operations	
9	1.030(a)	Approval	Approval of the MEL required	
10	1.030(a)	Approval	Content of MMEL to be accepted by the operator (MEL requires Approval)	
11	1.035 (c)	Acceptance	Quality system (including quality assurance - procedures) and quality manager to be acceptable	
12	1.035 (e)	Acceptance	Nomination of 2 Quality Managers (Operations and Engineering) to be acceptable	
13	1.065 (a)	Approval	Approvals by all States concerned (origin, overflight and destination) for the transport of weapons of war and munitions of war	
14	1.065 (b)(2)	Approval	Approval by all States concerned for the carriage of weapons, unloaded, to differ from the requirement (b)(2)	
15	1.070	Acceptance	Alternative procedures for stowage acceptable	
16	1.085 (e)	Acceptance	Acceptance of appropriate requirements on the consumption of alcohol which shall be established by the Operator	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
17	1.130 (a)(3)	Acceptance	Authority may accept that the Ops. Manual contains necessary Flight Manual information	
18	1.135 (b)	Acceptance	Operational documents, if not on printed paper, to be to an acceptable standard of accessibility etc.	
19	1.165(c)(2)(i)	Approval	Approval of leasing arrangements between operators in all cases except 'wet lease-out'	
20	1.165(c)(1)(i)	Approval	Approval for dry lease-in	
21	1.165(c)(2)(i)	Approval	Approval for wet lease-in from an entity	
22	1.165(c)(1)(ii)	Acceptance	(Dry lease-in); acceptance of any 'differences' in instrumentation	
23	1.175 (c)(1)	Approval	Approval for an operator to hold an AOC from another Authority if Approved by both	
24	1.175 (h)	Acceptance	Accountable Manager to beacceptable	
25	1.175 (i)	Acceptance	Nominated Post Holders to be acceptable	
26	1.175 (j)	Acceptance	Person holding more than one of the nominated posts to be acceptable	
27	1.175 (k)	Acceptance	Operators employing 20 or less full-time staff, one or more of the nominated posts being filled by the Accountable Manager to be acceptable	
28	App. 1 to 1.175 (e)	Approval	Approval to alter the basic requirement to list aircraft registrations on the AOC	
29	App. 2 to 1.175 (b)(3)	Acceptance	acceptance of nomination as potholder on more than one AOC	
30	1.180(a)(2)	Approval	Approval of the maintenance system for issue/variation/continued validity of AOC	
31	1.195	Approval	Approval of method of exercising operational control	
32	1.230(c)	Approval	Approval by the State in which an aerodrome is located to vary the specified aerodrome approach and departure procedures	
33	1.230(c)	Approval	Variation of the approach and departure procedures in any State to be acceptable in addition to the State's Approval	
34	1.241	Approval	RVSM Approval for operation in airspace where reduced vertical separation minima apply	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
35	1.243	Approval	MNPS Approval for operation in defined areas or a defined portion of airspace where special navigation performance is required	
36	1.243	Approval	RNAV Approval for operation in defined areas or a defined portion of airspace where special navigation performance is required	
37	1.243	Approval	RNP Approval for operation in defined areas or a defined portion of airspace where special navigation performance is required	
38	1.245	Approval	Maximum distance from an adequate aerodrome for two-engine aeroplanes without an ETOPS Approval	
39	1.245 (a)(2)	Approval	Approval to operate in accordance with 1.245 (a)(2)	
	40 1.246	Approval	Approval of Extended range operations with two-engine aeroplanes (ETOPS)	
41	1.250	Approval	Approval of method of establishing minimum altitudes	
42	App. 1 to 1.255 (a)(3)(i)(D)	Approval	Approval (by the Authority) of an amount of fuel based on a statistical method which ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel.	
43	CAR-OPS 1.375	Approval	In-flight fuel management	
44	1.430	Acceptance	Method of determining Aerodrome Operating Minima to be acceptable	
45	App. 1 to 1.430 (a)(3)(i)	Approval	Approval of Reduced take-off minima in accordance with 1.430 (a)(3)(i)	
46	App. 1 to 1.430 (a)(3)(ii)	Approval	Approval of Reduced take-off minima in accordance with 1.430 (a)(3)(ii)	
47	App. 1 to 1.430 (a)(3)(iii)	Approval	Approval of Reduced take-off minima in accordance with 1.430 (a)(3)(iii)	
48	App. 1 to 1.430 (a)(4)(i)	Approval	Approval of Reduced take-off minima in accordance with 1.430 (a)(4)(i)	
49	App. 1 to 1.430 (a)(4)(ii)	Approval	Approval of Reduced take-off minima in accordance with 1.430 (a)(4)(ii)	
50	App. 1 to 1.430 (c)(1)(i)	Approval	Approval of criteria for establishing RVR/Converted Met Visibility in accordance with 1.430 (c)(1)(i)	
51	App. 1 to 1.430 (c)(1)(ii)	Approval	Approval of criteria for establishing RVR/Converted Met Visibility in accordance with 1.430 (c)(1)(ii)	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
52	App. 1 to 1.430 (d)(3)	Approval	Approval of Determination of RVR/CMV/Visibility minima for Category I, APV and non-precision approach operations in accordance with 1.430 (d)(3)	
53	App. 1 to 1.430 (d)(6)	Approval	Approval of Determination of RVR/CMV/Visibility minima for Category I, APV and non-precision approach operations in accordance with 1.430 (d)(6)	
54	App. 1 to 1.430 (d)(8)	Approval	Approval of Determination of RVR/CMV/Visibility minima for Category I, APV and non-precision approach operations in accordance with 1.430 (d)(8)	
55	App. 1 to 1.430 (e)(5)	Approval	Approval in accordance with 1.430 (e)(5)	
56	App. 1 to 1.430 (b)(6)(x)	Acceptance	Other visual references to be acceptable	
57	App. 1 to 1.430 (b)(1)	Acceptance	acceptance of App. 1 to 1.430 (b)(1)	
58	App. 1 to 1.430 (b)(2)	Acceptance	acceptance of App. 1 to 1.430 (b)(2)	
59	App. 1 to 1.430 (e)(3)	Approval	Approval of CAT III operations with no decision height	
61	1.440(b)	Approval	Approval for Low visibility take-off operations	
62	1.440(c)	Approval	Approval to conduct lower than standard Category operations	
63	1.440(c)(2)	Acceptance	"Equivalent" equipment of aeroplane to be acceptable	
64	1.455(a)	Approval	Approval for Category II or III (LVO) operations	
65	App. 1 to 1.440(b) (1)	Approval	General Operating Rules for Approval of Low Visibility Operations	
66	App. 1 to 1.440(b) (2)	Acceptance	acceptance of reduction of number of approach and landings based on credit given for experience gained by another operator with an AOC issued in accordance with EU-OPS 1 using same aeroplane type or variant and procedures	
67	App. 1 to 1.440 (b)(1)	Approval	Approval for number of approaches required for Data Collection for operations with DH not less than 50 ft. Approval for CAT IIIB operations	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
68	App. 1 to 1.440(f)(1)(i)	Approval	Approval for CAT II or IIIA Operations (with no previous CAT II or III experience) having gained minimum experience of 6 months CAT I operations on aeroplane type	
69	1.450	Approval	Approval for LVO training /checking syllabus including simulator training to include operating to limiting RVR and DH appropriate to the operator's Cat II/III Approval	
70	App. 1 to 1.450 (a)	Acceptance	Abbreviated course of LVO training to be acceptable	
71	App. 1 to 1.450 (c)(5)	Approval	Approval of other simulator for visual scenarios of Category II operations for aeroplanes with no type specific simulator	
72	App. 1 to 1.450 (f)(2)	Approval	Approval of Low Visibility Take-Off. Training to be carried out in an aeroplane, without the requirement for minimum RVR conditions, where no simulator exists	
73	App. 1 to 1.455 (a) Note 2	Approval	Approval for other certificated guidance systems or displays	
74	1.470 (d)	Approval	Approval for use with non-standard designs of performance standards ensuring an equivalent level of safety	
75	1.475 (b)	Acceptance	Performance data in the AFM may need to be supplemented with other acceptable data as per the relevant subpart	
76	1.485 (a)	Approval	Performance data in the AFM may need to be supplemented with other acceptable data if the Approved performance date in the AFM is insufficient	
77	1.485 (b)	Acceptance	For the wet and contaminated runway case, performance data or equivalent may be acceptable	
78	1.495 (c)(3)	Approval	Approval of special procedures for use of increased bank angles	
79	App 1 to 1.495(c)(3)	Approval	Approval of increased bank angles	
80	1.510 (c)	Approval	Approval for alternative method to 1.510 (b)	
81	1.510 (d)	Approval	Approval for alternative method to 1.510 (c)	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
82	1.515 (a)(3)	Approval	Approval for use of factored landing distance data for steep approach procedures using a screen height not below 35 ft	
83	1.515 (a)(4)	Approval	Approval for alternative safety case using Short Landing Operations	
84	App 1 to 1.515 (a)(3) (a)	Approval	Approval of Steep Approach procedures	
85	App 1 to 1.515 (a)(4)	Approval	Approval for Short Landing operations	
86	1.520 (b)	Acceptance	Acceptability of 'equivalent' contaminated landing distance data	
87	1.530	Approval	Approval required under App. 1 to 1.005 (b)(23)	
88	1.542(a)	Approval	Approval for a single-engine aeroplane, in the event of engine failure, of an alternative requirement to that of carrying out a safe forced landing on land	
89	1.545	Approval	Approval required under App. 1 to 1.005 (b)(25)	
90	1.550	Approval	Approval required under App. 1 to 1.005 (b)(26)	
91	1.550 (a) (1)	Approval	Approval when landing on a dry runway for use of factored landing distance data using a screen height not below 35 ft	
92	1.550(a) (2)	Approval	Approval for Short Landing Operations	
93	App. 1 to 1.550(a)	Approval	Approval of Steep Approach Procedures using glideslope angles of 4.5º or more, and with screen heights of less than 50 ft but not less than 35ft	
94	App. 2 to 1.550(a) (2)	Approval	Approval of Short Landing Operations	
95	1.555(b)	Acceptance	acceptable data for the landing distance required on a contaminated runway	
96	1.570	Approval	Approved Performance Data in the AFM supplemented with other acceptable data	
97	1.600(b)	Acceptance	Data used to calculate the landing distance on a contaminated runway to be acceptable	
98	App. 1 to 1.605 (b)	Approval	Approval to use standard masses for load items other than passengers and baggage.	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
99	App. 1 to 1.605(d)(1)	Acceptance	CG margins and associated operational procedures, including assumptions with regard to passenger seating to be acceptable	
100	1.615(a)(3)	Acceptance	Other standard masses to be acceptable	
101	1.620(g)	Approval	Approval(s) to use alternative standard mass values.	
102	App. 1 to 1.620(g) para (c)	Approval	Approval for passenger weighing survey plan	
103	App. 1 to 1.620(g) para (d)(2)	Approval	Approval to use non-standard male/female ratios for revised standard adult mass values.	
104	1.625 (c)	Approval	Approval to use alternative procedures to the standard for mass and balance documentation and LMCs	
105	App. 1 to 1.625 (a)(1)(ii)	Approval	Approval to omit information from standard mass and balance documentation.	
106	App. 1 to 1.625 (c)	Approval	Approval to use on-board mass and balance computer as primary source for dispatch.	
107	1.670(b)	Approval	Approval to fit, on small aeroplanes, equipment other than weather radar capable of detecting thunderstorms and other potentially hazardous weather conditions	
108	1.680(a)(2)	Acceptance	Establishment of system of on-board quarterly radiation sampling to be acceptable	
109	1.715(c)	Acceptance	Aircraft equipped with electronic display, with an individual C of A issued after 1 January 1989 shall be equipped to record at least 32 parameters	
110	1.715 (g)	Approval	Approval for use of reduced parameter flight recorders	
111	1.720(d)	Acceptance	Aircraft with a maximum certified take-off mass of 27000 kg or below not recording parameters 14 and 15b of App1 to EU-OPS 1.720, to be acceptable	
112	1.720(a)	Acceptance	Aircraft with a maximum certified take-off mass over 27000 kg shall record at least first 32 parameters of Tables 1 to App 1 to AC OPS1.715/1.720/1.725	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
113	1.720(f)	Acceptance	All aeroplanes of a maximum certificated take-off mass of over 27,000 kg for which the application for type certification is submitted to the CAA on or after 1st January, 2022 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table-1. to be acceptable	
114	1.725(b)	Acceptance	Use of Class B AIR could be an acceptable means of recording data link communications.	
115	1.725(d)(2)	Acceptance	Non-recording of individual parameters that can be derived by calculation from the other recorded parameters, to be acceptable	
116	1.730(a)(3)	Acceptance	Child restraint Device to be acceptable	
117	1.730(a)(6)	Acceptance	Alternative to location of seats for cabin crew members near required floor level emergency exits to be acceptable	
118	1.740	Acceptance	Universal Symbol Placard to be acceptable	
119	1.825 (a)(2)	Approval	Approval for other Approved flotation devices equipped with a survivor locator light to be substituted for life jackets for infants	
120	Appendix 1 to 1.1435 (b)	Acceptance	Acceptance for other Approved flotation devices, on seaplanes and amphibians.	
121	1.940(a)(3)	Acceptance	All flight crewmembers hold an applicable and valid license to be acceptable	
122	1.940(a)(4)	Acceptance	Procedure to prevent crewing together of inexperienced flight crew members to be acceptable	
123	1.940(a)(6)	Acceptance	When a dedicated system panel operator is required by the AFM the flight crew includes one member who holds a Flight Engineers License or is a suitably qualified crew member to be acceptable	
124	App. 1 to 1.940 (f)	Acceptance	System of relief of dedicated system panel operator to be acceptable	
124a	1.943	Approval	Initial Pilot CRM Training Programme	
125	1.943(c)	Acceptance	Initial CRM training to be conducted by at least one acceptable CRM trainer	
126	1.945	Acceptance	Syllabus of conversion training to be acceptable	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
127	1.945 (d)(1)	Acceptance	Appropriate training, If Line Flying Under Supervision has not been commenced within the 21 days, to be acceptable	
128	1.945 (d)(2)	Approval	Approval to use FSTD for 6 take-offs and landings.	
129	1.945 (d)(3)	Acceptance	Refresher training to be conducted when LIFUS is delayed more than 21 days	
131	1.955(a)(1)	Acceptance	Minimum level of experience to be acceptable	
132	1.965(a)(2)	Approval	Approval of flight crew recurrent training and checking programme.	
133	1.965(a)(3)(iv)(B)	Acceptance	Modular CRM training to be conducted by at least one acceptable CRM trainer	
134	1.965(a)(4)(ii)	Acceptance	Nomination by Operator of suitably qualified Commander for the conduct of Line Check to be acceptable	
135	App. 1 to 1.965 (a)(3)(iii)(C)	Acceptance	Alternative method to Halon extinguishers for actual firefighting using representative equipment to be acceptable	
136	App. 1 to 1.965 (b)(3)(ii)	Acceptance	Methodology of assessment of CRM Skills to be acceptable	
137	App. 2 to 1.965(c)	Acceptance	Nomination by Operator of suitably qualified Commander or System Panel Operator Type Rating Instructor or Examiner for the conduct of Line Check to be acceptable	
138	1.968(a)(2)	Acceptance	Pilot qualification training and checking programme to be acceptable	
139	1.978 (a)	Approval	Approval of Alternative Training and Qualification Programme	
140	1.978 (e)	Approval	Approval of Alternative Training and Qualification Programme	
141	1.978 (e) (2)	Approval	Approval to combine Line check with a Line Oriented Quality Evaluation	
142	App. 1 to 1.978 (b) (3)	Acceptance	Process for curriculum development to be acceptable	
143	App. 1 to 1.978 (c)	Acceptance	Evaluation and implementation strategy to be acceptable	
144	App. 1 to 1.978 (c) (1)(i) B	Approval	Approval of an equivalent method other than a formal	
145	1.980	Approval	Operation on more than one type or variant to be approved	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
146	1.980(c)	Approval	Approval of the use of credit(s) related to training, checking and recency for a flight crew member operating more than one type or variant if not all requirements prescribed in Subpart N for each type or variant are complied with	
147	1.980(d)	Approval	Approval of procedures for flight crew to operate more than one type or variant	
148	App. 1 to 1.980(a)(2)	Acceptance	Specific procedures and/ or operational restrictions, to be acceptable	
149	App. 1 to 1.980 (d)(7)(i)	Approval	Approval for relevant recurrent training to be specified in Ops Manual If OPCs alternate between two types	
150	1.981(a)(2)	Approval	Approval for flight crew members to operate both helicopters and aeroplanes	
151	1.1000(e)	Acceptance	Procedure to select next most suitably qualified cabin crew in the event of in-charge cabin crew unable to operate, to be acceptable	
152	1.1005	Approval	Approval for cabin crew initial training	
153	1.1010	Approval	Approval for Conversion and Differences training programmes	
154	1.1015(b)	Approval	Approval of content of cabin crew recurrent training programme	
155	1.1030(a)	Approval	Approval for cabin crew to operate on more than three types.	
156	1.1041 (b)	Approval	Contents of the Operations Manual, including any amendments or revisions, do not contravene the conditions in the AOC or any applicable regulations and are acceptable to or, where applicable, Approved by, the Authority	
157	1.1041(c)	Approval	Approval for an operator to prepare the Ops Manual in a language other than English.	
158	1.1041 (m)	Acceptance	Assured level of accessibility, usability and reliability to be acceptable	
159	1.1045(b)	Acceptance	Detailed structure of the Operations Manual to be acceptable	
160	1.1060(b)	Acceptance	acceptance to omit items which are readily available in other documentation from the operational flight plan	

No.	CAR-OPS REQUIREMENT	Approval or acceptance	Subject	OM reference reflecting requirement
161	App. 1 to 1.1065	Acceptance	Form of information /documentation storage to be acceptable	
162	1.1105 (c)	Approval	Approval of Reporting times that realistically reflect the time for safety related ground duties	
163	1.1105 (e)	Approval	Approval of an operation based on an extended FDP including a break.	
164	1.1255	Approval	Approval to transport dangerous goods	
165	1.1295	Acceptance	acceptance of Dangerous Goods	
166	1.1320 (a)	Approval	Approval of staff training programmes	
167	1.1340	Approval	Approval of security training programmes including unlawful interference /sabotage / hi-jacking, and the minimisation of the consequences	
168	1.1355	Acceptance	Means or procedure for cabin crew to notify flight crew of suspicious activity or cabin security breaches to be acceptable	

IEM OPS-1.1041(c) Operations Manual – Language

(See CAR OPS-1.1041(c))

(1) CAR OPS-1.1041(c) requires the Operations Manual to be prepared in the English language. However, it is recognised that there may be circumstances where approval for the use of another language, for part or all of the Operations Manual, is justifiable. The criteria on which such an approval may be based should include at least the following:
   - (a) The language(s) commonly used by the operator;
   - (b) The language of related documentation used, such as the AFM;
   - (c) Size of the operation;
   - (d) Scope of the operation i.e. domestic or international route structure;
   - (e) Type of operation e.g. VFR/IFR; and
   - (f) The period of time requested for the use of another language.

AMC OPS-1.1045 Operations Manual Contents

(See CAR OPS-1.1045 & Appendix 1 to CAR OPS-1.1045)

(1) Appendix 1 to CAR OPS 1.1045 prescribes in detail the operational policies, instructions, procedures and other information to be contained in the Operations Manual in order that operations personnel can satisfactorily perform their duties. When compiling an Operations Manual, an operator may take advantage of the contents of other relevant documents. Material produced by the operator for Part B of the Operations Manual may be supplemented with or substituted by applicable parts of the Aeroplane Flight Manual required by CAR OPS 1.1050 or, where such a document exists, by an Aeroplane Operating Manual produced by the manufacturer of the aeroplane. In the case of performance class B aeroplanes. It is acceptable that a "Pilot Operating Handbook" (POH) or equivalent document is used as Part B of the Operations Manual, provided that the POH covers the necessary items. For Part C of the Operations Manual, material produced by the operator

may be supplemented with or substituted by applicable Route Guide material produced by a specialised professional company.

(2) If an operator chooses to use material from another source in his Operations Manual, he should either copy the applicable material and include it directly in the relevant part of the Operations Manual, or the Operations Manual should contain a statement to the effect that a specific manual(s) (or parts thereof) may be used instead of the specified part(s) of the Operations Manual.

(3) If an operator chooses to make use of material from an alternative source (e.g. a Route Manual producer, an aeroplane manufacturer or a training organisation) as explained above, this does not absolve the operator from the responsibility of verifying the applicability and suitability of this material. (See CAR OPS-1.1041(k)). Any material received from an external source should be given its status by a statement in the Operations Manual.

IEM OPS 1.1045(a) Standard Operating Procedures (SOP) and Checklists

(See CAR OPS-1.1045(a))

(1) Operators shall establish standard operating procedures (SOPs) and the use of checklists that shall be used by flight crew prior to, during and after all phases of operations, and in emergency, to ensure compliance with the operating procedures contained in the aircraft operating manual and the aeroplane flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual, are followed. The design and utilisation of checklists should observe Human Factors principles. These documents shall form a part of Operations Manual Part B, that provide guidance to flight operations personnel to ensure safe, efficient logical and predictable means of carrying out flight procedures. To achieve these objectives, SOPs shall unambiguously express;

   (a) what the task is:
   (b) when the task is going to be conducted (time and sequence);
   (c) by whom the task is going to be conducted;
   (d) how the task is going to be done(actions);
   (e) what the sequence of actions consists of; and
   (f) what type of feedback is to be provided as a result of the actions (verbal call-outs, instrument indications, switch positions and etc.)

(2) To ensure compatibility with specific operational environments and compliance by flight operations personnel, SOPs design should take into account:

   (a) the nature of the operator's environment and type of operation;
   (b) the operational philosophy, including crew coordination;
   (c) the training philosophy, including human performance training;
   (d) the operator's corporate culture, including the degree of flexibility to be built into SOPs design;
   (e) the level of experience of different user groups, such as flight crew, aircraft maintenance engineers and cabin attendants;
   (f) resource conservation policies, such as fuel conservation or wear on power plants and systems
   (g) flight deck automation, including flight deck and systems layout and supporting documents
   (h) the compatibility between SOPs and operational documentation; and (i) procedural deviation during abnormal/unforeseen situation.

(3) Flight operations personnel should be involved in the development of SOPS. Operators shall establish a formal process of feedback from flight operations personnel to ensure standardization, compliance and evaluation of reasons for non-compliance during SOPs implementation and use.

(4) Operators shall establish checklists as an integral part of SOPs. Checklist shall describe the actions relevant to specific phases of operations (engine start, taxi, take off, etc.) that flight

crew must perform or verify and which relate to flight safety. Checklist should also provide a framework for verifying aircraft and systems configuration that guard against vulnerabilities in human performance.

(5) Operators shall establish crew briefing as an integral part of SOPs. Crew briefing communicate duties, standardise activities, ensure that a plan of action is shared by crew members and enhance crew situational awareness.

(6) Flight crew briefing shall be conducted for, but not limited to, the following phases of operations
- (a) pre-flight;
- (b) departure; and (c) arrival

(7) Pre-flight briefing shall include both flight crew and cabin crew. The briefings should focus on crew coordination as well as aircraft operational issues. They shall include, but not be limited to:
- (a) any information necessary for the flight, including unserviceable equipment or abnormalities that may affect operational or passenger safety requirements;
- (b) essential communications, and emergency and safety procedures; and (c) weather conditions

(8) Flight crew departure briefings should prioritise all relevant conditions that exist for the take -off and climb. They shall include, but not limited to:
- (a) runway in use, aircraft configuration and take-off speeds;
- (b) departure procedures;
- (c) departure routes;
- (d) navigation and communication equipment set-up;
- (e) aerodrome, terrain and performance restriction, including noise abatement procedures (if applicable);
- (f) take-off alternates (if applicable);
- (g) any item(s) included in minimum equipment list (if applicable);
- (h) review of applicable emergency procedure; and
- (i) applicable standard call-outs

(9) Flight crew arrival briefings should prioritise all relevant conditions that exist for the descent, approach and landing. They shall include, but not limited to:
- (a) terrain restriction and minimum safe altitudes during descent;
- (b) arrival routes;
- (c) instrument or visual approach procedures and runway in use;
- (d) operational minima, aircraft configuration, and landing speeds;
- (e) navigation and communication equipment set-up;
- (f) missed approach procedures;
- (g) alternate aerodrome and fuel considerations;
- (h) review of applicable emergency procedures;
- (i) applicable standard call-outs; and
- (j) cold temperature correction

IEM OPS-1.1045(b) Operations Manual Structure

(See CAR OPS-1.1045(b) & Appendix 1 to CAR OPS-1.1045)

(1) CAR OPS 1.1045(a) prescribes the main structure of the Operations Manual as follows:
- (a) Part A – General/Basic;
- (b) Part B – Aeroplane Operating Matters – Type related;
- (c) Part C – Route and Aerodrome Instructions and Information;
- (d) Part D – Training.

(2) CAR OPS-1.1045(b) requires the operator to ensure that the detailed structure of the Operations Manual is acceptable to the Authority.

(3) Appendix 1 to CAR OPS-1.1045 contains a comprehensively detailed and structured list of all items to be covered in the Operations Manual. Since it is believed that a high degree of standardisation of Operations Manuals will lead to improved overall flight safety, it is strongly recommended that the structure described in Appendix 1 to CAR OPS-1.1045 should be used by operators as far as possible.

(4) Manuals which do not comply with the recommended structure may require a longer time to be accepted/approved by the Authority.

(5) To facilitate comparability and usability of Operations Manuals by new personnel, formerly employed by another operator, operators are recommended not to deviate from the numbering system used in Appendix 1 to CAR OPS-1.1045. If there are sections which, because of the nature of the operation, do not apply, it is recommended that operators maintain the numbering system described below and insert ‘Not applicable’ or ‘Intentionally blank’ where appropriate.

Appendix 1 to CAR OPS-1.1045 Operations Manual Contents

(See IEM to Appendix 1 to CAR OPS-1.1045)

An operator shall ensure that the Operations Manual contains the following:

Part A. GENERAL/BASIC

0 ADMINISTRATION AND CONTROL OF OPERATIONS MANUAL

0.1 ***Introduction***

(a) A statement that the manual complies with all applicable regulations and with the terms and conditions of the applicable Air Operator Certificate.
(b) A statement that the manual contains operational instructions that are to be complied with by the relevant personnel.
(c) A list and brief description of the various parts, their contents, applicability and use.
(d) Explanations and definitions of terms and words needed for the use of the manual.

0.2 ***System of amendment and revision***

(a) Details of the person(s) responsible for the issuance and insertion of amendments and revisions.
(b) A record of amendments and revisions with insertion dates and effective dates.
(c) A statement that handwritten amendments and revisions are not permitted except in situations requiring immediate amendment or revision in the interest of safety.
(d) A description of the system for the annotation of pages and their effective dates.
(e) A list of effective pages.
(f) Annotation of changes (on text pages and, as far as practicable, on charts and diagrams).
(g) Temporary revisions.
(h) A description of the distribution system for the manuals, amendments and revisions.

1 ORGANISATION AND RESPONSIBILITIES

1.1 ***Organisational structure***. A description of the organisational structure including the general company organigram and operations department organigram. The organigram must depict the relationship between the Operations Department and the other Departments of the company. In particular, the subordination and reporting lines of all Divisions, Departments etc., which pertain to the safety of flight operations, must be shown.

1.2 ***Nominated post-holders***. The name of each nominated post-holder responsible for flight operations, the maintenance system, crew training and ground operations, as prescribed in CAR OPS-1.175 paragraph (j). A description of their function and responsibilities must be included.

1.3 ***Responsibilities and duties of operations management personnel.*** A description of the duties, responsibilities and Authority of operations management personnel pertaining to the safety of flight operations and the compliance with the applicable regulations.

1.4 ***Authority, duties and responsibilities of the commander.*** A statement defining the Authority, duties and responsibilities of the commander.

1.5 Duties and responsibilities of crew members other than the commander.

2 OPERATIONAL CONTROL AND SUPERVISION

2.1 ***Supervision of the operation by the operator****.* A description of the system for supervision of the operation by the operator (See Appendix 2 to CAR OPS-1.175). This must show how the safety of flight operations and the qualifications of personnel are supervised. In particular, the procedures related to the following items must be described:

2.1.1 License and qualification validity; and
2.1.2 Competence of operations personnel; and
2.1.3 Control, analysis and storage of records, flight documents, additional information and data; and
2.1.4 Information is to be retained on the ground.

2.2 ***System of promulgation of additional operational instructions and information****.* A description of any system for promulgating information which may be of an operational nature but is supplementary to that in the Operations Manual. The applicability of this information and the responsibilities for its promulgation must be included.

2.3 ***Accident prevention and flight safety programme****.* A description of the main aspects of the flight safety programme with respect to its integration within the Safety Management System established as per CAR OPS-1.037.

2.4 ***Operational control****.* A description of the procedures and responsibilities necessary to exercise operational control with respect to flight safety and procedures for an aircraft tracking system.

2.5 ***Powers of the Authority****.* A description of the powers of the Authority and guidance to staff on how to facilitate inspections by Authority personnel.

3 QUALITY SYSTEM

A description of the quality system adopted including at least:
(a) Quality policy;
(b) A description of the organisation of the Quality System; and
(c) Allocation of duties and responsibilities.

4 CREW COMPOSITION

4.1 ***Crew Composition.*** An explanation of the method for determining crew compositions taking account of the following:

4.1.1 The type of aeroplane being used;
4.1.2 The area and type of operation being undertaken;
4.1.3 The phase of the flight;
4.1.4 The minimum crew requirement and flight duty period planned;
4.1.5 Experience (total and on type), recency and qualification of the crew members; and
4.1.6 The designation of the commander and, if necessitated by the duration of the flight, the procedures for the relief of the commander or other members of the flight crew. (See Appendix 1 to CAR OPS-1.940.)
4.1.7 The designation of the in-charge cabin crew member and, if necessitated by the duration of the flight, the procedures for the relief of the in-charge cabin crew member and any other member of the cabin crew.

4.2 ***Designation of the commander***. The rules applicable to the designation of the commander.

4.3 ***Flight crew incapacitation***. Instructions on the succession of command in the event of flight crew incapacitation.

4.4 ***Operation on more than one type.*** A statement indicating which aeroplanes are considered as one type for the purpose of:

4.4.1 Flight crew scheduling; and
4.4.2 Cabin crew scheduling.

5 QUALIFICATION REQUIREMENTS

5.1 A description of the required license, rating(s), qualification/competency (e.g. for routes and aerodromes), experience, training, checking and recency for operations personnel to conduct their duties. Consideration must be given to the aeroplane type, kind of operation and composition of the crew.

5.2 ***Flight crew***

5.2.1 Commander.
5.2.2 Pilot relieving the commander.
5.2.3 Co-pilot.
5.2.4 Pilot under supervision.
5.2.5 System panel operator.
5.2.6 Operation on more than one type or variant.

5.3 ***Cabin crew***.

5.3.1 in-charge cabin crew member.
5.3.2 Cabin crew member.
5.3.2.1 Required cabin crew member.
5.3.2.2 Additional cabin crew member and cabin crew member during familiarisation flights.
5.3.3 Operation on more than one type or variant.

5.4 ***Training, checking and supervision personnel***.

5.4.1 For flight crew.
5.4.2 For cabin crew.

5.5 ***Other operations personnel***

6 CREW HEALTH PRECAUTIONS

6.1 ***Crew health precautions.*** The relevant regulations and guidance to crew members concerning health including:

6.1.1 Alcohol and other intoxicating liquor;
6.1.2 Narcotics;
6.1.3 Drugs;
6.1.4 Sleeping tablets;
6.1.5 Pharmaceutical preparations;
6.1.6 Immunisation;
6.1.7 Deep diving;
6.1.8 Blood donation;
6.1.9 Meal precautions prior to and during flight;
6.1.10 Sleep and rest; and
6.1.11 Surgical operations.

7 FLIGHT TIME LIMITATIONS

7.1 ***Flight and Duty Time Limitations and Rest Requirements.*** The scheme developed by the operator in accordance with Subpart Q (or existing national requirements until such time as Subpart Q has been adopted).

7.2 ***Exceedances of flight and duty time limitations and/or reductions of rest periods.*** Conditions under which flight and duty time may be exceeded or rest periods may be reduced and the procedures used to report these modifications.

7.3 ***A description of the fatigue risk management***, including at least the following:
7.3.1 The philosophy and principles;
7.3.2 Documentation of processes;
7.3.3 Scientific principles and knowledge;
7.3.4 Hazard identification and risk assessment processes;
7.3.5 Risk mitigation process;
7.3.6 FRM safety assurance processes; and
7.3.7 FRM promotion processes

8 OPERATING PROCEDURES

8.1 ***Flight Preparation Instructions.*** As applicable to the operation:

8.1.1. ***Minimum Flight Altitudes.*** A description of the method of determination and application of minimum altitudes including:
(a) A procedure to establish the minimum altitudes/flight levels for VFR flights; and
(b) A procedure to establish the minimum altitudes/flight levels for IFR flights.

8.1.2. ***Criteria for determining the usability of aerodromes***

8.1.3. ***Methods for establishing aerodrome operating minima.*** The method for establishing aerodrome operating minima for IFR flights in accordance with CAR OPS-1 Subpart E. Reference must be made to procedures for the determination of the visibility and/or runway visual range and for the applicability of the actual visibility observed by the pilots, the reported visibility and the reported runway visual range.

8.1.4, En-route Operating Minima for VFR Flights or VFR portions of a flight and, where single engine aeroplanes are used, instructions for route selection with respect to the availability of surfaces which permit a safe forced landing.

8.1.5. Presentation and Application of Aerodrome and En-route Operating Minima.

8.1.6. ***Interpretation of meteorological information.*** Explanatory material on the decoding of MET forecasts and MET reports relevant to the area of operations, including the interpretation of conditional expressions.

8.1.7. ***Determination of the quantities of fuel, oil and water methanol carried.*** The methods by which the quantities of fuel, oil and water methanol to be carried are determined and monitored in flight. This section must also include instructions on the measurement and distribution of the fluid carried on board. Such instructions must take account of all circumstances likely to be encountered on the flight, including the possibility of in-flight re-planning and of failure of one or more of the aeroplane's power plants. The system for maintaining fuel and oil records must also be described.

8.1.8. ***Mass and Centre of Gravity.*** The general principles of mass and centre of gravity including:
(a) Definitions;
(b) Methods, procedures and responsibilities for preparation and acceptance of mass and centre of gravity calculations;
(c) The policy for using standard and/or actual masses;
(d) The method for determining the applicable passenger, baggage and cargo mass;
(e) The applicable passenger and baggage masses for various types of operations and aeroplane type;
(f) General instruction and information necessary for verification of the various types of mass and balance documentation in use;
(g) Last Minute Changes procedures;

(h) Specific gravity of fuel, oil and water methanol; and
(i) Seating policy/procedures.

8.1.9. ***ATS Flight Plan***. Procedures and responsibilities for the preparation and submission of the air traffic services flight plan. Factors to be considered include the means of submission for both individual and repetitive flight plans.

8.1.10. ***Operational Flight Plan.***Procedures and responsibilities for the preparation and acceptance of the operational flight plan. The use of the operational flight plan must be described including samples of the operational flight plan formats in use.

8.1.11. ***Operator's Aeroplane Technical Log.***The responsibilities and the use of the operator's Aeroplane Technical Log must be described, including samples of the format used.

8.1.12. ***List of documents, forms and additional information to be carried.***

8.2 ***Ground Handling Instructions***

8.2.1 ***Fuelling procedures***. A description of fuelling procedures, including:

(a) Safety precautions during refuelling and defuelling including when an APU is in operation or when a turbine engine is running and the prop-brakes are on;
(b) Refuelling and defuelling when passengers are embarking, on board or disembarking; and
(c) Precautions to be taken to avoid mixing fuels.

8.2.2 ***Aeroplane, passengers and cargo handling procedures related to safety.*** A description of the handling procedures to be used when allocating seats and embarking and disembarking passengers and when loading and unloading the aeroplane. Further procedures, aimed at achieving safety whilst the aeroplane is on the ramp, must also be given. Handling procedures must include:

(a) Children/infants, sick passengers and Persons with Reduced Mobility;
(b) Transportation of inadmissible passengers, deportees or persons in custody;
(c) Permissible size and weight of hand baggage;
(d) Loading and securing of items in the aeroplane;
(e) Special loads and classification of load compartments;
(f) Positioning of ground equipment;
(g) Operation of aeroplane doors;
(h) Safety on the ramp, including fire prevention, blast and suction areas;
(i) Start-up, ramp departure and arrival procedures;
(j) Servicing of aeroplanes;
(k) Documents and forms for aeroplane handling; and
(l) Multiple occupancy of aeroplane seats.

8.2.3 ***Procedures for the refusal of embarkation***. Procedures to ensure that persons who appear to be intoxicated or who demonstrate by manner or physical indications that they are under the influence of drugs, are refused embarkation. This does not apply to medical patients under proper care.

8.2.4 ***De-icing and Anti-icing on the ground***. A description of the de-icing and anti-icing policy and procedures for aeroplanes on the ground. These shall include descriptions of the types and effects of icing and other contaminants on aeroplanes whilst stationary, during ground movements and during take-off. In addition, a description of the fluid types used must be given including:

(a) Proprietary or commercial names;
(b) Characteristics;
(c) Effects on aeroplane performance;
(d) Hold-over times; and
(e) Precautions during usage.

8.3 ***Flight Procedures***

8.3.1 ***VFR/IFR Policy***. A description of the policy for allowing flights to be made under VFR, or of requiring flights to be made under IFR, or of changing from one to the other.

8.3.2 ***Navigation Procedures.*** A description of all navigation procedures relevant to the type(s) and area(s) of operation. Consideration must be given to:

(a) Standard navigational procedures including policy for carrying out independent cross-checks of keyboard entries where these affect the flight path to be followed by the aeroplane;
(b) MNPS and POLAR navigation and navigation in other designated areas;
(c) RNAV;
(d) In-flight re-planning;
(e) Procedures in the event of system degradation; and
(f) RVSM.

8.3.3 ***Altimeter setting procedures***

(a) metric altimetry and conversion tables, and
(b) QFE operating procedures.

8.3.4 ***Altitude alerting system procedures***

8.3.5 ***Ground Proximity Warning System procedures.*** Procedures and instructions required for the avoidance of controlled flight into terrain, including limitations on high rate of descent near the surface (the related training requirements are covered in D.2.1).

8.3.6 ***Policy and procedures for the use of TCAS/ACAS***

8.3.7 ***Policy and procedures for in-flight fuel management***

8.3.8 ***Adverse and potentially hazardous atmospheric conditions***. Procedures for operating in, and/or avoiding, adverse and potentially hazardous atmospheric conditions including:

(a) Thunderstorms;
(b) Icing conditions;
(c) Turbulence;
(d) Wind-shear;
(e) Jetstream;
(f) Volcanic ash clouds;
(g) Heavy precipitation;
(h) Sand storms;
(i) Mountain waves; and
(j) Significant Temperature inversions.

8.3.9 ***Wake Turbulence***. Wake turbulence separation criteria, taking into account aeroplane types, wind conditions and runway location.

8.3.10 ***Crew members at their stations***. The requirements for crew members to occupy their assigned stations or seats during the different phases of flight or whenever deemed necessary in the interest of safety and also include procedures for controlled rest in the flight crew compartment.

8.3.11 ***Use of safety belts for crew and passengers***. The requirements for crew members and passengers to use safety belts and/or harnesses during the different phases of flight or whenever deemed necessary in the interest of safety.

8.3.12 ***Admission to Flight Deck***. The conditions for the admission to the flight deck of persons other than the flight crew. The policy regarding the admission of Inspectors from the Authority must also be included.

8.3.13 ***Use of vacant crew seats***. The conditions and procedures for the use of vacant crew seats.

8.3.14 ***Incapacitation of crew members***. Procedures to be followed in the event of incapacitation of crew members in flight. Examples of the types of incapacitations and the means for recognising them must be included.

8.3.15 ***Cabin Safety Requirements.*** Procedures covering:

(a) Cabin preparation for flight, in-flight requirements and preparation for landing including procedures for securing the cabin and galleys;
(b) Procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aeroplane;
(c) Procedures to be followed during passenger embarkation and disembarkation; and
(d) Procedures when refuelling/ defuelling with passengers embarking, on board or disembarking.
(e) Smoking on board is not allowed.

8.3.16 ***Passenger briefing procedures.*** The contents, means and timing of passenger briefing in accordance with CAR OPS-1.285.

8.3.17 ***Procedures for aeroplanes operated whenever required cosmic or solar radiation detection equipment is carried.*** Procedures for the use of cosmic or solar radiation detection equipment and for recording its readings including actions to be taken in the event that limit values specified in the Operations Manual are exceeded. In addition, the procedures, including ATS procedures, to be followed in the event that a decision to descend or re-route is taken.

8.3.18 ***Policy on the use of Autopilot and Auto-throttle.***

8.4 ***AWO.*** A description of the operational procedures associated with All Weather Operations. (See also CAR OPS-1, Subparts D & E).

8.5 ***ETOPS.*** A description of the ETOPS operational procedures.

8.6 ***Use of the Minimum Equipment and Configuration Deviation List(s)***

8.7 ***Non-revenue flights.*** Procedures and limitations for:

(a) Training flights;
(b) Test flights;
(c) Delivery flights;
(d) Ferry flights;
(e) Demonstration flights; and
(f) Positioning flights, including the kind of persons who may be carried on such flights.

8.8 ***Oxygen Requirements***

8.8.1 An explanation of the conditions under which oxygen must be provided and used.

8.8.2 The oxygen requirements specified for:

(a) Flight crew;
(b) Cabin crew; and
(c) Passengers.

9 DANGEROUS GOODS AND WEAPONS

9.1 Information, instructions and general guidance on the transport of dangerous goods including:

(a) Operator's policy on the transport of dangerous goods;
(b) Guidance on the requirements for acceptance, labelling, handling, stowage and segregation of dangerous goods;
(c) Procedures for responding to emergency situations involving dangerous goods;
(d) Duties of all personnel involved as per CAR OPS-1.1315; and
(e) Instructions on the carriage of the operator's employees.

9.2 The conditions under which weapons, munitions of war and sporting weapons may be carried.

10 SECURITY

10.1 Security instructions and guidance of a non-confidential nature which must include the Authority and responsibilities of operations personnel. Policies and procedures for handling and reporting crime on board such as unlawful interference, sabotage, bomb threats, and hijacking must also be included.

10.2 A description of preventative security measures and training.

Note: Parts of the security instructions and guidance may be kept confidential.

11 HANDLING, NOTIFYING AND REPORTING OCCURRENCES

Procedures for the handling, notifying and reporting occurrences. This section must include:

(a) Definition of occurrences and of the relevant responsibilities of all persons involved;
(b) Illustrations of forms used for reporting all types of occurrences (or copies of the forms themselves), instructions on how they are to be completed, the addresses to which they should be sent and the time allowed for this to be done;
(c) In the event of an accident, descriptions of which company departments, Authorities and other organisations that have to be notified, how this will be done and in what sequence;
(d) Procedures for verbal notification to air traffic service units of incidents involving ACAS RAs, bird hazards, dangerous goods and hazardous conditions;
(e) Procedures for submitting written reports on air traffic incidents, ACAS RAs, bird strikes, dangerous goods incidents or accidents, and unlawful interference;
(f) Reporting procedures to ensure compliance with CAR OPS-1.085(b) and CAR OPS-1.420. These procedures must include internal safety related reporting procedures to be followed by crew members, designed to ensure that the commander is informed immediately of any incident that has endangered, or may have endangered, safety during flight and that he is provided with all relevant information.

12 RULES OF THE AIR

Rules of the Air including:

(a) Visual and instrument flight rules;
(b) Territorial application of the Rules of the Air;
(c) Communication procedures including COM-failure procedures;
(d) Information and instructions relating to the interception of civil aeroplanes;
(e) The circumstances in which a radio listening watch is to be maintained;
(f) Signals;
(g) Time system used in operation;
(h) ATC clearances, adherence to flight plan and position reports;
(i) Visual signals used to warn an unauthorised aeroplane flying in or about to enter a restricted, prohibited or danger area;
(j) Procedures for pilots observing an accident or receiving a distress transmission;
(k) The ground/air visual codes for use by survivors, description and use of signal aids; and
(l) Distress and urgency signals.

13 LEASING

A description of the operational arrangements for leasing, associated procedures and management responsibilities.

Part B. AEROPLANE OPERATING MATTERS – TYPE RELATED & STANDARD OPERATING PROCEDURES (SOP)

All Part B manuals including SOP, if in separate volumes, are to be listed in Part A under GENERAL/BASIC, 0 Administration and Control of Operations Manual. Part B manual shall take into account the differences between types, and variants of types, under the following headings:

0 GENERAL INFORMATION AND UNITS OF MEASUREMENT

0.1 General Information (e.g. aeroplane dimensions), including a description of the units of measurement used for the operation of the aeroplane type concerned and conversion tables.

1 LIMITATIONS

1.1 A description of the certified limitations and the applicable operational limitations including:

(a) Certification status (eg. FAR/CS–23, FAR/CS–25, ICAO Annex 16 (FAR/CS–36 and FAR/CS–34) etc.);
(b) Passenger seating configuration for each aeroplane type including a pictorial presentation;
(c) Types of operation that are approved (e.g. VFR/IFR, CAT II/III, RNP Type, flights in known icing conditions etc.);
(d) Crew composition;
(e) Mass and centre of gravity;
(f) Speed limitations;
(g) Flight envelope(s);
(h) Wind limits including operations on contaminated runways;
(i) Performance limitations for applicable configurations;
(j) Runway slope;
(k) Limitations on wet or contaminated runways;
(l) Airframe contamination; and
(m) System limitations.

2 NORMAL PROCEDURES

2.1 The normal procedures and duties assigned to the crew, the appropriate check-lists, the system for use of the check-lists and a statement covering the necessary coordination procedures between flight and cabin crew. The following normal procedures and duties must be included:

(a) Pre-flight;
(b) Pre-departure;
(c) Altimeter setting and checking;
(d) Taxy, Take-Off and Climb;
(e) Noise abatement;
(f) Cruise and descent;
(g) Approach, Landing preparation and briefing;
(h) VFR Approach;
(i) Instrument approach;
(j) Visual Approach and circling;
(k) Missed Approach;
(l) Normal Landing;
(m) Post Landing; and
(n) Operation on wet and contaminated runways.

3 ABNORMAL AND EMERGENCY PROCEDURES

3.1 The abnormal and emergency procedures and duties assigned to the crew, the appropriate check-lists, the system for use of the check-lists and a statement covering the necessary co-ordination procedures between flight and cabin crew. The following abnormal and emergency procedures and duties must be included:

(a) Crew Incapacitation;
(b) Fire and Smoke Drills;
(c) Unpressurised and partially pressurised flight;
(d) Exceeding structural limits such as overweight landing;
(e) Exceeding cosmic radiation limits;
(f) Lightning Strikes;

(g) Distress Communications and alerting ATC to Emergencies;
(h) Engine failure;
(i) System failures;
(j) Guidance for Diversion in case of Serious Technical Failure;
(k) Ground Proximity Warning;
(l) TCAS Warning;
(m) Wind-shear;
(n) Emergency Landing/Ditching; and
(o) Departure Contingency Procedures.

4 PERFORMANCE

4.1 Performance data must be provided in a form in which it can be used without difficulty.

4.2 *Performance data.* Performance material which provides the necessary data for compliance with the performance requirements prescribed in CAR OPS-1 Subparts F, G, H and I must be included to allow the determination of:

(a) Take-off climblimits – Mass, Altitude, Temperature;
(b) Take-off field length (dry, wet, contaminated);
(c) Net flight path data for obstacle clearance calculation or, where applicable, take-off flight path;
(d) The gradient losses for banked climb outs;
(e) En-route climb limits;
(f) Approach climb limits;
(g) Landing climb limits;
(h) Landing field length (dry, wet, contaminated) including the effects of an in-flight failure of a system or device, if it affects the landing distance;
(i) Brake energy limits; and
(j) Speeds applicable for the various flight stages (also considering wet or contaminated runways).

4.2.1. Supplementary data covering flights in icing conditions. Any certificated performance related to an allowable configuration, or configuration deviation, such as anti-skid inoperative, must be included.

4.2.2. If *Performance Data*, as required for the appropriate performance class, is not available in the approved AFM, then other data acceptable to the Authoritymust be included. Alternatively, the Operations Manual may contain cross-reference to the approved Data contained in the AFM where such Data is not likely to be used often or in an emergency.

4.3 *Additional Performance Data.* Additional performance data where applicable including:

(a) All engine climb gradients;
(b) Drift-down data;
(c) Effect of de-icing/anti-icing fluids;
(d) Flight with landing gear down;
(e) For aeroplanes with three (3) or more engines, one engine inoperative ferry flights; and
(f) Flights conducted under the provisions of the CDL.

5 FLIGHT PLANNING

5.1 Data and instructions necessary for pre-flight and in-flight planning including actors such as speed schedules and power settings. Where applicable, procedures for engine(s)-out operations, ETOPS (particularly the one-engine-inoperative cruise speed and maximum distance to an adequate aerodrome determined in accordance with CAR OPS-1.245) and flights to isolated aerodromes must be included.

5.2 The method for calculating fuel needed for the various stages of flight, in accordance with CAR OPS- 1 .255.

6 MASS AND BALANCE

Instructions and data for the calculation of the mass and balance including:

(a) Calculation system (e.g. Index system);

(b) Information and instructions for completion of mass and balance documentation, including manual and computer generated types;
(c) Limiting masses and centre of gravity for the types, variants or individual aeroplanes used by the operator; and
(d) Dry Operating mass and corresponding centre of gravity or index.

7 LOADING

Procedures and provisions for loading and securing the load in the aeroplane.

8 CONFIGURATION DEVIATION LIST

The Configuration Deviation List(s) (CDL), if provided by the manufacturer, taking account of the aeroplane types and variants operated including procedures to be followed when an aeroplane is being dispatched under the terms of its CDL.

9 MINIMUM EQUIPMENT LIST

The Minimum Equipment List (MEL) taking account of the aeroplane types and variants operated and the type(s)/area(s) of operation. The MEL must include the navigational equipment and take into account the required navigation performance for the route and area of operation.

10 SURVIVAL AND EMERGENCY EQUIPMENT INCLUDING OXYGEN

10.1 A list of the survival equipment to be carried for the routes to be flown and the procedures for checking the serviceability of this equipment prior totake-off. Instructions regarding the location, accessibility and use of survival and emergency equipment and its associated check list(s) must also be included.

10.2 The procedure for determining the amount of oxygen required and the quantity that is available. The flight profile, number of occupants and possible cabin decompression must be considered. The information provided must be in a form in which it can be used without difficulty.

11 EMERGENCY EVACUATION PROCEDURES

11.1 Instructions for preparation for emergency evacuation including crew co-ordination and emergency station assignment.

11.2 *Emergency evacuation procedures.* A description of the duties of all members of the crew for the rapid evacuation of an aeroplane and the handling of the passengers in the event of a forced landing, ditching or other emergency.

12 AEROPLANE SYSTEMS

A description of the aeroplane systems, related controls and indications and operating instructions. (See IEM to Appendix 1 to CAR OPS-1.1045.)

Part C. ROUTE AND AERODROME INSTRUCTIONS AND INFORMATION

1 Instructions and information relating to communications, navigation and aerodromes including minimum flight levels and altitudes for each route to be flown and operating minima for each aerodrome planned to be used, including:

(a) Minimum flight level/altitude;
(b) Operating minima for departure, destination and alternate aerodromes;
(c) Communication facilities and navigation aids;
(d) Runway data and aerodrome facilities;
(e) Approach, missed approach and departure procedures including noise abatement procedures;
(f) COM-failure procedures;
(g) Search and rescue facilities in the area over which the aeroplane is to be flown;
(h) Information related to RFFS (Rescue and Fire Fighting Services) protection shall be described in the operators Operations Manual for aerodrome information against aircraft Fire Fighting required.
(i) A description of the aeronautical charts that must be carried on board in relation to the type of flight and the route to be flown, including the method to check their validity;
(j) Availability of aeronautical information and MET services;

(k) En-route COM/NAV procedures;
(l) Aerodrome categorisation for flight crew competence qualification (See AMC CAR OPS-1.975); and
(m) Special aerodrome limitations (performance limitations and operating procedures etc.).

Part D. TRAINING SYLLABI AND CHECKING PROGRAMMES – GENERAL

1 Training Syllabi and Checking Programmes – General

1.1 General *(for all operations personnel assigned to operational duties in connection with the preparation and/or conduct of a flight)*

1.2 Amendment and Revisions

2 Training syllabi and checking procedures

2.1 ***Flight crew***. All relevant items prescribed in CAR OPS-1 Subpart N;

Chapter 1. Organisation
- 1.1 Organisation Structure

Chapter 2 Training and checking personnel
- 2.1 Appointment of Flight Crew Training Staff
- 2.2 Not used
- 2.3 Duties and Responsibilities
  - 2.1.1 Training and Check Captains
  - 2.1.2 Training First Officers
  - 2.1.3 Procedures to be applied in the event that personnel do not achieve or maintain the required standard
    - 2.1.3.1 TRI (MPA) Rating
    - 2.1.3.2 TRE Authorisation
    - 2.1.3.3 SFI Authorisation
    - 2.1.3.4 SFE Authorisation
- 2.4 Qualifications and Experience
  - 2.4.1 General
  - 2.4.2 TRI(MPA) Minimum Requirements
  - 2.4.3 TRE- Minimum Requirements
  - 2.4.4 SFI- Minimum Requirements
  - 2.4.5 FE- Minimum Requirements
  - 2.4.6 Commanders nominated for Line Training and Checks
  - 2.4.7 TRI/TRE/SFI/SFE- Re-authorisation and Renewal

Chapter 3 Administration
- 3.1 General
- 3.2 Mandatory Requirements
- 3.3 Records
- 3.4 Minimum Qualification/Experience Levels
  - 3.4.1 Commander- Multi Pilot Aeroplanes
  - 3.4.2 Commander- Single Pilot Aeroplanes
  - 3.4.3 Pilot-in-Command Relieving the Commander
  - 3.4.4 Co Pilot
  - 3.4.5 Relief Co Pilot
  - 3.4.6 Upgrade to Commander
  - 3.4.7 System Panel Operator (Flight Engineer)
  - 3.4.8 Relief System Panel Operator (Flight Engineer)
  - 3.4.9 Operations on more than one type or variant, Authority Approval Required
- 3.5 Period of Validity

3.5.1 Operator Proficiency check
3.5.2 Line Check
3.5.3 Annual Emergency and safety Equipment Check
3.5.4 Triennial Emergency and Safety Equipment Check
3.5.5 Crew Resource Management
3.5.6 Ground and Refresher Training
3.5.7 Pilot Qualification to operate in either pilot's seat
3.5.8 Route and Aerodrome Competence Qualification-PIC
3.5.9 Recent Experience- PIC Single Pilot Operations
3.5.10 Recent Experience-PIC Multi Pilot Operations
3.5.11 Recent Experience-Co Pilot
3.5.12 Recent Experience-LVTO and Category II/III
3.5.13 Instrument Rating-(Aeroplane)

Chapter 4 Training Policy
4.1 Instructor and Check Personnel
4.1.1 General
4.1.2 Selection
4.1.3 Training-Commanders Nominated for Line Training and Checks
4.1.4 Training-TRI/TRE
4.1.5 Training-Training First Officer

Chapter 5 Conversion Training and Checking
5.1 General
5.2 Ground Training
5.3 Emergency and Safety equipment Training
5.4 CRM Training
5.5 Synthetic Training Device/Aeroplane Training
5.5.1 General
5.5.2 Synthetic Training Device Training
5.5.3 Aeroplane Training
5.6 Flying Test and Checks
5.7 Line Flying Under Supervision
5.8 Low Visibility Operations
5.8.1 General
5.8.2 Ground Training
5.8.3 Synthetic Training Device Training and/or Flight Training
5.8.4 Flight Crew Qualification
5.8.5 Line Flying Under Supervision
5.8.6 Type and Command experience
5.8.7 Low Visibility Take Off with RVR less than 150metres
5.9 ETOPS Training and Checking
5.9.1 ETOPS Training
5.9.2 ETOPS Check Program
5.10 RVSM Training
5.11 System Panel Operator (Flight Engineer)

Chapter 6 Route competence Training

Chapter 7 Difference and Familiarisation Training

Chapter 8 Recurrent Training
8.1 General
8.2 Ground and Refresher
8.3 Aeroplane/Synthetic Training device
8.4 Emergency and Safety Equipment

8.4.1 General
8.4.2 Annual
8.4.3 Triennial
8.5 CRM
8.6 Single Pilot Operations Under IFR or at Night
8.7 System Panel Operator (Flight Engineer)

Chapter 9 Recurrent Checking
91. General
9.2 Operator Proficiency check
9.3 Emergency and Safety Equipment Check
9.4 Line check
9.5 Single Pilot Operations Under IFR or at Night
9.6 System Panel Operator (Flight Engineer)

Chapter 10 Command Training
10.1 Minimum Experience Levels
10.2 Command course

Chapter 11 Pilot qualification to operate in either Pilot's Seat

Chapter 12 Training Records and Checking Forms
Form 1-Type or Class Rating
Form 2-Operator Proficiency Check/or Combined OPC/LPC
Form 3-Certificate of Test\
Form 4- Instrument Rating Renewal
Form 5-Certificates for Low Visibility Operations and other Special Qualifications

Appendices

A Conversion Training and checking-Ground Syllabus
B Conversion Training and Checking-CRM
C Conversion Training and Checking-Synthetic Training Devices
D Conversion Training and checking-Low Visibility Operations – Ground Training
E Conversion Training and Checking-Low Visibility Operations – Approved Flight Simulator Training and/or Flight Training
F Operator Proficiency Check
G Line Check

2.2 ***Cabin Crew Training and Checking**. (*All relevant items prescribed in CAR OPS-1 Subpart O)

1 Introduction
2 In-charge cabin crew member
3 Initial Training
4 Conversion and differences Training
5 Familiarisation
6 Recurrent Training
7 Refresher Training
8 Checking
9 Training Records

2.3 ***Training Syllabus For Transportation of Dangerous***

Goods: Operations Personnel Concerned including Crew

Members

1 Introduction

2 For Operators who do not hold a Permanent Approval to Carry Dangerous Goods
3 For Operators who do hold a Permanent Approval to Carry Dangerous Goods
4 All relevant items prescribed in CAR OPS-1 Subpart S (Security).

2.4 ***Training Syllabus for Transportation of Dangerous Goods:***

Operations Personnel Other Than Crew Members *(e.g. despatcher, handling personnel etc.).*

1 Introduction
2 For Operators who do not hold a Permanent Approval to Carry Dangerous Goods
3 Areas of Training
4 Further Information
5 All other relevant items prescribed in CAR OPS-1 pertaining to their duties.

3 Procedures

1. Procedures for training and checking
2. Procedures to be applied in the event that personnel do not achieve or maintain the required standards
3. Procedures to ensure that abnormal or emergency situations requiring the application of part or all of abnormal or emergency procedures and simulation of IMC by artificial means, are not simulated during commercial air transportation flight

4

4 Description of documentation to be stored and storage periods. (See Appendix 1 to CAR OPS-1.1065.)

IEM to Appendix 1 to CAR OPS 1.1045 Operations Manual Contents

(1) With reference to Operations Manual Section A, paragraph 8.3.17, on cosmic radiation, limit values should be published in the Operations Manual only after the results of scientific research are available and internationally accepted.

(2) With reference to Operations Manual Section B, paragraphs 9 (Minimum Equipment List) & 12 (Aeroplane Systems), operators should give consideration to using the ATA number system when allocating chapters and numbers for aeroplane systems.

IEM OPS 1.1055(a)(12) Signature or equivalent

(See CAR-OPS 1.1055(a)(12))

(1) CAR-OPS 1.1055 requires a signature or its equivalent. This IEM gives an example of how this can be arranged where normal signature by hand is impracticable and it is desirable to arrange the equivalent verification by electronic means.

(2) The following conditions should be applied in order to make an electronic signature the equivalent of a conventional hand-written signature:

- (a) Electronic ‘signing’ should be achieved by entering a Personal Identification Number (PIN) code with appropriate security etc;
- (b) Entering the PIN code should generate a print-out of the individual’s name and professional capacity on the relevant document(s) in such a way that it is evident, to anyone having a need for that information, who has signed the document;
- (c) The computer system should log information to indicate when and where each PIN code has been entered;
- (d) The use of the PIN code is, from a legal and responsibility point of view, considered to be fully equivalent to signature by hand;
- (e) The requirements for record keeping remain unchanged; and.
- (f) All personnel concerned should be made aware of the conditions associated with electronic signature and should confirm this in writing.

IEM OPS 1.1055(b) Journey log

(See CAR-OPS 1.1055(b))

The ‘other documentation’ referred to in this paragraph might include such items as the operational flight plan, the aeroplane technical log, flight report, crew lists etc.

Appendix 1 to CAR–OPS 1.1065 Document storage periods

An operator shall ensure that the following information/documentation is stored in an acceptable form, accessible to the Authority, for the periods shown in the Tables below.

Note: Additional information relating to maintenance records is prescribed in CAR M.

Table 1: Information used for the preparation and execution of a flight

Information used for the preparation and execution of the flight as described in CAR OPS-1.135	
Operational flight plan	3 months
Aeroplane Technical log	24 months after the date of the last entry
Route specific NOTAM/AIS briefing documentation if edited by the operator	3 months
Mass and balance documentation	3 months
Notification of special loads including written information to the commander about dangerous goods	3 months
Completed Flight Preparations Forms requested by CAR-OPS 1.135(a) items (3, 5, 7, 10, 11)	3 months

Table 2: Reports

Reports	
Journey log	3 months
Flight report(s) for recording details of any occurrence, as prescribed in CAR OPS-1.420, or any event which the commander deems necessary to report/record	3 months
Reports on exceedances of duty and/or reducing rest periods	3 months
Fuel and oil records	3 months

Table 3: Flight Crew Records

Flight Crew Records	
Flight, Duty and Rest time	15 months
License	As long as the flight crew member is exercising the privileges of the license for the operator
Conversion training and checking	3 years
Command course (including checking)	3 years
Recurrent training and checking	3 years
Training and checking to operate in either pilot’s seat	3 years
Recent experience (CAR OPS-1.970 refers)	15 months

Flight Crew Records	
Route and aerodrome competence (CAR OPS-1.975 refers)	3 years
Training and qualification for specific operations when required by CAR OPS-1 (e.g. ETOPS, CAT II/III operations)	3 years
Dangerous Goods training as appropriate	2 years

Table 4: Cabin Crew Records

Cabin Crew Records	
Flight, Duty and Rest Time, Initial training, conversion and differences training (including checking)	15 months As long as the cabin crew member is employed by the operator
Recurrent training and refresher (including checking)	Until 12 months after the cabin crew member has left the employ of the operator
Dangerous Goods training as appropriate	3 years

Table 5: Records for other operations personnel

Records for other operations personnel	
Training/qualification records of other personnel for whom an approved training programme is required by CAR–OPS	Last 2 training records

Table 6: Other Records

Other Records	
Records on cosmic and solar radiation dosage	Until 12 months after the crew member has left the employ of the operator
Quality System records	5 years
Dangerous Goods Transport Document	3 months after completion of the flight
Dangerous Goods Acceptance Document	3 months after completion of the flight
Dangerous Goods Acceptance Checklist	3 months after completion of the flight

SUBPART Q – FLIGHT & DUTY TIME LIMITATIONS & REST REQUIREMENTS

CAR OPS-1.1085 General

(a) Each operator shall establish a flight and duty time limitations (FDTL) and rest scheme for crewmembers.
(b) Each operator shall ensure that:
  (1) The flight and duty time limitations and rest scheme is in accordance with the provisions of this Subpart;
  (2) Flights are planned to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the flight and the turnaround times, and the nature of operation; and
  (3) Duty rosters are prepared and published in advance and in accordance with the Authority Approved Operator's Operations Manual.
(c) A crew member shall not operate on an aircraft if he knows or suspects that he is suffering from or is likely to suffer from fatigue, or feels unfit to the extent that the flight may be endangered.
(d) Each operator shall nominate a home base for each crew member.
(e) Each operator shall nominate months or roster periods as the method for determining all flight and duty time limitations in this subpart, but in no case, mix the two methods.

CAR OPS-1.1090 Commercial Air Transport Operations

(a) Commercial Air Transport (CAT) operations shall be subject to the requirements of Subpart- Q
(b) By way of derogation from paragraph (a), air taxi, emergency medical service and single pilot CAT operations by aeroplanes shall be subject to the requirements specified in the Sultanate of Oman Civil Aviation Regulations and in CAR OPS-1, Subpart Q.
(c) By way of derogation from paragraph (a), CAT operations with helicopters and CAT operations with sailplanes shall comply with the requirements specified in the Sultanate of Oman Civil Aviation Law in which the operator has its principal place of business.
(d) Non-commercial operations, including non-commercial specialised operations, with complex motor-powered aeroplanes and helicopters, as well as commercial specialised operations with aeroplanes, helicopters and sailplanes shall comply as regards flight time limitations, with the requirements specified in the Sultanate of Oman Civil Aviation Regulations in which the operator has its principal place of business, or, where the operator has no principal place of business, the place where the operator is established or resides.
(e) With regard to flight time limitation:
  (1) the CAA shall issue the applicable certification specifications to ensure compliance with essential requirements and, as appropriate, the related implementing rules. Initially, the implementing rules shall include all substantive provisions of CAR OPS-1, Subpart Q, taking into account the latest scientific and technical evidence;
  (2) CAA may approve individual flight time specification schemes which deviate from the certification specifications referred to in subparagraph (1), above;
  (3) the CAA shall, within one month, assess the individual scheme on the basis of a scientific and medical evaluation. Thereafter the CAA may grant the approval, unless the CAA has discussed the scheme with that operator and proposed changes thereto. Should the operator agree with these changes, it may grant the approval accordingly;
  (4) in the event of unforeseen urgent operational circumstances or operational needs of limited duration and non-repetitive nature, derogations to certification specifications may apply provisionally until the CAA expresses its opinion.
  (5) **Determination of disruptive schedules.**
    i. For the purpose of flight time limitations, the CAA shall determine, in accordance with the definitions of "early type" and "late type" of disruptive schedules in sub-regulation CAR OPS-1.1100 of Subpart Q which of those two types of

disruptive schedules shall apply to all CAT operators under its oversight.

(6) **Approval of individual flight time specification schemes.**

i. The CAA shall approve flight time specification schemes proposed by CAT operators if the operator demonstrates compliance with Sultanate of Oman Civil Aviation Law and Subpart Q to this Regulation.

ii. Whenever a flight time specification scheme proposed by an operator deviates from the applicable certification specifications issued by the CAA.

iii. Whenever a flight time specification scheme proposed by an operator derogates from applicable regulation, the CAA shall apply the procedure that will provide an equivalent level of protection to that attained by the regulations, without discrimination on grounds of operators, grant an approval derogating from those regulations.

iv. Approved deviations or derogations shall be subject, after being applied, to an assessment to determine whether such deviations or derogations should be confirmed or amended. The CAA shall conduct an independent assessment based on information provided by the operator. The assessment shall be proportionate, transparent and based on scientific principles and knowledge.

(7) **Approval of individual flight time specification schemes.**

i. Further guidance on fatigue risk management processes, appropriate fatigue management, the underlying scientific principles and operational knowledge may be found in ICAO Doc 9966 (Manual for the Oversight of Fatigue Management Approaches).

CAR-OPS 1.1092 General Principles

The prime objective of a flight and duty time limitation scheme shall ensure that crew members are adequately rested at the beginning of each flying duty period (FDP), and whilst flying are sufficiently free from fatigue so that they can operate to a satisfactory level of efficiency and safety in all normal and abnormal situations.

Aircraft operators are expected to appreciate the relationship between the frequency and pattern of scheduled FDPs and rest periods and time off, and give due consideration to the cumulative effects of long working hours interspersed with minimum rest. Factors to be considered when planning duty periods shall include;

(a) The allocation of work patterns, which avoid such undesirable practices as;
   (1) alternating day/night duties,
   (2) the positioning of crews so that a serious disruption of established sleep/work patterns occur,
   (3) the scheduling of rest periods between eighteen (18) and thirty (30) hours especially after long flights crossing multiple time zones.

(b) planning days off and notifying crews well in advance,

(c) Internal consultation to agree basic roster concepts, which ensure adequate rest prior to flight but, within that constraint.

SECTION 1 – FLIGHT & DUTY TIME LIMITATIONS & REST REQUIREMENTS

CAR OPS-1.1095 Applicability

The Authority has established the following regulations specifying the limitations applicable to the flight time and flight duty periods for crew members. These regulations also make provision for adequate rest periods to ensure that fatigue occurring either in a flight or successive flights, or accumulated over a period of time due to these and other tasks, does not endanger the safety of a flight.

This subpart is applicable to all Oman registered aeroplanes, as well as foreign registered aeroplanes operated under an Oman Air Operators Certificate. In particular;

(a) Commercial Air Transport operations, or operations operated by an air transport undertaking.

(b) Private use operations of turbo-jet andturbo-propeller aeroplanes. This subpart applies to flight crews and cabin crews only.

CAR OPS-1.1100 Definitions

(See GM-1 to GM-7 CAR OPS-1.1100)

For the purpose of this Subpart. the following definitions shall apply:

Terminology	*Description*
Acclimatised:	When a crew member has spent 3 consecutive local nights on the ground within a local time zone band, which is two hours wide, and is able to take uninterrupted night's sleep The crew member will remain acclimatised thereafter until a duty period finishes at a place where local time differs by more than 2 hours from that at the point of departure.
Accommodation: *(Also see - Suitable Accommodation)*	For the purpose of standby and split duty, a quiet and comfortable place not open to the public with the ability to control light and temperature, equipped with adequate furniture that provides a crew member with the possibility to sleep, with enough capacity to accommodate all crew members present at the same time and with access to food and drink.
Actual flight operation:	Actual flight operation starts at the reporting time and ends when the crew goes off duty.
Adequate facilities:	A quiet and comfortable place not open to the public.
Augmented flight crew:	A flight crew that comprises more than the minimum number required to operate the aeroplane and in which each flight crew member can leave his or her assigned post and be replaced by another appropriately qualified flight crew member for the purpose of in-flight rest.
Block time:	The time between the time an aircraft first moves from its parking place for the purpose of taking off until it comes to rest on the designated parking position or until all engines are stopped.
Break:	A period of time within a flight duty period, shorter than a rest period, counting as duty and during which a crew member is free of all tasks.
Cabin Crewmember:	An appropriately qualified crew member, other than a flight crew member, who is assigned by an operator to perform duty related to safety of flight and passengers during operations of aircraft.

Terminology	*Description*
Commander:	The pilot in command: The pilot designated by the operator being in command and charged with the safe conduct of a flight.
Contactable:	A short period of time during the day, other than a day off, during which the operator requires a crew member to be at an agreed location for the purpose of giving notification of a duty period, which will commence not less than 10 hours ahead. The contactable period shall be nominated by the operator and acceptable to the Authority
Crew member:	A person assigned by an operator to perform duty on an aircraft.
Days Off:	Periods of relaxation free from all duties. A single day off shall include two local nights (minimum of 34 hours period). Consecutive days off shall include a further local night for each additional consecutive day off. A rest period may be included as part of a day off.
Delayed reporting	Means the postponement of a scheduled FDP by the operator before a crew member has left the place of rest;
Dispatch crew:	A fully qualified and current flight/cabin crew member authorized to carry out pre-flight duties as defined by an operator.
Duty:	Any task that crew member is required by the Operator to perform, including, for example, flight duty, administrative work, training, positioning and standby when it is likely to induce fatigue. Administrative work has to be understood as any task that a crew member is required to carry out associated with the business of an AOC holder, which is accepted or approved by AUTHORITY under the regulatory framework.
Duty Period:	A period which starts when flight crew or cabin crew members are required by an Operator to report for or to commence a duty and ends when that person is free from all duties, including post-flight duty. For simulators, the duty period starts at the beginning of the Pre-briefing and ends at the end of the De-briefing.
Early start:	Any duty that is commenced in the period 0500-0659 hours local time.
Fatigue:	A physiological state of reduced mental or physical performance capability resulting from sleep loss or extended wakefulness, circadian phase, or workload (mental and/or physical activity) that can impair a crew member's alertness and ability to safely operate an aircraft or perform safety-related duties.
Flight Crew member:	A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period such as Pilots and Flight Engineers.
Flight Duty Period (FDP):	A period which commences when a crew member is required to report for duty that includes a flight or a series of flights and which finishes when the aeroplane finally comes to rest at the end of the last flight on which he/she is a crew member.

Terminology	*Description*
Flight time/ Block Hours — aeroplanes:	The total time from the moment an aeroplane first moves for the purpose of taking off until the moment it finally comes to rest at the end of the flight. *"Flight time" as here defined is synonymous with the term "block to block" time or "chock to chock" time in general usage which is measured from the time an aeroplane first moves for the purpose of taking off until it finally stops at the end of the flight.*
FTL variation:	Any operation conducted outside the limits of the prescriptive FTL regulation, and under a specific approval by the Authority on the basis of a risk assessment provided by the operator and assessed by Authority to provide a level of safety equivalent to, or better than, that achieved through the prescriptive fatigue management regulations.
Home base:	Means the location, assigned by the operator to the crew member, from where the crew member normally starts and ends a duty period or a series of duty periods and where, under normal circumstances, the operator is not responsible for the accommodation of the crew member concerned.
In-Flight Rest facility:	Means a comfortable, fully reclining seat, separated and screened from the passengers and flight deck, equipped with a call device, sleep restraint, portable oxygen, and not subject to distraction from noise generated in the cabin.
Late finish:	A duty is a Late Finish when the duty finishes in the period 0100 to 0159 hours local time
Local Night:	A period of 8 hours falling between 2200 hours and 0800 hours' local time.
Operating crew member:	A crew member carrying out his/her duties in an aircraft during a flight that is required for the safety of the aeroplane and its occupants, according to their licenses or authorisation.
Operational delay:	Delays that are beyond the control of the operator such as those that would be caused by weather, aircraft equipment malfunction, and air traffic control delays. It would not include late arriving passengers, late food service, late fuel trucks, delays in loading baggage-freight-mail, or similar events.
Positioning:	The practice of transferring crews from place to place as passengers in surface or air transport at the behest of the Operator.
Reporting Time:	The time at which a crew member is required by an operator to report for any duty.
Reserve:	Means a period of time during which a crew member is required by the operator to be available to receive an assignment for an FDP, positioning or other duty notified at least 10 hours in advance.
Rest Period:	A continuous and defined subsequent to and/or prior to duty, during which flight or cabin crew members are free of all duties.
Rostered/Planned duty:	A duty period, or series of duty periods, with stipulated start and finish times, notified by the operator to crews in advance.

Terminology	Description
Rostering Period:	A number of consecutive weeks, usually 4, but defined by the operator.
Scheduled Duty:	The allocation of a specific flight or flights or other duties to a crew member within the pre-notified rostered/planned series of duty periods.
Sector:	Segment of a Flight Duty Period (FDP) between an aircraft first moving for the purpose of taking off until it comes to rest after landing on the designated parking position
Split Duty:	A flying duty period, which consists of two or more sectors, separated by less than a minimum rest period.
Standby Duty:	A period during which an Operator places constraints on a crew member who would otherwise be off duty. However, it shall not include any time during which an Operator requires a crew member to be contactable for the purpose of giving notification of a duty, which is due to start 10 hours or more ahead.
Suitable Accommodation:	A well-furnished bedroom, with single occupancy if required by the crew member, which is subject to minimum noise, is well ventilated and should have the facility to control the levels of light and temperature.
Time difference:	The number of hours separating local standard time at two locations (disregarding 'daylight saving time').
Travelling:	All time spent by a crew member transiting between the place of rest, and the place of reporting for duty.
Unforeseen operational circumstance:	An unplanned event, such as un-forecast weather, equipment malfunction, or air traffic delay that is beyond the control of the operator.
Week:	A period of seven consecutive days starting at any set time and on set day as specified and stated by the Operator.
Window of Circadian Low ('WOCL'):	Means the period between 02:00 and 05:59 hours in the time zone to which a crew member is acclimatised

CAR OPS-1.1105 Operator responsibilities

(See AMC-1 & 2 CAR OPS-1.1105 paras (a) & (j), GM-1 CAR OPS-1.1105(j))

An operator shall:

(a) Ensure training of rostering staff shall include guidance on the effects of disturbing circadian rhythms and sleep deprivation.

(b) Publish duty rosters sufficiently in advance to provide the opportunity for crew members to plan adequate rest;

(c) Ensure that flight duty periods are planned in a way that enables crew members to remain sufficiently free from fatigue so that they can operate to a satisfactory level of safety under all circumstances;

(d) Specify reporting times that allow sufficient time for ground duties;

(e) Take into account the relationship between the frequency and pattern of flight duty periods and rest periods and give consideration to the cumulative effects of undertaking long duty hours combined with minimum rest periods;

(f) Allocate duty patterns which avoid practices that cause a serious disruption of an established sleep/work pattern, such as alternating day/night duties;
(g) Comply with the provisions concerning disruptive schedules;
(h) Provide rest periods of sufficient time to enable crew members to overcome the effects of the previous duties and to be rested by the start of the following flight duty period;
(i) Away from base the operator shall provide for crew members both the opportunity and facilities for adequate pre-flight rest, in suitable accommodation.
(j) Plan recurrent extended recovery rest periods and notify crew members sufficiently in advance;
(k) Plan flight duties in order to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the sector and turnaround times;
(l) Change a schedule and/ or crew arrangements if the actual operation exceeds the maximum flight duty period on more than 33 % of the flight duties in that schedule during a scheduled seasonal period.

CAR OPS-1.1110 Crew member responsibilities

(See CAR OPS-1.085)

A crew member shall not fly, and an operator shall not require that crew member to fly, if either has reason to believe that he/she is suffering, or is likely to suffer while flying, from such fatigue as may endanger the safety of the aircraft or of its occupants. In addition:
(a) Comply with point CAR OPS-1.085 paragraphs (a), (b), (c), (d) and
(b) They have the equal responsibility for preventing the onset of fatigue, which cannot rest on the operator alone. Crew members shall ensure that they are not in breach of the operator's scheme.
(c) Shall make optimum use of the opportunities and facilities for rest provided and plan and use their rest periods properly.
(d) Crew members are reminded that they are not entitled to act as an operating crewmember of an aircraft if they know or suspect that their physical or mental condition renders them temporarily unfit so to act.

CAR OPS-1.1115 Fatigue risk management system (FRMS)

(See AMC's 1, 2, 3, 4, 5, 6, 7,8, 9 & 10 and GM's 1 & 2 for CAR OPS-1.1115)

(a) The Authority shall approve the operators FRMS before it may take place of any or all of the prescriptive fatigue management regulations. An approved FRMS shall provide a level of safety equivalent to, or better than, the prescriptive fatigue management regulations.
(b) When FRMS is required by this Subpart or for an applicable certification specification, the operator shall establish, implement and maintain a FRMS as an integral part of its management system. The FRMS shall be described in the operations manual.
    (1) that no crew member allows their task achievement/decision making to deteriorate to the extent that safety is endangered because of the effects of fatigue, taking into account, inter alia, fatigue accumulation, sleep deprivation, number of sectors flown, night duties or time zone changes;
    (2) that a crew member does not perform allocated duties on board an aircraft when unfit due to fatigue and
    (3) that prevention of fatigue is managed through a rostering system that addresses flight times, flight duty periods, duty and adapted rest periods. Limitations established within the rostering system must take account of all relevant factors contributing to fatigue such as, in particular, number of sectors flown, time-zone crossing, sleep deprivation, disruption of circadian cycles, night hours, positioning, cumulative duty time, for given periods of time, sharing of allocated tasks between crew members, and also the provision of augmented crews.

(c) The FRMS established, implemented and maintained shall provide for continuous improvement to the overall performance of the FRMS and shall include:
  (1) a description of the philosophy and principles of the operator with regard to FRMS, referred to as the FRMS policy;
  (2) documentation of the FRMS processes, including a process for making personnel aware of their responsibilities and the procedure for amending this documentation;
  (3) scientific principles and knowledge;
  (4) a hazard identification and risk assessment process that allows managing the operational risk(s) of the operator arising from crew member fatigue on a continuous basis;
  (5) a risk mitigation process that provides for remedial actions to be implemented promptly, which are necessary to effectively mitigate the operator's risk(s) arising from crew member fatigue and for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions;
  (6) FRMS safety assurance processes;
  (7) FRMS promotion processes.

(d) The FRMS shall correspond to the flight time specification scheme, the size of the operator and the nature and complexity of its activities, taking into account the hazards and associated risks inherent in those activities and the applicable flight time specification scheme.

(e) The operator shall take mitigating actions when the FRMS safety assurance process shows that the required safety performance is not maintained.

(f) Although operators must plan their schemes in accordance with the requirements, it is recognised that the standard provisions will not necessarily satisfy every type of operation. In these circumstances operators may apply for FTL Variation to the standard provisions at least thirty (30) days, or as otherwise agreed, before the date of the intended operation. Consideration will only be given where an operator can show that any proposal will ensure a better or equivalent level of protection against fatigue than the basic requirements.

(g) *Approval of FTL Variation by the CAA:* The Authority may grant variations to the FTL requirements contained in this Subpart provided the operator demonstrates to the Authority, on the basis of a risk assessment, that an equivalent level of safety is ensured. The Authority may impose additional requirements prior to the approval of the variations to the prescriptive scheme. A validation flight may be conducted by the Authority before or after the issuance of each route FTL variation scheme.

Note: Any existing approved Flight Time Variation to the prescriptive scheme shall remain in force until the time a re-assessment is required. Such re-assessment shall be conducted considering the AMC-8 & 9 OPS-1.115(f).

CAR OPS-1.1120 Prescriptive Fatigue Management Requirements

The operator's FRMS shall establish a process to ensure that an FRMS provides a level of safety equivalent to, or better than, the prescriptive fatigue management regulations. As part of this process, the Authority shall:

(a) require that the operator establish maximum values for flight times and/or flight duty periods(s) and duty period(s), and minimum values for rest periods. These values shall be based upon scientific principles and knowledge, subject to safety assurance processes, and acceptable to the Authority;

(b) mandate a decrease in maximum values and an increase in minimum values in the event that the operator's data indicates these values are too high or too low, respectively; and

(c) approve any increase in maximum values or decrease in minimum values only after evaluating the operator's justification for such changes, based on accumulated FRMS experience and fatigue-related data.

Note: Safety assurance processes are described in Annex 6, Appendix 7.

CAR OPS-1.1125 Implementation of an FRMS

Where the operator implements an FRMS to manage fatigue-related safety risks, the operator shall, as a minimum:

(a) incorporate scientific principles and knowledge within the FRMS;
(b) identify fatigue-related safety hazards and the resulting risks on an ongoing basis;
(c) ensure that remedial actions, necessary to effectively mitigate the risks associated with the hazards, are implemented promptly;
(d) provide for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions; and
(e) provide for continuous improvement to the overall performance of the FRMS.

Note 1: As of 7 November 2019, detailed requirements for an FRMS are in Annex 6, Appendix 7.

Note 2: As of 7 November 2019, provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19.

SECTION 2 – COMMERCIAL AIR TRANSPORT OPERATORS

CAR OPS-1.1150 Home Base

(See GM-1 CAR OPS-1.1150)

An operator shall assign a home base to each crew member as per the following:

(a) The home base is a single airport location assigned with a high degree of permanence.

(b) In the case of a change of home base, the first recurrent extended recovery rest period prior to starting duty at the new home base is increased to seventy (72) hours, including three (3) local nights. Travelling time between the former home base and the new home base is positioning.

CAR OPS-1.1155 Limits for Flying Time and Duty Period

(a) No person shall act as an operating crew member of the flight crew of an aircraft if at the beginning of the flight the aggregate of all his previous flight times;

   (1) during the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred (100) block hours: or

   (2) during the period of twelve (12) months expiring at the end of the previous month exceeds nine hundred (900) block hours:

(b) The maximum cumulative duty hours for Flight crew of an aeroplane shall not exceed;

   (1) Fifty-five (55) hours in any seven (7) consecutive days, but may be increased to sixty (60) hours, when rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays.

   (2) Ninety-five (95) hours in any fourteen (14) consecutive days; and

   (3) One hundred and ninety (190) hours in any twenty-eight (28) consecutive days.

CAR OPS-1.1160 Duty cycle and days off

A Crew member:

(a) Shall not be on duty more than seven (7) consecutive days between days off, but may be positioned, and may operate only, under unforeseen circumstances, to the usual operating base on the eighth day, provided they are then allocated a minimum of two (2) consecutive days off, and

(b) Shall have two (2) consecutive days off in any consecutive fourteen (14) days following the previous two (2) consecutive days off, and

(c) Shall have a minimum of seven (7) days off in any consecutive twenty-eight (28) days, and

(d) Shall have an average of at least eight (8) days off in each consecutive twenty-eight (28) day period, averaged over three (3) such periods.

CAR-OPS 1.1162 Standard Provisions Applicable to a FDP/FTL Scheme

(See AMC 1 &2 & GM TO CAR OPS-1.1162(d))

(a) Subject to the maxima and minima specified in this subpart, it is incumbent on the operator to establish maximum FDPs and minimum rest periods appropriate to the nature of flight operations undertaken.

(b) An operator of an aircraft shall have a scheme for the regulation of flight and duty times of crews. The scheme shall be approved by the Authority and be included in the Operations Manual for the benefit of all crew members and the staff concerned with the preparation and day to day management of rostering and scheduling.

(c) Although operators must plan their schemes in accordance with the requirements, it is recognised that the standard provisions will not necessarily satisfy every type of operation.

   In these circumstances operators may apply for FTL Variation to the standard provisions at least thirty (30) days, or as otherwise agreed, before the date of the intended operation. Consideration will only be given where an operator can show that any proposal will ensure a better or equivalent level of protection that achieved through the prescriptive fatigue management regulations.

(d) Approval of FTL Variation by CAA:
  (1) The CAA may grant variations to the FTL requirements contained in this Subpart provided the operator demonstrates to the CAA, on the basis of a risk assessment, that an equivalent level of safety is ensured.
  (2) The CAA may impose additional requirements prior to the approval of the variations to the prescriptive scheme.
  (3) A validation flight may be conducted by the CAA before or after the issuance of each route FTL variation scheme.

CAR OPS-1.1165 Flight Time Limitations (FTL) and Flight Duty Period (FDP) – All Operations

(See AMC-1 to 6 and GM-1 to 9 for CAR OPS-1.1165)

(a) ***Late finishes/Early starts/Night Duties:*** The conditions set in this paragraph only apply when a crew member is acclimatised. Sleep deprivation, leading to the onset of fatigue, can arise if an Operating Crew Member is required to report early for duty on a number of consecutive days. Therefore:
  (1) Not more than three (3) consecutive duties that occur in any part of the period 0100 to 0659 hours' local time can be undertaken, nor will there be more than four (4) such duties in any seven (7) consecutive days.
  (2) Any run of consecutive duties (Late Finishes or Nights or Early Starts) can only be broken by a period of not less than thirty-four (34) consecutive hours free from such duties. These thirty-four (34) consecutive hours may include a duty that is not an Early, Late or Night duty.
  (3) Operating Crew Members who are employed on a regular early morning duty for a maximum of five (5) consecutive duties will work to the following:
    i. The minimum rest period before the start of such a series of duties will be twenty-four (24) hours.
    ii. The duty will not exceed nine (9) hours, irrespective of the sectors flown.
    iii. At the finish of such a series of duties, Operating Crew Members will have a minimum of sixty-three (63) hours free of all duties.
  (4) Any duties scheduled to be conducted within any part of the period 0200 to 0459 hours local time, for a minimum of two (2) and a maximum of three (3) consecutive nights, then Operating Crew Members shall finish the duty preceding this series of duties by 2100 hours local time before covering the block of consecutive night duties. (This allows Operating Crew Members a rest period during a local night).
  (5) ***Alternative:*** Operators may replace the above paragraph (a) with one of the following choices:
    A. Either Options A and B **OR** Options B and C.
      i. The operator may roster Operating Crew Members for either two (2) or three (3) consecutive nights, but must ensure that the duty preceding this series of duties finishes by 2359 hours local time (2 nights) or 2100 hours local time (3 nights) as appropriate. ii. If it is preferred to retain the present contents, then attention must be paid to the notes attached to the Options listed (below).

ii. These notes list the actions to be followed in the event that duty is inadvertently extended beyond the cut-off times (i.e. 2100 or 2359 hours).

Option A – 3 consecutive night duties

Should any duties be scheduled to be carried out within any part of the period 0200 and 0459-hours local time, for three (3) consecutive nights, then crew members will finish the duty preceding this series of duties by 2100 hours local time before commencing the block of consecutive night duties, such that the Operating Crew Members can take a rest period during a local night. If the duty immediately prior to the three (3) consecutive night duties extends beyond 2100 hours local time and the individual Operating Crew Member is willing to continue with the planned roster, [i.e. three (3) consecutive night duties] then provided that duty preceding this series of duties finishes no later than 2359 hours local time, the schedule may continue.

Note 1: *Under this Option, if the operating Crew member chooses not to continue the planned roster (after finishing duty between 2100 and 2359 hours local time) then only the planned first and second night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.*

Note 2: *Under this Option, if the duty finishes after 2359 hours local time, then only the first of the three (3) consecutive night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.*

Option B – 2 consecutive night duties

Should any duties be scheduled to be carried out within any part of the period 0200 and 0459 hours local time, for two (2) consecutive nights, then Operating Crew Members will finish the duty preceding this series of duties by 2359 hours local time before commencing the block of two (2) consecutive night duties, such that the crew members can avail a rest period during a local night.

Note: Under this Option in the event of 2359 hours being exceeded, then only the first of the two (2) planned consecutive night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.

Option C - 3 consecutive night duties

Should any duties be scheduled to be carried out within any part of the period 0200 and 0459 hours local time, for three (3) consecutive nights, then crew members will finish the duty preceding this series of duties by 2100 hours local time before commencing the block of consecutive night duties, such that the crew members can avail a rest period during a local night.

Note 1: *Under this Option in the event of 2100 hours being exceeded, then only the first of the three (3) planned consecutive night duties that impinge on any part of the period 0200 to 0459 hours local time may be undertaken.*

Note 2: *In all cases the limits in paragraphs 2.1(i) and 2.1(ii) must not be exceeded [i.e. maximum of three (3) consecutive nights and four (4) in seven (7) consecutive days].*

2.1. However, Operating Crew Members who are employed on a regular night duty for a maximum of five (5) consecutive nights will work to the following:

i. The minimum rest period before the start of such a series of duties will be twenty-four (24) hours.
ii. The duty will not exceed eight (8) hours, irrespective of the sectors flown.
iii. At the finish of such a series of duties crew members will have a minimum of fifty-four (54) hours free of all duties.

2.1.1. Options for night operations

If an operator elects to roster four (4) or five (5) consecutive night duties, then the criteria laid down in paragraph 2.1 must be complied with and must form part of the approved FTL scheme. Operators are reminded that the normal days off requirements must be met (i.e. the fifty-four

(54) hours off between two blocks of five (5) nights is only one (1) proper day off).

However, if operators find that this part of the Scheme is too restrictive then one of the following options may be employed but, if used, must be fully complied with:

i. When crew are employed on duty for a total of twenty (20) hours or less during five (5) consecutive night duties, (i.e. maximum duty each night is four (4) hours) the fifty-four (54) hours free from all duties will meet the "Days Off" requirements for each twenty-eight (28) consecutive day period. Any positioning flights must be completed within the twenty (20) hours' duty.

ii. When crew are employed on duty for a total of more than twenty (20) hours but not more than forty (40) hours during five (5) consecutive night duties, the first fifty-four(54) hours (between week 1 and week 2) may be counted as two (2) "Days Off". For the twenty-eight (28) consecutive day period that starts on the first night of the first duty, crew must be given a minimum of a further five (5) "Days Off" (average of a further six (6) days). Any positioning flights must be completed within the forty (40) hours' duty.

iii. When crew are employed on duty which requires full use of forty (40) hours' duty during five (5) consecutive night duties plus a maximum of three (3) hours positioning (pre- and post-total) then:

A. Allowable flying hours (month and year) will be reduced to the following:

1) a maximum of seventy-five (75) hours in any twenty-eight (28) consecutive days with a maximum of sixty (60) hours in twenty-eight (28) consecutive days averaged over three (3) twenty-eight (28) day periods, and;
2) 600 hours in any twelve (12) consecutive months.
3) a minimum of nine (9) "Days Off" in any twenty-eight (28) consecutive days will be granted;
4) any increase in duty over forty (40) hours during the block of five (5) consecutive night duties is to be added to the subsequent fifty-four (54) hours rest period which may not be reduced.

2.1.2. General rules

(a) To be applied when an operator utilises (i), (ii) or (iii) of paragraph 2.1.1 above

i. The exercise of "Commander's Discretion" is limited to one (1) hour per night with a total of two (2) hours allowed during any five (5) consecutive night cycle. Any duty worked in excess of forty (40) hours by use of "Commander's Discretion" must also be added to the subsequent fifty-four (54) hours rest which may not be reduced.

ii. The absolute maximum duty permitted during a block of five (5) consecutive night duties is forty-five (45) hours (40 hours, plus 3 hours positioning, plus 2 hours "Commander's Discretion", as per paragraphs 2.1.1 (iii) and 2.1.2 (i) above).

iii. Crew cannot be rostered for more than eight (8) hours per night, except when working to paragraph 2.1.1 (iii) above.

iv. Combination of split duties and extension of FDP by in-flight rest are not permitted.

v. "Commander's Discretion" to reduce rest is not permitted.

Note: *For five (5) consecutive earlies, the same rule as in 2.1.2 (i) above applies (i.e. maximum 1 hour discretion per day and a total of 2 hours in the 5 day cycle).*

(b) **Air Taxi/Sole Use Charter - Interrupted Rest**

(1) If, prior to the start of an FDP, a crew member's rest period is interrupted for operational reasons between 2300 and 0700 hours local time, the following shall apply:

i. If the disturbance happens earlier than one (1) hour before the planned departure from the crew member's place of rest, the time elapsed between that disturbance and the departure time from the place of rest minus one (1) hour, shall count as part of the subsequent FDP.

Note: *The phrase "operational reasons" applies to such actions as contacting the customer, checking weather, liaison with ATC or any action pertaining to the planned flight. It is anticipated that operators with a twenty-four (24) hour support organisation will provide these services for crew, leaving their crew members undisturbed.*

(2) Extension of Flying duty period by In-flight relief

i. When any additional Operating Crew Member is carried to provide in-flight relief with the intent of extending an FDP, that individual shall hold qualifications which are equal or superior to those held by the crew member who is to be rested. To take advantage of this facility the division of duty and rest between crew members must be kept in balance. It is unnecessary for the relieving crew member to rest in between the times relief is provided for other crew members.

ii. When in-flight relief is utilized, there must be for the crew members resting, a comfortable reclining seat provided with foot, legs and arm rests, or a crew rest compartment with a bunk or equivalent flat-bed first or business class seat, separated by at least a side seat (where possible) from any passenger and screened from the flight deck,

iii. As a contingency procedure in case of unforeseen circumstances that make the accepted in-flight rest facility unserviceable, an equivalent rest facility according the configuration/layout of the passenger cabin has to be assigned to the affected crew member.

Note: *The Authority, on individual operator application, will accept an exception for the minimum condition in-flight rest facilities for cabin crew, on listed aircrafts without certified Crew Rest Compartment, if;*

(1) Reserved seats for resting are located in an exclusive row for cabin crew, without any passenger seated, and seats should be able to be reclined.

(2) The row location has to be notified to the Authority and subject to its acceptance.

iv. A total in-flight rest of less than three (3) hours does not allow for the extension of an FDP, but where the total in-flight rest, which need not be consecutive, is three (3) hours or more, then the permitted FDP may be extended as follows:

- If rest is taken in a bunk or equivalent flatbed seat: A period equal to one half of the total rest taken, provided that the maximum FDP permissible shall be eighteen (18) hours or nineteen (19) hours in the case of Cabin Crew Member
- If rest is taken in a seat: A period equal to one third of the total rest taken, provided that the maximum FDP permissible shall be fifteen (15) hours or sixteen (16) hours in the case of Cabin Crew Member.

(c) ***Split duty*** (Also see AMC-6 & 7 for CAR OPS-1.1165)

(1) When an FDP consists of two or more sectors/duties, of which one can be a positioning journey counted as a sector, but separated by less than a minimum rest period, then the FDP may be extended beyond that permitted by the amounts indicated below:

Consecutive Hours Rest	Maximum Extension of FDP
Less than 3 hours	NIL
3 to 10 hours	A period equal to half of the consecutive hours taken.

(2) The rest period shall not include the time allowed for immediate post-flight duties and pre-flight duties, a minimum total of thirty (30) minutes. The actual time allowed for immediate post-flight duties and pre-flight duties shall be specified by the operator in

its Operations Manual (OM). When the rest period is six (6) hours or less it will suffice if a quiet and comfortable place, not open to the public, if provided with a comfortable reclining seat (reclining more than forty [40] degrees and provide foot and leg rest), or bunk are available. If the rest period is more than six (6) consecutive hours, then suitable accommodation must be provided.

(3) When rest is taken in the aircraft on the ground,
  i. In-flight rest facilities acceptable standards are applicable, and
  ii. Minimum standards of noise, temperature, light and ventilation are to be specified in the Operations Manual. Such arrangements will only be permitted when the Operating Crew have adequate control of the temperature and ventilation within the aircraft, and passengers are not on board.

(d) ***Rest period*** (Also see GM-6, 7, 8, & 9 to CAR OPS-1.1165(d))

(1) The aircraft operator must notify all crew members in good time of a flying duty period so that sufficient and uninterrupted pre-flight rest can be obtained. When away from base the operator must provide the crew with the opportunity and the facilities for adequate pre-flight rest. The operator must provide suitable accommodation. When flights are carried out at such short notice that it is impracticable for an operator to arrange suitable accommodation, then this responsibility devolves to the aircraft commander.

(2) The minimum rest period which must be provided before undertaking a flying duty period shall be:
  i. at least as long as the preceding duty period; or
  ii. twelve (12) hours;
  iii. whichever is the greater.

(3) When away from base, in the case when the rest period earned by a crew member is twelve (12) hours, and suitable accommodation is provided by the operator, then that rest period may be reduced by one (1) hour. In such circumstances, if the travelling time between the aerodrome and the accommodation is more than thirty (30) minutes each way then the rest period must be increased by the amount the total time spent travelling exceeding one hour. The room allocated to the crew member must be available for occupation for a minimum of ten (10) hours. This sub-paragraph does not apply to rest periods that exceed twelve (12) hours.

(4) Exceptionally at home base, individual crew members may be asked to exercise their discretion to reduce rest by up to a maximum of one (1) hour but only to a minimum of twelve (12) hours for flight crew and eleven (11) hours for cabin crew. If discretion is used, it is the responsibility of the operator and the crew member to inform the commander of the flight immediately following the rest period, that a reduced rest period has been taken.

(5) If the preceding duty period, which includes any time spent on positioning, exceeded eighteen (18) hours, then the ensuing rest period must include a local night.

(6) The rest period following a sequence of reduced rest and then an extended FDP, cannot be reduced.

(7) After being called out from a standby duty the length of minimum rest shall be determined by the length of standby duty, plus any time spent on positioning, and any FDP completed.

(8) Crew members who inform an operator that they are having difficulty in achieving adequate pre-flight rest must be given the opportunity to consult an aviation medical specialist.

(e) ***Aircraft commander's discretion to extend a flying duty period.***

(See Appendices A and B of this Subpart)

(1) An aircraft commander may, at his discretion, and after taking note of the circumstances of other members of the crew, extend an FDP beyond that permitted in

paragraph (j), provided he is satisfied that the flight can be made safely. The extension shall be calculated according to what actually happens, not on what was planned to happen. An extension of three (3) hours is the maximum permitted, except in cases of emergency;

Note: In respect of an extension of a flying duty period, an emergency is a situation which in the judgement of the commander presents a serious risk to the health or safety of crew and passengers, or endangers the lives of others (includes security reasons). Discretion reports may be used by the Authority to assess the realism of particular schedules.

(2) The operator's scheme shall include guidance to aircraft commanders on the limits within which discretion may be exercised, and shall include specific limits to which a commander may extend the flying duty period. In a Flying Duty Period involving two (2) or more sectors up to a maximum of two (2) hours discretion may be exercised prior to the first and subsequent sectors. On a single sector flight and immediately prior to the last sector on a multi-sector flight, a commander may utilise the full amount of discretion authorised by the operator.

(3) A commander may exercise discretion to extend an FDP following a reduced rest period, only exceptionally, and then only to the extent necessary to allow for unforeseen circumstances that become apparent during the last sector.

(4) Whenever a commander extends an FDP, it shall be reported to the Operator on a Discretion Report Form, in a format acceptable to the Authority. If the extension is greater than two (2) hours, or when exercised after any reduced rest period, then the operator shall submit the commander's written report, together with the operator's comments to the Authority, within fourteen (14) days of the aircraft's return to base.

(f) ***Mixed duties***

(1) When a crew member is required to report for duty in advance of the stipulated report time for a scheduled flight, to carry out a task at the behalf of the company, then the time spent on that task shall be part of the subsequent FDP.

(2) *Mixed Simulator and Aircraft Flying*
When a Flight Crew Member flies in the simulator, either on a check or training flight, or as a Training Captain or Instructor, and then within the same Duty Period flies as a Flight Crew Member on a scheduled commercial transport flight, all the time spent in the simulator is counted in full towards the subsequent FDP. Simulator flying does not count as a sector, but the FDP allowable is calculated from the report time of the simulator detail.

(g) ***Travelling Time***

(1) Travelling time, other than that time spent on positioning, does not count as duty.

(2) When crew members are required to travel from their home to an aerodrome other than the one from which they normally operate, any travelling time over and above the journey time from home to the usual operating aerodrome shall be classed as positioning. Notional times for any additional travelling shall be agreed between the operator and the Authority.

(h) ***Positioning***

(1) All Operating crew member’s time spent positioning time for company operations shall count as Duty Time, but positioning does not count as a sector when calculating the FDP. In these circumstances the FDP commences not later than the time at which the Operating Crew Member reports for the positioning journey, or positions in accordance with paragraph (g)(2) above.

(2) If, after a Positioning journey, the Operating Crew Member spends less than a minimum rest period at suitable accommodation provided by the company, and then carries out an FDP, the positioning will be counted as a sector if a split duty is claimed when calculating the allowable FDP. If it is not, a split duty FDP will not be used.

(i) ***Delayed Reporting Time in a Single FDP***

(1) When an Operating Crew Member is informed of a delay to the reporting time due to a changed schedule, before leaving the place of rest, the FDP shall be calculated as follow:

i. When the delay is less than four (4) hours, the maximum FDP allowed shall be based on the original report time and the FDP shall start at the actual report time;

ii. Where the delay is four (4) hours or more, the maximum FDP shall be based on the more limiting time band of the planned and the actual report time and the FDP starts four (4) hours after the original report time.

(2) When an operator informs a crew member before leaving the place of rest of a delay in reporting time of ten (10) hours or more ahead, and that crew member is not further disturbed by the operator until a mutually agreed hour, then that elapsed time is classed as a rest period. If, upon the resumption of duty, further delays occur, then the appropriate criteria in this paragraph and paragraph (1) above shall be applied to the rearranged reporting time.

(j) ***Maximum FDP***

(1) An operator shall specify standard reporting times that realistically reflect the time for safety related ground duties as approved by the Authority. Pre-flight duties are part of the FDP; a minimum of thirty (30) minutes duty will be allowed for post-flight activities. The time spent between reporting for a flight and the completion of post-flight tasks determines the length of the subsequent rest period.
If this "period" for post FDP duties is routinely exceeded, then the post FDP duty period stated in the scheme must be revised to better represent the actual time taken.

(2) A non-standard reporting time designed to take advantage of an increased FDP from a more favourable time band, must not be used.

(3) Table A applies when the FDP starts at a place where the crew member is acclimatised; Table B applies at other times:

<u>Table A – Two or more Flight Crew- Acclimatised</u>

Local Time of Start	Sectors							
	1	2	3	4	5	6	7	8 or more
06:00-07:59	13	12¼	11½	10¾	10	09½	09	09
08:00-12:59	14	13¼	12½	11¾	11	10½	10	09½
13:00-17:59	13	12¼	11½	10¾	10	09½	09	09
18:00-21:59	12	11¼	10½	09¾	09	09	09	09
22:00-05:59	11	10¼	09½	09	09	09	09	09

Table B – Two or more Flight Crew - Not Acclimatised

Length of preceding rest (hours)	Sectors						
	1	2	3	4	5	6	7 or more
Up to 18 or over 30	13	12¼	11½	10¾	10	09¼	09
Between 18 and 30	11½	11	10½	09¾	09	09	09

Note: The practice of inserting a short duty into a rest period of between 18 and 30 hours. In order to produce a rest period of less than 18 hours, thereby taking advantage of the longer FDP contained in Table B, is not permitted.

(k) ***Limits on Two Flight Crew when schedule Flight Time is more than Seven (7) hours (not***

applicable to Cabin Crew)

When an aeroplane flight crew is only two pilots, the allowable FDP shall be calculated as follows. A sector scheduled for more than seven (7) hours is considered as a multi-sector flight, as below:

Table C – Two or more Flight Crew - Flight Time greater than 7Hrs

Scheduled Sector Length / Times	Acclimatized	Not Acclimatized
Sector Length over 7 hours but not more than 9 hours	2 sectors	4 sectors
Sector Length over 9 hours but not more than 11 hours	3 sectors	4 sectors
Sector Length over 11 hours	4 sectors	Not applicable

i. The appropriate Table (A or B) is then entered with the start time of the duty period and the ‘factored’ number of sectors, to determine the allowable FDP.
ii. When an additional, current, type rated pilot is an Operating Crew Member, then these limits do not apply and the permissible FDP is determined by entering Table A or B with time of start and the actual sectors planned.

CAR OPS-1.1170 Standby and duties at the airport

(See AMC-1, 2, 3, 4 & 5 for CAR OPS-1.1170)

If an operator assigns crew members to standby or to any duty at the airport, the following shall apply in accordance with the certification specifications applicable to the type of operation:

(a) Standby and any duty at the airport shall be in the roster and the start and end time of standby shall be defined and notified in advance to the crew members concerned to provide them with the opportunity to plan adequate rest;
(b) A crew member is considered on airport standby from reporting at the reporting point until the end of the notified airport standby period; (See AMC-3 & 4 OPS-1.1170(b))
(c) Airport standby shall count in full as duty period for the purpose of CAR OPS-1.1165;
(d) Any duty at the airport shall count in full as duty period and the FDP shall count in full from the airport duty reporting time;
(e) The operator shall provide accommodation to the crew member on airport standby which shall include the following:
  (1) The resting area at the airport shall be separated from the operational area of crew activities by a sound-proof door;
  (2) Suitable secure baggage storage facilities shall be provided within this rest area;
  (3) Suitable seating that allows to recline more than 45° back angle to the vertical; and provides leg and foot support;
  (4) It is separated from other seating by at least a curtain to provide darkness and some sound mitigation, and is reasonably free from disturbance by other crew members.
(f) Flight time specification schemes shall specify the following elements:
  (1) the maximum duration of any standby; and
  (2) the impact of the time spent on standby on the maximum FDP that may be assigned, taking into account facilities provided to the crew member to rest, and other relevant factors such as:
    i. the need for immediate readiness of the crew member,
    ii. the interference of standby with sleep, and
    iii. sufficient notification to protect a sleep opportunity between the call for duty and the assigned FDP;
  (3) the minimum rest period following standby which does not lead to assignment of an FDP;
  (4) how time spent on standby other than airport standby shall be counted for the purpose

of cumulative duty periods.

CAR OPS-1.1175 Reserve duty

(See AMC-1 to 5 & GM-1 for CAR OPS-1.1175)

If an operator assigns crew members to reserve duty, the following requirements shall apply in accordance with the certification specifications applicable to the type of operation:

(a) Reserve duty shall be in the roster;

(b) Flight time specification schemes shall specify the following elements:

  (1) the maximum duration of any single reserve duty period;

  (2) the number of consecutive reserve duty days that may be assigned to a crew member.

(c) Reserve duty accommodation shall be approved by the Authority.

CAR OPS-1.1180 Nutrition

(See AMC-1 to CAR OPS-1.1180)

(a) During the FDP there shall be the opportunity for a meal and drink in order to avoid any detriment to a crew member's performance, especially when the FDP exceeds six (6) hours.

(b) An operator shall specify in its operations manual how the crew member's nutrition during FDP is ensured.

CAR-OPS 1.1185 Cabin crew requirements

The limitations, which shall be applied to cabin crew, are those applicable to flight crew members, but with the following differences:

(a) An FDP can be one (1) hour longer than that permitted for flight crew. The FDP and limits set on early starts for cabin crew shall be based on the time at which the flight crew report for their FDP. Cabin crew FDP shall start at the report time of the Cabin Crew

(b) The minimum rest period which will be provided before undertaking a flying duty period shall be:

  (1) at least as long as the preceding duty period less one (1) hour; or

  (2) eleven (11) hours; whichever is the greater.

(c) The combined sum of standby time and subsequent FDP can be one (1) hour longer than that permitted for flight crew.

(d) The maximum duty hours for cabin crew shall not exceed

  (1) Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays;

  (2) One hundred and five (105) hours in any fourteen (14) consecutive days; and

  (3) Two hundred and ten (210) hours in any twenty-eight (28) consecutive days.

(e) No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;

  (1) during the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred (100) Block Hours; or

  (2) during the period of twelve (12) consecutive months expiring at the end of the previous month exceeds one thousand (1000) Block hours.

(f) Notwithstanding (d) and (e), the following shall be considered:

  (1) For crews that exclusively operate short and medium haul routes;
  No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;

    i. during the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred and twenty (120) Block Hours or during the period of twelve months (12) expiring at the end of the previous month exceeds one thousand and two hundred (1200) Block hours.
    The Cabin crew members who fly above one hundred (100) block hours in twenty-

eight (28) consecutive days and/or one thousand (1000) block hours in twelve (12) consecutive months shall fulfill the following conditions:

A. Minimum of eight (8) days-off in any twenty-eight (28) consecutive days
B. A total of twenty-six (26) days-off in any eighty-four (84) consecutive day period
C. A total of one hundred & four (104) days off in any consecutive twelve (12) month period excluding annual leave entitlement.

ii. The maximum Duty Hours for Cabin Crew members shall not exceed;

A. Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays,
B. 105 hours in any fourteen (14) consecutive days,
C. 200 hours in any twenty-eight (28) consecutive days; and
D. 600 hours in any eighty-four (84) consecutive days.

(2) For crews that operate long hauls or mixed long, medium and short haul routes:

i. Subset 1:

No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;

A. During the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred and fifteen (115) Block Hours or during the period of twelve (12) months expiring at the end of the previous month exceeds one thousand and two hundred (1200) Block hours
B. The Cabin crew members who fly above one hundred (100) block hours in twenty-eight (28) consecutive days and/or one thousand (1000) block hours in twelve (12) consecutive months shall fulfill the following conditions:
   - Minimum of eight (8) days-off in any twenty-eight (28) consecutive days;
   - A total of twenty-six (26) days-off in any consecutive eighty-four (84) day period (if two or more fourteen (14) consecutive day periods exceeds one hundred (100) block hours each one;
   - A total of ninety-four (94) days off in any consecutive twelve (12) month period excluding annual leave entitlement.
C. The maximum Duty Hours for Cabin Crew members shall not exceed;
   - Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays,
   - 115 hours in any fourteen (14) consecutive days;
   - 200 hours in any twenty-eight (28) consecutive days; and
   - 555 hours in any eighty-four (84) consecutive days.

ii. Subset 2

No Cabin Crew Member shall act as an Operating Crew Member of an aircraft if at the beginning of the flight the aggregate of all his/her previous flight times;

A. During the period of twenty-eight (28) consecutive days expiring at the end of the day on which the flight begins exceeds one hundred and twenty (120) Block Hours or during the period of twelve months (12) expiring at the end of the previous month exceeds one thousand and two hundred (1200) Block hours.
B. The Cabin crew members who fly above one hundred (100) block hours in twenty-eight (28) consecutive days and/or one thousand (1000) block hours in twelve (12) consecutive months shall fulfil the following

conditions:

- Minimum of eight (8) days-off in any twenty-eight (28) consecutive days
- A total of twenty-six (26) days-off in any eighty-four (84) consecutive day period (if two or more twenty-eight (28) consecutive day periods exceeds one hundred (100) block hours each one;
- A total of one hundred (100) days off in any consecutive twelve (12) month period excluding annual leave entitlement.

C. The maximum Duty Hours for Cabin Crew members shall not exceed;

- Sixty (60) hours in any seven (7) consecutive days, but may be increased to sixty-five (65) hours, when a rostered duty covering a series of duty periods, once commenced, is subject to unforeseen delays,
- 115 hours in any fourteen (14) consecutive days;
- 200 hours in any twenty-eight (28) consecutive days; and
- 600 hours in any eighty-four (84) consecutive days.

CAR OPS-1.1190 Reporting time

Each operator shall specify reporting times that realistically reflect the time required for pre-flight duties of not less than sixty (60) minutes prior to the beginning of the planned block time unless otherwise approved by the Authority.

CAR OPS-1.1195 Records to be maintained

(See Appendix 1 to CAR-OPS 1.1065)

(a) An operator shall maintain records for all its flight and cabin crew members of flight time, flight duty periods, duty periods, and rest periods for at least fifteen (15) months from the date of the last relevant entry. These records shall include;
    (1) For each crew member: The beginning, end and duration of each duty or FDP, and function performed during the period. In addition;
        i. Duration of each rest period prior to a FDP or standby duty period, and
        ii. Dates of days off, and
        iii. Seven (7) Consecutive day totals of duty
        iv. Fourteen (14) consecutive day totals of duty
        v. Twenty-eight (28) consecutive day totals of duty
        vi. The twelve (12) consecutive month totals of duty
        vii. Twenty-eight (28) day and twelve (12) consecutive months Block Hour durations
    (2) For each flight crew member:
        i. Daily and seven (7) consecutive day period flying hours, in addition to (a)(1) above.
    (3) In case of augmented crew and in-flight rest is performed:
        i. For the aircraft Commander, the beginning, end and duration of each Block Time.
        ii. For all other Flight Crew Members, the beginning, end and the duration of each Block Time expressed, as the time at the controls as an Operating Crew Member.
        iii. For cabin crew, beginning, end and the duration of each Block Time expressed as the time on service as Operating Crew member.
(b) Additionally, operators shall retain all aircraft commander's discretion reports of extended FDPs, extended flying hours, and reduced rest periods for a period of at least 6 months after the event.
(c) Records referred to in point CAR OPS 1.085(a), (b), (c), and (d) in relation to crew members who undertake duties for more than one operator, shall be kept for a period of twenty-four (24) months in accordance with sub-paragraphs (a)(1) and (2).

SECTION 3 – SUBPART Q – GM/AMC – COMMERCIAL AIR TRANSPORT

GM-1 OPS-1.1100 Definitions

ACCLIMATISED

(a) A crew member remains acclimatised to the local time of his or her reference time during 47 hours 59 minutes after reporting no matter how many time zones he has crossed.

(b) The maximum daily FDP for acclimatised crew members is determined by using table A of CAR OPS-1.1165(j)(1) with the reference time of the point of departure. As soon as forty- eight (48) hours have elapsed, the state of acclimatisation is derived from the time elapsed since reporting at reference time and the number of time zones crossed.

(c) A crew member is considered to be in an unknown state of acclimatisation after the first 48 hours of the rotation have elapsed unless he remains in the first arrival destination time zone (either for rest or any duties) in accordance with Table A in CAR OPS-1.1165.

(d) Should a crew member's rotation include additional duties that end in a different time zone than his or her first arrival destination's time zone while he is considered to be in an unknown state of acclimatisation, then the crew member remains in an unknown state of acclimatisation until he or she:

  (1) has taken the rest period required at home base;
  (2) has taken the rest period required at the new location; or
  (3) has been undertaking duties starting at and returning to the time zone of the new location until he or she becomes acclimatised in accordance with the values in Table A of CAR OPS-1.1165.

(e) To determine the state of acclimatisation, the two following criteria should be applied:

  (1) the greater of the time differences between the time zone where he or her was last acclimatised or the local time of his or her last departure point and the new location; and
  (2) the time elapsed since reporting at home base for the first time during the rotation.

GM-2 OPS-1.1100 Definitions

ACCLIMATISED 'POINT OF DEPARTURE'

The point of departure refers to the reporting point for a flight duty period or positioning duty after a rest period.

GM-3 OPS-1.1100 Definitions

Table 1: ACCLIMATISED 'TIME ELAPSED SINCE REPORTING AT REFERENCE TIME'

The time elapsed since reporting at reference time for operations at home base refers to the time elapsed since reporting for the first time at home base for a rotation.

GM-4 OPS-1.1100 Definitions

ADEQUATE FURNITURE FOR 'ACCOMMODATION'

Adequate furniture for crew member accommodation should include a seat that reclines at least 45° back angle to the vertical, has a seat width of at least 20 inches (50cm) and provides leg and foot support.

GM-5 OPS-1.1100 Definitions

DETERMINATION OF DISRUPTIVE SCHEDULES

If a crew member is acclimatised to the local time at his/her home base, the local time at the home base should be used to consider an FDP as 'disruptive schedule'. This applies to operations within the 2-hour wide time zone surrounding the local time at the home base, if a crew member is acclimatised to the local time at his/her home base.

GM-6 OPS-1.1100 Definitions

ELEMENTS OF STANDBY FOR DUTY

CAR OPS 1.1170(c) and (d) determine which elements of standby count as duty.

GM-7 OPS-1.1100 Definitions

OPERATING CREW MEMBER

A person on board an aircraft is either a crew member or a passenger. If a crew member is not a passenger on board an aircraft he should be considered as 'carrying out duties'. The crew member remains an operating crew member during in-flight rest. In-flight rest counts in full as FDP, and for the purpose of CAR OPS-1.1160.

AMC-1 CAR OPS-1.1105 Operator responsibilities

SCHEDULING

(a) Scheduling has an important impact on a crew member's ability to sleep and to maintain a proper level of alertness. When developing a workable roster, the operator shall strike a fair balance between the commercial needs and the capacity of individual crew members to work effectively. Rosters shall be developed in such a way that they distribute the amount of work evenly among those that are involved.

(b) Schedules shall allow for flights to be completed within the maximum permitted flight duty period and flight rosters shall take into account the time needed for pre-flight duties, taxiing, the flight- and turnaround times. Other factors to be considered when planning duty periods shall include:
   (1) the allocation of work patterns which avoid undesirable practices such as alternating day/night duties, alternating eastward-westward or westward-eastward time zone transitions, positioning of crew members so that a serious disruption of established sleep/work patterns occur;
   (2) scheduling sufficient rest periods especially after long flights crossing many time zones; and
   (3) preparation of duty rosters sufficiently in advance with planning of recurrent extended recovery rest periods and notification of the crew members well in advance to plan adequate pre-duty rest.

AMC-2 OPS-1.1105(a) Operator responsibilities

PUBLICATION OF ROSTERS

Rosters shall be published fourteen (14) days in advance.

AMC-3 OPS-1.1105(j) Operator responsibilities

OPERATIONAL ROBUSTNESS OF ROSTERS

The operator should establish and monitor performance indicators for operational robustness of rosters.

GM-1 OPS-1.1105(j) Operator responsibilities

OPERATIONAL ROBUSTNESS OF ROSTERS

Performance indicators for operational robustness of rosters should support the operator in the assessment of the stability of its rostering system. Performance indicators for operational robustness of rosters should at least measure how often a rostered crew pairing for a duty period is achieved within the planned duration of that duty period. Crew pairing means rostered positioning and flights for crew members in one duty period.

GM-1 OPS-1.1115 Fatigue risk management systems (FRMS)

Further guidance on FRMS processes, appropriate fatigue management, the underlying scientific principles and operational knowledge may be found in ICAO Doc 9966 (Manual for the Oversight of Fatigue Management Approaches).

AMC-1 OPS-1.1115(b)(1) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS POLICY

(a) The operator's FRMS policy should identify all the elements of FRMS.
(b) The FRMS policy should define to which operations FRMS applies.
(c) The FRMS policy should:
   (1) reflect the shared responsibility of management, flight and cabin crew, and other involved personnel;
   (2) state the safety objectives of FRMS;
   (3) be signed by the accountable manager;
   (4) be communicated, with visible endorsement, to all the relevant areas and levels of the organisation;
   (5) declare management commitment to effective safety reporting;
   (6) declare management commitment to the provision of adequate resources for FRMS;
   (7) declare management commitment to continuous improvement of FRMS;
   (8) require that clear lines of accountability for management, flight and cabin crew, and all other involved personnel are identified; and
   (9) require periodic reviews to ensure it remains relevant and appropriate,

AMC-2 OPS-1.1115(b)(2) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS DOCUMENTATION

The operator should develop and keep current FRMS documentation that describes and records:
(1) FRMS policy and objectives;
(2) FRMS processes and procedures;
(3) accountabilities, responsibilities and authorities for these processes and procedures;
(4) mechanisms for on-going involvement of management, flight and cabin crew members, and all other involved personnel;
(5) FRMS training programmes, training requirements and attendance records;
(6) scheduled and actual flight times, duty periods and rest periods with deviations and reasons for deviations; and
(7) FRMS outputs including findings from collected data, recommendations, and actions taken.

GM-2 OPS-1.1115(b)(3) Fatigue risk management systems (FRMS)

SCIENTIFIC METHOD

'Scientific method' is defined as 'a method or procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses'.
A scientific study may be required as an element of proactive fatigue hazard identification. Such a study should be based on scientific principles, i.e. use the scientific method. That means that the study should consist of the following elements as applicable to each individual case:
(a) an introduction with a summary and the description of the study design, methods and results;
(b) a statement of the hypothesis being tested, how it is being tested and a conclusion as to

whether the hypothesis was found to be true or not;

(c) a description of the data collection method and tools, e.g. the sensitivity of the activity monitors, further information on any model and its limitations and how it is being used as part of the study;

(d) a description of how the study subjects were selected and how representative of the crew member population the study group is;

(e) a description of the rosters the study participants have worked containing data such as e.g. flight and duty hours, number of sectors, duty start/finish times;

(f) reports on mean sleep duration and efficiency and data for other standard measures (e.g. sleep timing, self-rated sleepiness/fatigue, sources of sleep disruption, performance, safety);

(g) a description of how sleep and the other measures varied across the roster (i.e. day-to-day) and where and why minimum sleep occurred;

(h) statistical data analysis to test the hypothesis; and

(i) the explanation of how the study results have been used to influence the design of the roster or other fatigue mitigations.

AMC-3 OPS-1.1115(b)(4) Fatigue risk management systems (FRMS)

CAT OPERATORS' IDENTIFICATION OF HAZARDS

The operator shall develop and maintain three documented processes for fatigue hazard identification:

(a) Predictive

The predictive process shall identify fatigue hazards by examining crew scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include, but are not limited to:

(1) operator or industry operational experience and data collected on similar types of operations;
(2) evidence-based scheduling practices; and
(3) bio-mathematical models.

(b) Proactive

The proactive process shall identify fatigue hazards within current flight operations. Methods of examination may include, but are not limited to:

(1) self-reporting of fatigue risks;
(2) crew fatigue surveys;
(3) relevant flight and cabin crew performance data;
(4) available safety databases and scientific studies; and
(5) analysis of planned versus actual time worked.

(c)Reactive

The reactive process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimised. At a minimum, the process may be triggered by any of the following:

(1) fatigue reports;
(2) confidential reports;
(3) audit reports;
(4) incidents; or
(5) flight data monitoring (FDM) events.

AMC-4 OPS-1.1115(b)(4) Fatigue risk management systems (FRMS)

CAT OPERATORS RISK ASSESSMENT

An operator shall develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation. The risk assessment procedures should review identified hazards and link them to:
(a) operational processes;
(b) their probability;
(c) possible consequences; and
(d) the effectiveness of existing safety barriers and controls.

AMC-5 OPS-1.1115(b)(5) Fatigue risk management systems (FRMS)

CAT OPERATORS RISK MITIGATION

An operator shall develop and implement risk mitigation procedures that:

(a) select the appropriate mitigation strategies;
(b) implement the mitigation strategies; and
(c) monitor the strategies' implementation and effectiveness.

AMC-6 OPS-1.1115(b)(6) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS SAFETY ASSURANCE PROCESSES

The operator shall develop and maintain FRMS safety assurance processes to:
(a) provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to:
    (1) hazard reporting and investigations;
    (2) audits and surveys; and
    (3) reviews and fatigue studies;
(b) provide a formal process for the management of change which shall include, but is not limited to:
    (1) identification of changes in the operational environment that may affect FRMS;
    (2) identification of changes within the organisation that may affect FRMS; and
    (3) consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and
(c) provide for the continuous improvement of FRMS. This shall include, but is not limited to:
    (1) the elimination and/or modification of risk controls have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;
    (2) routine evaluations of facilities, equipment, documentation and procedures; and
    (3) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

AMC-7 OPS-1.1115(b)(7) Fatigue risk management systems (FRMS)

CAT OPERATORS FRMS PROMOTION PROCESS

FRMS promotion processes shall support the on-going development of FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the operator as part of its FRMS:
(a) Training programmes shall ensure competency commensurate with the roles and responsibilities of management, flight and cabin crew, and all other involved personnel under the planned FRMS; and
(b) An effective FRMS communication plan that:
    (1) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and

(2) describes communication channels used to gather and disseminate FRMS-related information.

AMC-8 OPS 1.1115 Training Syllabus - Fatigue management training

TRAINING SYLLABUS FATIGUE MANAGEMENT TRAINING

(1) All personnel engaged in the provision FRMS training shall be approved by the Authority prior to conducting such training courses, seminars or briefings.
(2) The training syllabus shall contain the following:
   (a) Applicable regulatory requirements for flight, duty and rest;
   (b) The basics of fatigue including sleep fundamentals and the effects of disturbing the circadian rhythms;
   (c) The causes of fatigue, including medical conditions that may lead to fatigue;
   (d) The effect of fatigue on performance;
   (e) Fatigue countermeasures;
   (f) The influence of lifestyle, including nutrition, exercise, and family life, on fatigue;
   (g) Familiarity with sleep disorders and their possible treatments;
   (h) Where applicable, the effects of long-range operations and heavy short-range schedules on individuals;
   (i) The effect of operating through and within multiple time zones; and
   (j) The crew members' responsibility for ensuring adequate rest and fitness for flight duty.

AMC-9 to CAR OPS-1.1115(f) Commercial Air Transport Operations

(a) ***APPLICATION AND APPROVAL PROCESS –*** The application and approval process shall start with the submission of an operational plan by the operator including the following documentation:
   (1) FTL Variation scheme (sample to be discussed with Authority).
   (2) On-board crew rest scheme, including extended FDPs and delayed scenarios.
   (3) Risk assessment focuses on the crew members' ability to operate the aircraft or perform safety-related duties during the whole FDP.
   (4) A contingency plan for flights to Oman from outstations with Depleted Crew Complement.

(b) ***FTL VARITION SCHEME –*** The FTL VARITION SCHEME should consider the following:
   (1) Pre-flight Rostering Requirements – All crew members should be acclimatised prior to operating a flight or a standby when departing from home base.
   (2) A scheme should be established by the Operator to:
      i. provide guidance to the crew on the expected pre-flight preparations and in-flight rest period.
      ii. provide guidance to the crew on the minimum rest when away from base.
      iii. provide guidance to the crew on the minimum rest between consecutive flights.
      iv. determine the maximum number of pairings per calendar month.
      v. determine the requirement for replacement of crew due to flight disruptions at home base or away from base.
      vi. determine the crew compliment and composition.

AMC-10 to CAR OPS-1.1115(f) General Aviation and private operators

The General Aviation or the private operator sectors shall ensure that the following documents to be submitted:
(a) Two years historical data for Pilots & Cabin Crew in terms of their duty and flying hours.
(b) Two years historical data for Pilots & Cabin Crew days off.
(c) Two years historical data for Pilots & Cabin Crew un-flown days.
(d) Two years historical data for the aircraft hours as per the fleet.

(e) A Comparison table of the regulation and the proposed changes, reason for the change, reference from an international regulation if any.
(f) A Safety Case that includes a risk assessment to ensure a better or equivalent level of protection against fatigue than the basic requirements.
(g) An official request for the variation quoting full responsibility for the request.
(h) An appropriate monitoring, reliability and oversight mechanism is included.
(i) After the issuance of the FTL variation approval, will conduct an inflight FTL variation assessment or survey the crew members.
(j) The approval letter is valid for six months subject to variation assessment results and the crew feedback.

Note: Unless otherwise specified in this Subpart Q, the UK Civil Aviation Authority document, Civil Aviation Publication, ***CAP 371 or any other superseding publication may be used as additional guidance in the process*** *of assessment of operator schemes.*

GM to CAR OPS-1.1115(f) Applications and variations to FTL schemes

(a) The application and approval process sequentially are as follows:

(1) Submission of an operational plan by the operator including the Fatigue Risk Assessment. These will involve the following:
i. Authorization to commence trial by the Authority.
ii. Assessment by the Authority.

(2) Validation results and final approval by the Authority.

Note: The Authority will conduct an ongoing safety oversight which may include Validation Flights. The aim of this validation is to assess the implementation and effectiveness of the preventive and mitigating risk controls, as well to gather operational data and information relevant to the FTL variation standards adequacy.

(b) Such variations to the FTL should be designed in accordance with the operational experience of each operator, and procedures accepted by the Authority and taking into account other relevant factors such as current scientific knowledge, as well as including appropriate risk controls mechanisms. The following elements may be considered to develop a risk assessment:

(1) ***Scientific and Technical considerations:*** AOC holders should consider general scheduling principles based on fatigue science, at the time of planning, issuance, amendment and analysis of crew rosters. Below are included some of those principles:
i. The perfect schedule for the human body is daytime duties with unrestricted sleep at night. Anything else is a compromise.
ii. The circadian body clock does not adapt fully to altered schedules such as night work. It does adapt progressively to a new time zone, but full adaptation usually takes longer than the 24-48 hours of most layovers.
iii. Whenever a duty period overlaps a crewmember's usual sleep time, it can be expected to restrict sleep. Examples include early duty start times, late duty end times, and night work.
iv. The more that a duty period overlaps a crewmember's usual sleep time, the less sleep the crewmember is likely to obtain. Working right through the usual night time sleep period is the worst-case scenario.
v. Night duty also requires working through the time in the circadian body clock cycle when self-rated fatigue and mood are worst and additional effort is required to maintain alertness and performance.
vi. Across consecutive duties with restricted sleep, crewmembers will accumulate a sleep debt and fatigue-related impairment will increase.
vii. Sufficient rest periods to recover from sleep debt considering length and frequency of the rest periods.

(2) ***Safety Case:*** For each AOC holder intending to apply for a FTL variation, a "safety case" for risk assessment is set on the basis of the assessment that demonstrate an acceptable level of alertness of the crew during the whole FDP, as well unforeseen circumstances for extended FDP scenarios considered in the variation limits (unforeseen circumstances may be based on their in-service experiences and likely scenarios). Therefore, the related provided facilities should have been assessed and monitoring:

i. Inflight rest facilities, as CRC or alternatives one in case of unforeseen circumstances.
ii. Suitable accommodation during layover.

(3) ***Select and implement preventive and mitigating controls:*** The following controls and mitigations are to be considered:

i. The aircraft chosen for the route has the best available on-board crew rest facilities.
ii. All crewmembers flying the new operation receive specific education on personal and organizational strategies for managing fatigue on the operation. This includes discussion on how to make best use of in-flight and layover sleep opportunities.
iii. Sufficient flight crew to ensure that a single captain does not have sole command responsibility for entire flight. iv. There is a clear policy on the distribution of inflight rest opportunities, so that crewmembers can plan how best to use them.
v. Each crewmember has sufficient rest opportunities in flight.
vi. Meals may be taken by the flight crew on the flight deck, in order to maximize the amount of time for sleep during in-flight rest periods.
vii. The layover hotel has been carefully vetted to ensure that it provides adequate facilities for sleep, eating, and exercise.
viii. A procedure is implemented between the Operator and the layover hotel to provide notification of delays without having to wake crewmembers. ix. There are clear procedures on the management of flight delays.
x. There are clear procedures on the management of flight diversions.

(4) The following common parameters are to be considered in the application for variation for singular or cluster of routes:

i. Time zone
ii. Departure time windows
iii. FDP extensions
iv. Operational complexity
v. Crew composition
vi. Rest type facility

GM-1 OPS-1.1150 Home base

TRAVELLING TIME

Crew members should consider making arrangements for temporary accommodation closer to their home base if the travelling time from their residence to their home base usually exceeds ninety (90) minutes.

AMC-1 to OPS-1.1162(d) FTL Variation for Air Carriers

APPLICATION AND APPROVAL PROCESS

(1) The application and approval process shall start with the submission of an operational plan by the operator including the following documentation:

(a) FTL Variation scheme (sample to be discussed with CAA)
(b) On-board crew rest scheme, including extended FDPs and delayed scenarios
(c) Risk assessment focuses on the crew members' ability to operate the aircraft or perform safety-related duties during the whole FDP.
(d) A contingency plan for flights to Oman from an outstation with a "Depleted Crew Complement FTL Variation Scheme".

(2) The FTL Variation Scheme shall consider the following:
(a) Pre-flight Rostering Requirements:
i. All crew members shall be acclimatised prior to operating a flight or a standby when departing from home base.
(b) A scheme shall be established by the Operator that:
i. provides guidance to the crew on the expected pre-flight preparations and in flight rest period.
ii. provides guidance to the crew on the minimum rest when away from base.
iii. provides guidance to the crew on the minimum rest between consecutive flights.
iv. determines the maximum number of pairings per calendar month.
v. determines the requirement for replacement of crew due to flight disruptions at home base or away from base.
vi. determines the crew complement and composition.

AMC-2 to OPS-1.1162(d) FTL Variation for Non-Scheduled and Private Operators

(1) The non-scheduled or the private operator shall ensure that the following documents are submitted:
(a) Two (2) years historical data for Pilots & Cabin Crew in terms of their duty and flying hours.
(b) Two (2) years historical data for Pilots & Cabin Crew days off.
(c) Two (2) years historical data for Pilots & Cabin Crew un-flown days.
(d) Two (2) years historical data for the aircraft hours as per the fleet.
(e) A Comparison table of the regulation and the proposed changes, reason for the change, reference from an international regulation if any.
(f) A Safety Case that includes a risk assessment to ensure a better or equivalent level of protection against fatigue than the basic requirements.
(g) An official request for the variation quoting full responsibility for the request.

(2) The initial approval shall be valid for six months and is subject to variation assessment results and crew feedback indicating that the safety objective contained in paragraph (f) is not jeopardized.
(3) An appropriate monitoring, reliability and oversight mechanism shall be included.
(4) After the issuance of the FTL variation approval, the operator shall conduct an inflight FTL variation assessment including a survey of the crew members.

Note: Unless otherwise specified in this Subpart Q, the UK Civil Aviation Authority, CAP 371 or any other superseding publication may be used as additional guidance in the process of assessment of the operator schemes.

GM to OPS-1.1162(d) Approval of FTL Variation by CAA:

The application and approval process sequentially are as follows:
(a) Submission of an operational plan by the operator including the Fatigue Risk Assessment. These will involve the following:
(1) Authorization to commence trial by the CAA.
(2) Assessment by the CAA.
(b) Validation results and final approval by the CAA.

Note: The CAA will conduct an ongoing safety oversight which may include Validation Flights.

The aim of this validation is to assess the implementation and effectiveness of the preventive and mitigating risk controls, as well to gather operational data and information relevant to the FTL variation standards adequacy.

Such variations to the FTL should be designed in accordance with the operational experience of each operator, and procedures accepted by the CAA and taking into account other relevant factors such as current scientific knowledge, as well as including appropriate risk control mechanisms. The following elements may be considered to develop a risk assessment:

(1) **Scientific and Technical considerations.**
AOC holders should consider general scheduling principles based on fatigue science, at the time of planning, issuance, amendment and analysis of crew rosters. Below are included some of those principles:

i. The perfect schedule for the human body is daytime duties with unrestricted sleep at night. Anything else is a compromise.
ii. The circadian body clock does not adapt fully to altered schedules such as night work. It does adapt progressively to a new time zone, but full adaptation usually takes longer than the 24-48 hours of most layovers.
iii. Whenever a duty period overlaps a crewmember's usual sleep time, it can be expected to restrict sleep. Examples include early duty start times, late duty end times, and night work.
iv. The more that a duty period overlaps a crewmember's usual sleep time, the less sleep the crewmember is likely to obtain. Working right through the usual night time sleep period is the worst-case scenario.
v. Night duty also requires working through the time in the circadian body clock cycle when self-rated fatigue and mood are worst and additional effort is required to maintain alertness and performance.
vi. Across consecutive duties with restricted sleep, crewmembers will accumulate a sleep debt and fatigue-related impairment will increase.
vii. Sufficient rest periods to recover from sleep debt considering length and frequency of the rest periods.

(2) **Safety Case.**
For each AOC holder intending to apply for a FTL variation, a "safety case" for risk assessment is set on the basis of the assessment that demonstrate an acceptable level of alertness of the crew during the whole FDP, as well as unforeseen circumstances for extended FDP scenarios considered in the variation limits (unforeseen circumstances may be based on their in-service experiences and likely scenarios). Therefore, the related provided facilities should be assessed and monitored:

i. Inflight rest facilities such as Crew Rest Container or alternatives in case of unforeseen circumstances.
ii. Suitable accommodation during layover.

(3) **Select and implement preventive and mitigating controls.**
Following controls and mitigations are considered:

i. The aircraft chosen for the route has the best available on-board crew rest facilities.
ii. All crewmembers flying the new operation receive specific education on personal and organizational strategies for managing fatigue on the operation. This includes discussion on how to make best use of in-flight and layover sleep opportunities.
iii. Sufficient flight crew to ensure that a single captain does not have sole command responsibility for the entire flight.
iv. There is a clear policy on the distribution of inflight rest opportunities, so that crewmembers can plan how best to use them.
v. Each crewmember has sufficient rest opportunities in flight.

vi. Meals may be taken by the flight crew on the flight deck, in order to maximize the amount of time for sleep during in-flight rest periods.
vii. The layover hotel has been carefully vetted to ensure that it provides adequate facilities for sleep, eating, and exercise.
viii. A procedure is implemented between the Operator and the layover hotel to provide notification of delays without having to wake crewmembers.
ix. There are clear procedures on the management of flight delays.
x. There are clear procedures on the management of flight diversions.

(4) The following common parameters are to be considered in the application for variation for singular or cluster of routes:
i. Time zone;
ii. Departure time windows;
iii. FDP extensions;
iv. Operational complexity;
v. Crew composition; and
vi. Rest type facility.

AMC-1 OPS-1.1165 Flight duty period (FDP)

(a) Night duties under the provisions of CAR OPS-1.1165 shall comply with the following:
(1) When establishing the maximum FDP for consecutive night duties, the number of sectors is limited to four (4) sectors per duty.
(2) The operator applies appropriate fatigue risk management to actively manage the fatiguing effect of night duties of more than ten (10) hours in relation to the surrounding duties and rest periods.

(b) Extension of FDP without in-flight rest:
(1) The extension of FDP without in-flight rest under the provisions of CAR OPS-1.1165 is limited to the values specified in CAR OPS-1.1165 (j) - *Maximum FDP*.

AMC-2 OPS-1.1165 Flight Duty Period (FDP)

IN-FLIGHT REST

(a) In-flight rest shall be taken during the cruise phase of the flight.
(b) In-flight rest periods shall be allocated in order to optimise the alertness of those flight crew members at control during landing.

AMC-3 OPS-1.1165 Flight Duty Period (FDP)

UNFORESEEN CIRCUMSTANCES IN ACTUAL FLIGHT OPERATIONS — COMMANDER'S DISCRETION

(a) As general guidance when developing a commander's discretion policy, the operator shall take into consideration the shared responsibility of management, flight and cabin crew in the case of unforeseen circumstances. The exercise of commander's discretion shall be considered exceptional and shall be avoided at home base and/or company hubs where standby or reserve crew members will be available. Operators will access on a regular basis the series of pairings where commander's discretion has been exercised in order to be aware of possible inconsistencies in their rostering.

(b) The operator's policy on commander's discretion shall state the safety objectives, especially in the case of an extended FDP or reduced rest and shall take due consideration of additional factors that may decrease a crew member's alertness levels, such as:
(1) WOCL encroachment;
(2) weather conditions;
(3) complexity of the operation and/or airport environment;
(4) aeroplane malfunctions or specifications;
(5) flight with training or supervisory duties;
(6) increased number of sectors;

(7) circadian disruption; and
(8) individual conditions of affected crew members (time since awake, sleep-related factor, workload, etc.).

AMC-4 CAR OPS-1.1165(c) Flight times and duty periods

POST-FLIGHT DUTIES

The operator shall specify post-flight duty times, taking into account the type of operation, the size and type of aircraft and the airport conditions.

AMC-5 OPS-1.1165(c) Split duty

The increase of limits on flight duty, under the provisions of CAR OPS-1.1165(c), complies with the following:

(a) The break on the ground within the FDP has a minimum duration of three (3) consecutive hours.
(b) The break excludes the time allowed for post and pre-flight duties and travelling. The minimum total time for post and pre-flight duties and travelling is thirty (30) minutes. The operator specifies the actual times in its operations manual.
(c) The maximum FDP specified in CAR OPS-1.1165 paragraph (c) shall not exceed 50 % of the break.
(d) Suitable accommodation is provided either for a break of six (6) hours or more or for a break that encroaches the window of circadian low (WOCL).
(e) In all other cases:
    (1) accommodation is provided; and
    (2) any time of the actual break exceeding six (6) hours or any time of the break that encroaches the WOCL does not count for the extension of the FDP.
(f) Split duty cannot be combined with in-flight rest.

AMC-6 OPS-1.1165(c)(2) Split duty

POST, PRE-FLIGHT DUTY AND TRAVELLING TIMES

The operator shall specify post and pre-flight duty and travelling times, taking into account aircraft type, type of operation and airport conditions.

GM-1 OPS-1.1165 Flight Duty Period (FDP)

REPORTING TIMES

The operator should specify reporting times taking into account the type of operation, the size and type of aircraft and the reporting airport conditions.

GM-2 OPS-1.1165 Flight duty period (FDP)

NIGHT DUTIES – APPROPRIATE FATIGUE RISK MANAGEMENT

(a) When rostering night duties of more than ten (10) hours (referred to below as 'long night duties'), it is critical for the crew member to obtain sufficient sleep before such duties when he is adapted to being awake during day time hours at the local time where he is acclimatised. To optimise alertness on long night duties, the likelihood of obtaining sleep as close as possible to the start of the FDP should be considered, when rostering rest periods before long night duties, by providing sufficient time to the crew member to adapt to being awake during the night. Rostering practices leading to extended wakefulness before reporting for such duties should be avoided. Fatigue risk management principles that could be applied to the rostering of long night duties may include:
    (1) avoiding long night duties after extended recovery rest periods
    (2) progressively delaying the rostered ending time of the FDPs preceding long night duties;

(3) starting a block of night duties with a shorter FDP; and
(4) avoiding the sequence of early starts and long night duties.

(b) Fatigue risk management principles may be applied to the rostering of long night duties by means of:
(1) considering operator or industry operational experience and data collected on similar operations;
(2) evidence-based scheduling practices; and
(3) bio-mathematical models.

GM-3 OPS-1.1165 Flight duty period (FDP)

REFERENCE TIME

The start time of the FDP in the table refers to the 'reference time'. That means, to the local time of the point of departure, if this point of departure is within a two (2) hour wide time zone band around the local time where a crew member is acclimatised.

GM-4 OPS-1.1165(e)(1) Extension of Flight Duty Period (FDP)

COMMANDER'S DISCRETION

The maximum allowable FDP should be determined by the planned block times and factored number of sectors as applicable. The factored number of sectors should be increased by the additional number of sectors in case of a diversion.

GM-5 OPS-1.1165 Flight Duty Period (FDP)

DELAYED REPORTING

Operator procedures for delayed reporting should:
(a) specify a contacting mode;
(b) establish minimum and maximum notification times; and
(c) avoid interference with sleeping patterns when possible.

GM-6 OPS 1.1165(d) Rest periods

MINIMUM REST PERIOD AT HOME BASE IF SUITABLE ACCOMMODATION IS PROVIDED

An operator may apply the minimum rest period away from home base during a rotation which includes a rest period at a crew member's home base. This applies only if the crew member does not rest at his/her residence, or temporary accommodation, because the operator provides suitable accommodation. This type of roster is known as "back-to-back operation".

GM-7 OPS-1.1165(d) Rest periods

MINIMUM REST PERIOD AWAY FROM HOME BASE

The time allowed for physiological needs should be 1 hour. Consequently, if the travelling time to the suitable accommodation is more than 30 minutes, the operator should increase the rest period by twice the amount of difference of travelling time above 30 minutes.

GM-8 OPS-1.1165(d) Rest periods

TIME ELAPSED SINCE REPORTING

The time elapsed since reporting for a rotation involving at least a four (4) hour time difference to the reference time stops counting when the crew member returns to his/her home base for a rest period during which the operator is no longer responsible for the accommodation of the crew member.

GM-9 OPS-1.1165(d) Additional rest to compensate for time zone differences

REST AFTER ROTATIONS WITH THREE OR MORE FLIGHT DUTY PERIODS

For a rotation with three or more FDPs, the greatest time zone difference from the original reference time shall be used to determine the minimum number of local nights of rest to compensate for time zone differences. If such a rotation includes time zones crossings in both directions, the calculation is based on the highest number of time zones crossed in any one FDP during the rotation.

AMC-1 OPS-1.1170 Standby

The modification of limits on flight duty, duty and rest periods under the provisions of CAR OPS-1.1165 complies with the following:

(a) Airport standby

(1) If not leading to the assignment of an FDP, airport standby is followed by a rest period as specified in AMC OPS-1.1165(d).

(2) If an assigned FDP starts during airport standby, the following applies:

i. the FDP counts from the start of the FDP. The maximum FDP is reduced by any time spent on standby in excess of four (4) hours;

ii. the maximum combined duration of airport standby and assigned FDP as specified in CAR OPS-1.1155 paragraphs (b) and (d) is sixteen (16) hours.

(b) Standby other than airport standby:

(1) the maximum duration of standby other than airport standby is sixteen (16) hours;

(2) The operator's standby procedures are designed to ensure that the combination of standby and FDP do not lead to more than eighteen (18) hours awake time;

(3) 25 % of time spent on standby other than airport standby counts as duty time for the purpose of CAR OPS-1.1160;

(4) standby is followed by a rest period in accordance with CAR OPS-1.1185;

(5) standby ceases when the crew member reports at the designated reporting point;

(6) if standby ceases within the first six (6) hours, the maximum FDP counts from reporting;

(7) if standby ceases after the first six (6) hours, the maximum FDP is reduced by the amount of standby time exceeding six (6) hours;

(8) if the FDP is extended due to in-flight rest according to CAR OPS-1.1155 paragraph (c), or to split duty according to CS FTL-1.1170, the six (6) hours of paragraphs (6) and (7) are extended to eight (8) hours;

(9) if standby starts between 23:00 and 07:00, the time between 23:00 and 07:00 does not count towards the reduction of the FDP under paragraphs (6), (7) and (8) until the crew member is contacted by the operator; and

(10) the response time between call and reporting time established by the operator allows the crew member to arrive from his/her place of rest to the designated reporting point within a reasonable time.

AMC-2 OPS-1.1170 Standby

MINIMUM REST AND STANDBY

(a) If airport or other standby initially assigned is reduced by the operator during standby that does not lead to an assignment to a flight duty period, the minimum rest requirements specified in CAR OPS-1.1185 shall apply.

(b) If a minimum rest period as specified in CAR OPS-1.1185 is provided before reporting for the duty assigned during the standby, this time period shall not count as standby duty.

(c) Standby other than airport standby counts (partly) as duty for the purpose of CAR OPS- 1.1160 only. If a crew member receives an assignment during standby other than airport standby, the actual reporting time at the designated reporting point shall be used for the purpose of CAR OPS-1.1185.

AMC-3 OPS-1.1170(b) Standby

STANDBY OTHER THAN AIRPORT STANDBY NOTIFICATION

Operator procedures for the notification of assigned duties during standby other than airport standby shall avoid interference with sleeping patterns.

AMC-4 OPS.1170(b) Standby

AWAKE TIME

Scientific research shows that continuous awake in excess of 18 hours can reduce the alertness and shall be avoided.

AMC-5 OPS-1.1170(c) & (d) Standby and duties at the airport

(See CAR OPS-1.1170)

If an operator assigns crew members to standby or to any duty at the airport, the following shall apply in accordance with the certification specifications applicable to the type of operation:

(a) Standby and any duty at the airport shall be in the roster and the start and end time of standby shall be defined and notified in advance to the crew members concerned to provide them with the opportunity to plan adequate rest;

(b) A crew member is considered on airport standby from reporting at the reporting point until the end of the notified airport standby period;

(c) Airport standby shall count in full as duty period for the purpose of points CAR OPS-1.1165 and CAR OPS-1.1185;

(d) Any duty at the airport shall count in full as duty period and the FDP shall count in full from the airport duty reporting time;

(e) The operator shall provide accommodation to the crew member on airport standby which shall include the following:

   (1) The resting area at the airport shall be separated from the operational area of crew activities by a sound-proof door;

   (2) Suitable secure baggage storage facilities shall be provided within this rest area;

   (3) Suitable seating that allows to recline more than 45° back angle to the vertical; and provides leg and foot support;

   (4) It is separated from other seating by at least a curtain to provide darkness and some sound mitigation, and is reasonably free from disturbance by other crew members.

(f) Flight time specification schemes shall specify the following elements:

   (1) the maximum duration of any standby; and

   (2) the impact of the time spent on standby on the maximum FDP that may be assigned, taking into account facilities provided to the crew member to rest, and other relevant factors such as:

      i. the need for immediate readiness of the crew member,

      ii. the interference of standby with sleep, and

      iii. sufficient notification to protect a sleep opportunity between the call for duty and the assigned FDP;

   (3) the minimum rest period following standby which does not lead to assignment of an FDP;

   (4) how time spent on standby other than airport standby shall be counted for the purpose of cumulative duty periods.

AMC-1 OPS-1.1175 Reserve

The operator assigns duties to a crew member on reserve under the provisions of CAR OPS-1.1165 complying with the following:

(a) An assigned FDP counts from the reporting time.

(b) Reserve times do not count as duty period for the purpose of CAR OPS-1.1165.

(c) The operator defines the maximum number of consecutive reserve days within the limits of CAR OPS-1.1165.

(d) To protect an eight (8) hour sleep opportunity, the operator rosters a period of eight (8) hours, taking into account fatigue management principles, for each reserve day during which a crew member on reserve is not contacted by the operator.

AMC-2 OPS-1.1175 Reserve

RESERVE NOTIFICATION

Operator procedures for the notification of assigned duties during reserve shall avoid interference with sleeping patterns.

AMC-3 OPS-1.1175 Reserve

NOTIFICATION IN ADVANCE

The minimum 'at least ten (10) hours' between the notification of an assignment for any duty and reporting for that duty during reserve may include the period of eight (8) hours during which a crew member on reserve is not contacted by the operator.

AMC-4 OPS.1175 Standby

AWAKE TIME

Scientific research shows that continuous awake in excess of 18 hours can reduce the alertness and shall be avoided.

AMC-5 OPS-1.1175(c) Reserve

RECURRENT EXTENDED RECOVERY REST

CAR OPS 1.1165 paragraph (d) applies to a crew member rest on reserve.

GM-1 to AMC OPS-1.1175(c) Reserve

ROSTERING OF RESERVE

Including reserve in a roster, also referred to as ‘rostering’, implies that a reserve period that does not result in a duty period may not retrospectively be considered as part of a recurrent extended recovery rest period.

AMC-1 OPS-1.1180 Nutrition

MEAL OPPORTUNITY

(a) The operations manual shall specify the minimum duration of the meal opportunity, when a meal opportunity is provided, in particular when the FDP encompasses the regular meal windows (e.g. if the FDP starts at 11:00 hours and ends at 22:00 hours meal opportunities for two meals shall be given).

(b) It shall define the time frames in which a regular meal should be consumed in order not to alter the human needs for nutrition without affecting the crew member’s body rhythms.

Appendix A – Commander's Discretion Report – Extension of Flying Duty Period/Flying Hours

Part A

Operator Aircraft Type: ....Flight Number:………………………

Commander: .... Date: ....

Note:

- *If discretion exercised for part crew or individuals state name(s) and operating capacity below.*
- *An aircraft commander may, at his discretion, and after taking note of the circumstances of other members of the crew, extend an FDP beyond the Allowable FDP.*

Part B

Voyage Details:

1. Crew acclimatised ☐ **YES** ☐**NO**
2. Length of preceding rest:
   (a) 18 to 30 hrs
   (b) under 18 hrs or over 30 Hrs.
3. Allowable FDP from Table A or B: …….Hrs........... Mins
4. Split duty: actual time off............. time on.................. Credit.................
5. In-flight relief (more than 3 hours); rest taken............ bunk/seat ....Credit……………
6. Revised allowable FDP: …………………

Voyage Details									
Schedule (Planned)				**Actual**			**Crew**		
	Place	**UTC**	**Local**		**UTC**	**Local**	**No.**	**Rank**	**Name**
Duty to start				Duty started			1		
Depart				Departed			2		
Arrive				Arrived			3		
Depart				Departed			4		
Arrive				Arrived			5		
Depart				Departed			6		
Arrive				Arrived			7		
Depart				Departed			8		
Arrive				Arrived			9		
Depart				Departed			10		
Arrive				Arrived			11		
FDP to end				FDP ended			12		
				Actual FDP			13		

Appendix B – Commander's Discretion Report - Reduction of Rest

Note:	*All times to be recorded as date/time six-figure groups, expressed in both UTC and Local time.*			
Part A	Operator		Aircraft Type	
	Flight Number		Commander	
	Date			
Note:	*If discretion exercised for part crew or individuals state name(s) and operating capacity below.*			
			UTC	Local
Part B	Last duty started			
	Last duty ended			
	Calculated earliest next available			
	Actual start of next FDP			
	Rest earned		Hours:	
	Rest period reduced by:			
	Crew affected:			

Amount of Commander's Discretion Exercised .... Hrs/Mins

Planned FDP........................ Actual FDP........................

Allowed FDP........................ Extension........................

Length of preceding rest................ Time over six (6) hours on stby:................

Was the FDP preceded by Stand-by-duty? ☐**YES** ☐ **NO**

Note:

If rest is taken in a bunk (Up to 18 Hrs.).

A period equal to one half of the total of rest taken, provided that the FDP shall not exceed (*) hours; (*) hours in the case of cabin crew.

If rest is taken in a seat (Up to 15 Hrs.).

A period equal to one third of the total of rest taken, provided that the FDP permissible shall not exceed (*) hours; (*) hours in the case of cabin crew.

Extension of Flying Duty Period by Split Duty (3 – 10)

A period equal to half the consecutive hours' rest taken

SUBPART R – TRANSPORT OF DANGEROUS GOODS BY AIR

(See CAR-92 – Dangerous Goods)

CAR OPS-1.1250 Terminology

(See CAR-92.010 and AC OPS-1.1250(a)(3) & (4))

(a) Terms used in this Subpart have the following meanings:

(1) ***Acceptance Check List***. A document used to assist in carrying out a check on the external appearance of packages of dangerous goods and their associated documents to determine that all appropriate requirements have been met.

(2) ***All entities*** mean any person, air operators, aerodrome operators, ground handling agents, shippers, freight forwarders, Cargo Agents, training providers and packaging suppliers involved in the transport of dangerous goods by air within the Sultanate of Oman.

(3) ***Approval*** means an authorization issued by the Competent Authority as defined in these Regulations.

(4) ***Blacklisting*** means complete seizure of the operations.

(5) ***Cargo*** is any property carried on an aircraft other than mail and accompanied or mishandled baggage.

(6) ***Cargo Aircraft***. Any aircraft which is carrying goods or property but not passengers. In this context the following are not considered to be passengers:

i. A crew member;

ii. An operator's employee permitted by, and carried in accordance with, the instructions contained in the Operations Manual;

iii. An authorised representative of an Authority; or

iv. A person with duties in respect of a particular shipment on board.

(7) ***CoE*** means United Nations Committee of Experts.

(8) ***Competent Authority*** means the Civil Aviation Authority (CAA) designated by the Civil Aviation Law (as amended) to be responsible for the supervision and development of the national civil aviation affairs within the Sultanate of Oman.

(9) ***Consignee*** means any person, organization or government, which is entitled to take delivery of consignments.

(10) ***Consignment*** means one or more packages of dangerous goods accepted by an operator from one shipper at one time and at one address meant for one consignee.

(11) ***Crew-members*** mean a person assigned by an operator to duty on an aircraft during a flight duty period.

(12) ***Dangerous goods*** mean 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 as prescribed in ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air and the IATA Dangerous Goods Regulations.

(13) ***Dangerous Goods Accident.*** An occurrence associated with and related to the transport of dangerous goods which results in fatal or serious injury to a person or major property damage. (See CAR-92.155 and AC OPS-1.1250(a)(13) & (a)(14).)

(14) ***Dangerous Goods Incident.*** An occurrence, other than a dangerous goods accident, associated with and related to the transport of dangerous goods, not necessarily occurring on board an aircraft, which results in injury to a person, property damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardises the aircraft or its occupants is also deemed to constitute a dangerous goods incident. (See CAR-92.155 and AC OPS-1.1250(a)(13) & (a)(14).)

(15) ***Dangerous Goods Transport Document.*** A document which is specified by the Technical Instructions. It is completed by the person who offers dangerous goods for air transport and contains information about those dangerous goods. The document bears a signed declaration indicating that the dangerous goods are fully and accurately described by their proper shipping names and UN/ID numbers and that they are correctly classified, packed, marked, labelled and in a proper condition for transport.

(16) ***Exception*** means a provision in these Regulations, which excludes a specific item of dangerous goods from the requirements normally applicable to that item.

(17) ***Exemption*** means an authorization issued by the Competent Authority providing relief from the provisions of these Regulations.

(18) ***Flight crew*** means a licensed crew member charged with duties essential to the operations of an aircraft during a flight duty period.

(19) ***Forbidden*** means not allowed.

(20) ***Freight forwarder*** means a person or an organization who offers service of arranging the transport of cargo by air.

(21) ***Freight Container.*** A freight container is an article of transport equipment for radioactive materials, designed to facilitate the transport of such materials, either packaged or unpackaged, by one or more modes of transport. (Note: see Unit Load Device where the dangerous goods are not radioactive materials.)

(22) ***Ground Handling Agent.*** An agency which performs on behalf of the operator some or all of the latter's functions including receiving, loading, unloading, transferring or other processing of passengers or cargo.

(23) ***ID number.*** A temporary identification number for an item of dangerous goods which has not been assigned a UN number.

(24) ***Incompatible*** means dangerous goods, which if mixed, would be liable to cause a dangerous evolution of heat or gas or produce a corrosive substance.

(25) ***Inner packagings*** are packagings for which an outer package is required for transport.

(26) ***Inspection*** means an independent verification and testing approved by the Competent Authority.

(27) ***Mail*** means dispatches of correspondence and other items tendered by, and intended for delivery to, postal services in accordance with the rules of the Universal Postal Union (UPU).

(28) ***Mis-declared*** means dangerous goods offered for transport by air where:
   (1) they are incorrectly described on the Shipper's Declaration, such that had they been correctly described, they would not have been acceptable for carriage; or
   (2) They are found after acceptance check has been completed and do not comply with the Regulations.

(29) ***Net Quantity*** means the mass or volume of the dangerous goods contained in a package excluding the mass or volume of any packaging material, except in the case of explosive articles and of matches where the net mass is the mass of the finished article excluding packagings.

(30) ***Operator*** means a person, organization or enterprise engaged in or offering to engage in an aircraft operation.

(31) ***Outer packaging*** is the outer protection of a composite or combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packagings.

(32) ***Overpack.*** An enclosure used by a single shipper to contain one or more packages and to form one handling unit for convenience of handling and stowage. (Note: a unit load device is not included in this definition.)

(33) ***Package.*** The complete product of the packing operation consisting of the packaging and its contents prepared for transport.

(34) ***Packaging(s).*** Receptacles and any other components or materials necessary for the receptacle to perform its containment function and to ensure compliance with the packing requirements.

(35) ***Passenger aircraft*** is an aircraft that carries any person other than a crew member, an operator's employee in an official capacity, an authorized representative of an appropriate national Authority or a person accompanying a consignment or other cargo.

(36) ***Pilot-in-command*** means 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.

(37) ***Proper Shipping Name.*** The name to be used to describe a particular article or substance in all shipping documents and notifications and, where appropriate, on packagings.

(38) ***Radioactive*** means radioactive material together with any contaminated solids, liquids, and gases within the packaging.

(39) ***Revocation*** means withdrawal of the Entity Dangerous Goods Certification.

(40) ***Serious Injury.*** An injury which is sustained by a person in an accident and which:

i. Requires hospitalisation for more than forty-eight (48)hours, commencing within seven days from the date the injury was received; or
ii. Results in a fracture of any bone (except simple fractures of fingers, toes or nose); or
iii. Involves lacerations which cause severe hemorrhage, nerve, muscle or tendon damage; or
iv. Involves injury to any internal organ; or
v. Involves second- or third-degree burns, or any burns affecting more than 5% of the body surface; or
vi. Involves verified exposure to infectious substances or injurious radiation.

(41) ***Shipment*** means the specific movement of a consignment from origin to destination.

(42) ***Shipper*** means the person who signs the contract of carriage with operator for the carriage of goods.

(43) ***State of the Operator*** means 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.

(44) ***State of Origin.*** The Authority in whose territory the dangerous goods were first loaded on an aircraft.

(45) ***Suspension*** means temporary postponement of the Entity Dangerous Goods Certification.

(46) ***These Regulations*** mean all of the requirements of the current ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284-AN/905 as amended), IATA Dangerous Goods Regulations and as stated in CAR-92 (as amended).

(47) ***Technical Instructions*** mean the current edition of the document published by the International Civil Aviation Organization and entitled the "Technical Instructions for the Safe Transport of Dangerous Goods by Air" (reference number: Doc 9284-AN/905).

(48) ***Transport index*** means a number assigned to a package, overpack or freight container to provide control over radiation exposure.

(49) ***UN Number.*** The four-digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods to identify a substance or a particular group of substances.

(50) ***Unit Load Device.*** Any type of aircraft container, aircraft pallet with a net, or aircraft pallet with a net over an igloo. (Note: an overpack is not included in this definition;

for a container containing radioactive materials see the definition for freight container.)

CAR OPS-1.1255 Approval to Transport Dangerous Goods

(See CAR-92, Subpart G)

An operator shall not transport dangerous goods unless approved to do so by the Authority.

Note: Specific approval, certification and approval all have the same meaning when applied in this circumstance.

CAR OPS-1.1260 Scope

(See AC OPS & IEM OPS-1.1260)

(a) An operator shall comply with the provisions contained in the Technical Instructions on all occasions when dangerous goods are carried, irrespective of whether the flight is either within or outside the territory of the Oman FIR.

(b) Articles and substances which would otherwise be classed as dangerous goods are excluded from the provisions of this Subpart, to the extent specified in the Technical Instructions, provided:

   (1) They are required to be onboard the aeroplane in accordance with the relevant CARs or for operating reasons (See IEM OPS-1.1260(b));

   (2) They are carried as catering or cabin service supplies;

   (3) They are carried for use in flight as veterinary aid or as a euthanizing agent for an animal;

   (4) They are carried for use in flight for medical aid for a patient, provided that:

      i. Gas cylinders have been manufactured specifically for the purpose of containing and transporting that particular gas;

      ii. Drugs, medicines and other medical items are under the control of trained personnel during the time when they are in use in the aeroplane;

      iii. Equipment containing wet cell batteries is kept and, when necessary secured, in an upright position to prevent spillage of the electrolyte; and

      iv. Proper provision is made to stow and secure all the equipment during take-off and landing and at all other times when deemed necessary by the commander in the interests of safety; (Also see AC OPS-1.1260(b)(4)) or

   (5) They are carried by passengers or crew members.

(c) Articles and substances intended as replacements for those in (b)(1) and (b)(2) above shall be transported on an aeroplane as specified in the Technical Instructions.

CAR OPS-1.1265 Limitations on the Transport of Dangerous Goods

(See IEM OPS-1.1265(b))

(a) An operator shall take all reasonable measures to ensure that articles and substances that are specifically identified by name or generic description in the Technical Instructions as being forbidden for transport under any circumstances are not carried on any aeroplane.

(b) An operator shall take all reasonable measures to ensure that articles and substances or other goods that are identified in the Technical Instructions as being forbidden for transport in normal circumstances are only transported when:

   (1) They are exempted by the States concerned under the provisions of the Technical Instructions (see IEM OPS-1.1265(b)(1)); or

   (2) The Technical Instructions indicate they may be transported under an approval issued by the State of Origin.

CAR OPS-1.1270 Classification

An operator shall take all reasonable measures to ensure that articles and substances are classified as dangerous goods as specified in the Technical Instructions.

CAR OPS-1.1275 Packing

An operator shall take all reasonable measures to ensure that dangerous goods are packed as specified in the Technical Instructions.

CAR OPS-1.1280 Labelling and Marking

(a) An operator shall take all reasonable measures to ensure that packages, overpacks and freight containers are labelled and marked as specified in the Technical Instructions.
(b) Where dangerous goods are carried on a flight which takes place wholly or partly outside the territory of a State, labelling and marking must be in the English language in addition to any other language requirements.

CAR OPS-1.1285 Dangerous Goods Transport Document

(a) An operator shall ensure that, except when otherwise specified in the Technical Instructions, dangerous goods are accompanied by a dangerous goods transport document.
(b) Where dangerous goods are carried on a flight which takes place wholly or partly outside the territory of a State, the English language must be used for the dangerous goods transport document in addition to any other language requirements.

CAR OPS-1.1295 Acceptance of Dangerous Goods

(See CAR-92.110)

(a) An operator shall not accept dangerous goods for transport until the package, overpack or freight container has been inspected in accordance with the acceptance procedures in the Technical Instructions.
(b) An operator or his ground handling agent shall use an acceptance check list. The acceptance checklist shall allow for all relevant details to be checked and shall be in such form that will allow for the recording of the results of the acceptance check by manual, mechanical or computerised means.

CAR OPS-1.1300 Inspection for Damage, Leakage or Contamination

(See CAR-92.120)

(a) An operator shall ensure that:
  (1) Packages, overpacks and freight containers are inspected for evidence of leakage or damage immediately prior to loading on an aeroplane or into a unit load device, as specified in the Technical Instructions;
  (2) A unit load device is not loaded on an aeroplane unless it has been inspected as required by the Technical Instructions and found free from any evidence of leakage from, or damage to, the dangerous goods contained therein;
  (3) Leaking or damaged packages, overpacks or freight containers are not loaded on an aeroplane;
  (4) Any package of dangerous goods found on an aeroplane and which appears to be damaged or leaking is removed or arrangements made for its removal by an appropriate Authority or organisation. In this case the remainder of the

consignment shall be inspected to ensure it is in a proper condition for transport and that no damage or contamination has occurred to the aeroplane or its load; and

(5) Packages, overpacks and freight containers are inspected for signs of damage or leakage upon unloading from an aeroplane or from a unit load device and, if there is evidence of damage or leakage, the area where the dangerous goods were stowed is inspected for damage or contamination.

CAR OPS-1.1305 Removal of Contamination

(See CAR-92.125)

(a) An operator shall ensure that:

(1) Any contamination found as a result of the leakage or damage of dangerous goods is removed without delay; and

(2) An aeroplane which has been contaminated by radioactive materials is immediately taken out of service and not returned until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.

CAR OPS-1.1310 Loading Restrictions

(See CAR-92.135)

(a) ***Passenger Cabin and Flight Deck***. An operator shall ensure that dangerous goods are not carried in an aeroplane cabin occupied by passengers or on the flight deck, unless otherwise specified in the Technical Instructions.

(b) ***Cargo Compartments***. An operator shall ensure that dangerous goods are loaded, segregated, stowed and secured on an aeroplane as specified in the Technical Instructions.

(c) ***Dangerous Goods Designated for Carriage Only on Cargo Aircraft***. An operator shall ensure that packages of dangerous goods bearing the 'Cargo Aircraft Only' label are carried on a cargo aircraft and loaded as specified in the Technical Instructions.

CAR OPS-1.1315 Provision of Information

(See AMC-1 OPS-1.1315(e) and AC OPS-1.1315(c)(1))

(a) Information to Ground Staff. An operator shall ensure that:

(1) Information is provided to enable ground staff to carry out their duties with regard to the transport of dangerous goods, including the actions to be taken in the event of incidents and accidents involving dangerous goods; and

(2) Where applicable, the information referred to in sub-paragraph (a)(1) above is also provided to his handling agent.

(b) Information to Passengers and Other Persons

(1) An operator shall ensure that information is promulgated as required by the Technical Instructions so that passengers are warned as to the types of goods which they are forbidden from transporting aboard an aeroplane; and

(2) An operator and, where applicable, his handling agent shall ensure that notices are provided at acceptance points for cargo giving information about the transport of dangerous goods.

(c) *Information to Crew Members.* An operator shall ensure that information is provided in the Operations Manual to enable crew members to carry out their responsibilities in regard to the transport of dangerous goods, including the actions to be taken in the event of emergencies arising involving dangerous goods. (See AC OPS-1.1315(c)(1))

(d) *Information to the Commander.* An operator shall ensure that the commander is provided with written information, as specified in the Technical Instructions (See Table 1 of Appendix 1 to CAR OPS-1.1065 for the document storage period).

(e) *Information in the Event of an Aeroplane Incident or Accident (*See AMC-1 OPS-1.1315(e).)

(1) The operator of an aeroplane which is involved in an aeroplane incident shall, on request, provide any information required to minimise the hazards created by any dangerous goods carried.

(2) The operator of an aeroplane which is involved in an aeroplane accident shall, as soon as possible, inform the appropriate Authority of the State in which the aeroplane accident occurred of any dangerous goods carried.

CAR OPS-1.1320 Training programmes

(See CAR-92.590, CAR-92.595 and CAR-92 Appendix A)

(a) An operator shall establish and maintain staff training programmes, as required by the Technical Instructions, which shall be approved by the Authority.

(b) An operator shall ensure that staff receive training in the requirements commensurate with their responsibilities.

(c) Operators not holding a permanent approval to carry dangerous goods:

(1) An operator shall ensure that staff who are engaged in general cargo and baggage handling have received training to carry out their duties in respect of dangerous goods;

(2) As a minimum this training must cover the areas identified in CAR-92 Appendix A and be to a depth sufficient to ensure that an awareness is gained of the hazards associated with dangerous goods, how to identify them and what requirements apply to the carriage of such goods by passengers.

CAR OPS-1.1325 Dangerous Goods Incident and Accident Reports

(See AC OPS-1.1325 & Appendix 1 to CAR OPS-1.1325)

(a) An operator shall report dangerous goods incidents and accidents to the Authority. An initial report shall be dispatched within seventy-two (72) hours of the event unless exceptional circumstances prevent this.

(b) An operator shall also report to the Authority undeclared or mis-declared dangerous goods discovered in cargo or passengers' baggage. An initial report shall be dispatched within seventy-two (72) hours of the discovery unless exceptional circumstances prevent this.

(c) If the above stated incidents or accidents (paras (a) & (b)) occur in another state the occurrence shall also be reported to the local Authority. (See to CAR-92.160)

SECTION 2 – SUBPART R – AC/AMC/IEM — TRANSPORT OF DANGEROUS GOODS

AC OPS-1.1250(a)(13) & (a)(14) Terminology - Dangerous Goods Accident and Dangerous Goods Incident

(See CAR OPS-1.1250(a)(13) & (a)(14))

As a dangerous goods accident (See CAR OPS-1.1250(a)(13)) and dangerous goods incident (See CAR OPS-1.1250(a)(14)) may also constitute an aircraft accident, serious incident or incident the criteria for the reporting both types of occurrences should be satisfied (Also see CAR-13.400).

AC OPS-1.1260(b)(4) Medical Aid for a Patient

(See CAR OPS-1.1260(b)(4))

Gas cylinders, medications, other medical material (such as sterilising wipes) and wet cell or lithium batteries are the dangerous goods which are normally provided for use in flight as medical aid for a patient. However, what is carried may depend on the needs of the patient. These dangerous goods are not those which are a part of the normal equipment of the aeroplane.

IEM-1 OPS-1.1260(b) Dangerous goods on an aeroplane in accordance with the relevant regulations or for operating reasons

(See CAR OPS 1.1260(b))

(1) Dangerous goods required to be on board an aeroplane in accordance with the relevant CARs or for operating reasons are those which are for:
    (a) The airworthiness of the aeroplane;
    (b)The safe operation of the aeroplane; or
    (c)The health of passengers or crew.
(2) Such dangerous goods include but are not limited to:
    (a) Batteries;
    (b) Fire extinguishers;
    (c) First-aid kits;
    (d) Insecticides/Air fresheners;
    (e) Lifesaving appliances; and
    (f) Portable oxygen supplies.

IEM-2 OPS-1.1260(c) Scope – Dangerous goods carried by passengers or crew

(See CAR OPS 1.1260(c))

(1) The Technical Instructions exclude some dangerous goods from the requirements normally applicable to them when they are carried by passengers or crew members, subject to certain conditions.
(2) For the convenience of operators who may not be familiar with the Technical Instructions, these requirements are repeated below.
(3) The dangerous goods which each passenger or crew member can carry are:
    (a) Alcoholic beverages containing more than 24% but not exceeding 70% alcohol by volume, when in retail packaging not exceeding five (5) litres and with a total not exceeding five (5) litres per person;
    (b) Non-radioactive medicinal or toilet articles (including aerosols, hair sprays, perfumes, medicines containing alcohol); and, in checked baggage only, aerosols which are nonflammable, non-toxic and without subsidiary risk, when for sporting or home use. Release valves on aerosols must be protected by a cap or other suitable

means to prevent inadvertent release. The net quantity of each single article should not exceed 0·5 litre or 0·5 kg and the total net quantity of all articles should not exceed two (2) litres or two (2) kg;

(c) Safety matches or a lighter for the person's own use and when carried on the person. 'Strike anywhere' matches, lighters containing unabsorbed liquid fuel (other than liquefied gas), lighter fuel and lighter refills are not permitted;

(d) A hydrocarbon gas-powered hair curler, providing the safety cover is securely fitted over the heating element. Gas refills are not permitted;

(e) Small cylinders of a gas of division 2.2 worn for the operation of mechanical limbs and spare cylinders of a similar size if required to ensure an adequate supply for the duration of the journey;

(f) Radio-isotopic cardiac pacemakers or other devices (including those powered by lithium batteries) implanted in a person, or radio-pharmaceuticals contained within the body of a person as a result of medical treatment;

(g) A small medical or clinical thermometer containing mercury, for the person's own use, when in its protective case;

(h) Dry ice, when used to preserve perishable items, providing the quantity of dry ice does not exceed two (2) kg and the package permits the release of the gas. Carriage may be in carry-on (cabin) or checked baggage, but when in checked baggage the operator's agreement is required;

(i) When carriage is allowed by the operator, small gaseous oxygen or air cylinders for medical use;

(j) When carriage is allowed by the operator, not more than two small cylinders, or other suitable gas of division 2.2, fitted into a self-inflating life-jacket and not more than two spare cylinders;

(k) When carriage is allowed by the operator, wheelchairs or other battery-powered mobility aids with non-spillable batteries, providing the equipment is carried as checked baggage. The battery should be securely attached to the equipment, be disconnected and the terminals insulated to prevent accidental short circuits;

(l) When carriage is allowed by the operator, wheelchairs or other battery-powered mobility aids with spillable batteries, providing the equipment is carried as checked baggage. When the equipment can be loaded, stowed, secured and unloaded always in an upright position, the battery should be securely attached to the equipment, be disconnected and the terminals insulated to prevent accidental short circuits. When the equipment cannot be kept upright, the battery should be removed and carried in a strong, rigid packaging, which should be leak-tight and impervious to battery fluid. The battery in the packaging should be protected against accidental short circuits, be held upright and be surrounded by absorbent material in sufficient quantity to absorb the total liquid contents. The package containing the battery shall have on it 'Battery wet, with wheelchair' or 'Battery wet, with mobility aid', bear a 'Corrosives' label and be marked to indicate its correct orientation. The package shall be protected from upset by securement in the cargo compartment of the aeroplane. The commander shall be informed of the location of a wheelchair or mobility aid with an installed battery or of packed battery;

(m) When carriage is allowed by the operator, cartridges for weapons, (UN0012 and UN0014 only) in Division 1.4S providing they are for that person's own use, they are securely boxed and in quantities not exceeding five (5) kg gross mass and they are in checked baggage. Cartridges with explosive or incendiary projectiles are not permitted. Allowances for more than one person must not be combined into one or more packages.;

Note: Division 1.4S is a classification assigned to an explosive. It refers to cartridges which are packed or designed so that any dangerous effects from the *accidental functioning of one or more cartridges in a package are confined within the package unless it has been degraded by fire, when the dangerous effects are limited to the extent that they do not hinder firefighting or other emergency response efforts in the immediate vicinity of the package. Cartridges for sporting use are likely to be within Division 1.4S.*

(n) When carriage is allowed by the operator, a mercurial barometer or mercurial thermometer in carry-on (cabin) baggage when in the possession of a representative of a government weather bureau or similar official agency. The barometer or thermometer should be packed in a strong packaging having inside a sealed inner liner or bag of strong leak-proof and puncture resistant material impervious to mercury closed in such a way as to prevent the escape of mercury from the package irrespective of its position. The commander should be informed when such a barometer or thermometer is to be carried;

(o) When carriage is allowed by the operator, heat producing articles (i.e. battery operated equipment, such as under-water torches and soldering equipment, which if accidentally activated will generate extreme heat which can cause a fire), providing the articles are in carry-on (cabin) baggage. The heat producing component or energy source should be removed to prevent accidental functioning;

(p) With the approval of the operator(s), one avalanche rescue backpack per person equipped with a pyrotechnic trigger mechanism containing not more than 200 mg net of division 1.4S and not more than 250 mg of compressed gas in division 2.2. The backpack must be packed in such a manner that it cannot be accidentally activated. The airbags within the backpack must be fitted with pressure relief valves;

(q) Consumer electronic devices (watches, calculating machines, cameras, cellphones, lap top computers, camcorders, etc.) containing lithium or lithium-ion cells or batteries when carried by passengers or crew for personal use. Spare batteries must be individually protected so as to prevent short circuits and carried in carry-on baggage only. In addition, each spare battery must not exceed the following quantities:

- For lithium metal or lithium alloy batteries, lithium content of not more than 2 grams; or for lithium-ion batteries, an aggregate equivalent lithium content of not more than 8 grams.
- Lithium-ion batteries with an aggregate equivalent lithium content of more than eight (8) grams but not more than twenty-five (25) grams may be carried in carry-on baggage if they are individually protected so as to prevent short circuits and are limited to two spare batteries per person.

(4) The list in the Technical Instructions of items permitted for carriage by passengers or crew may be revised periodically and OPS may not always reflect the current list. Consequently, the latest version of the Technical Instructions should also be consulted.

IEM OPS-1.1265(b) States concerned with exemptions

(See CAR OPS 1.1265(b))

(1) The Technical Instructions provide that in certain circumstances dangerous goods, which are normally forbidden on an aeroplane, may be carried. These circumstances include cases of extreme urgency or when other forms of transport are inappropriate or when full compliance with the prescribed requirements is contrary to the public interest. In these circumstances all the States concerned may grant exemptions from the provisions of the Technical Instructions provided that every effort is made to achieve an overall level of safety which is equivalent to that provided by the Technical Instructions. Although exemptions are most likely to be granted for the carriage of dangerous goods which are not permitted in normal circumstances, they may also be granted in other circumstances, such as when the

packaging to be used is not provided for by the appropriate packing method or the quantity in the packaging is greater than that permitted. The Instructions also make provision for some dangerous goods to be carried when an approval has been granted only by the State of Origin, providing specific conditions, which are laid down in the Technical Instructions, are met.

(2) The States concerned are those of origin, transit, overflight and destination of the consignment and that of the operator. However, the Technical Instructions allow for the State of overflight to consider an application for exemption based solely on whether an equivalent level of safety has been achieved, if none of the other criteria for granting an exemption are relevant.

(3) The Technical Instructions provide those exemptions and approvals are granted by the "appropriate national Authority", which is intended to be the Authority responsible for the particular aspect against which the exemption or approval is being sought. The Instructions do not specify who should seek exemptions and, depending on the legislation of the particular State, this may mean the operator, the shipper or an agent. If an exemption or approval has been granted to other than an operator, the operator should ensure a copy has been obtained before the relevant flight. The operator should ensure all relevant conditions on an exemption or approval are met.

(4) The exemption or approval referred to in CAR OPS-1.1265(b) is in addition to the approval required by CAR OPS-1.1255.

AC OPS-1.1315(c)(1) Information to the Commander

(See-CAR OPS-1.1315(c)(1))

If the volume of information provided to the commander is such that it would be impracticable to transmit it in the event of an in-flight emergency, a summary of the information should be provided to the commander by the operator, containing at least the quantities and class or division of the dangerous goods in each cargo compartment.

AMC-1 OPS-1.1315(e) Information in the Event of an Inflight Emergency

(See CAR OPS-1.1315(e))

(1) To assist the ground services in preparing for the landing of an aeroplane in an emergency situation, it is essential that adequate and accurate information about any dangerous goods carried on board as cargo be given to the appropriate air traffic services unit. Wherever possible this information should include the proper shipping name and/or the UN/ID number, the class/division and for Class 1 the compatibility group, any identified subsidiary risks(s), the quantity and the location on board the aeroplane.

(2) When it is not possible to include all the information, those parts thought most relevant in the circumstances should be given, such as the UN/ID numbers or classes/divisions and quantity or a summary of the quantities and class/division in each cargo compartment. As an alternative, a telephone number can be given from where a copy of the written information to the commander can be obtained during the flight.

(3) It is accepted that due to the nature of the in-flight emergency, the situation may never permit the commander to inform the appropriate air traffic services unit of the dangerous goods carried as cargo on board the aeroplane.

AC OPS-1.1325 Dangerous Goods Incident and Accident Reports

(See CAR OPS-1.1325)

Use of a standard reporting format concerning the reporting of dangerous goods incidents and accidents would assist the Authorities and enable them to establish quickly the essential details of an occurrence. The details stated in Appendix 1 to CAR OPS-1.1325 para (3) have been listed for such use and its correct and full completion means that all the details required by CAR-13.400 would have been covered. these details may be sent to the relevant Authorities (state of operator and state of occurrence) by any appropriate means including fax, mail, electronic mail, etc.

Appendix 1 to CAR OPS-1.1325 Dangerous goods incident and accident reports

(See CAR OPS-1.1325)

(1) An operator shall ensure that any type of dangerous goods incident or accident is reported, irrespective of whether the dangerous goods are contained in cargo, mail, passengers' baggage or crew baggage. The finding of undeclared or mis-declared dangerous goods in cargo, mail or baggage shall also be reported.

(2) The first report shall be dispatched within seventy-two (72) hours of the event unless exceptional circumstances prevent this. It may be sent by any means, including e-mail, telephone or fax. This report shall include the details that are known at that time, under the headings identified in paragraph 3. If necessary, a subsequent report shall be made as soon as possible giving all the details that were not known at the time the first report was sent. If a report has been made verbally, written confirmation shall be sent as soon as possible.

(3) The first and any subsequent report shall be as precise as possible and contain such of the following data that are relevant:
   - (a) Date of the incident or accident or the finding of undeclared or mis-declared dangerous goods;
   - (b) Location, the flight number and flight date;
   - (c) Description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc;
   - (d) Proper shipping name (including the technical name, if appropriate) and UN/ID number, when known;
   - (e) Class or division and any subsidiary risk;
   - (f) Type of packaging, and the packaging specification marking on it;
   - (g) Quantity;
   - (h) Name and address of the shipper, passenger, etc;
   - (i) Any other relevant details;
   - (j) Suspected cause of the incident or accident;
   - (k) Action taken;
   - (l) Any other reporting action taken; and
   - (m) Name, title, address and telephone number of the person making the report.

(4) Copies of relevant documents and any photographs taken should be attached to a report.

SUBPART S – SECURITY

CAR OPS-1.1335 Security requirements

An operator shall ensure that all appropriate personnel are familiar, and comply, with the relevant requirements of the national security programmes of the Sultanate of Oman.

CAR OPS-1.1340 Training programmes

(See AC OPS-1.1340)

(a) An operator shall establish, maintain and conduct approved training programmes which enable the operator's crew members to take appropriate action to prevent acts of unlawful interference, such as sabotage or unlawful seizure of aeroplanes and to minimise the consequences of such events.
(b) The training programme shall be compatible with the National Aviation Security programme. Individual crew member shall have knowledge and competency of all relevant elements of the training programme.
(c) The operator shall establish and maintain an approved security training programme which ensures crew members act in the most appropriate manner to minimize the consequences of acts of unlawful interference. As a minimum, this programme shall include the following elements:
    (1) determination of the seriousness of any occurrence;
    (2) crew communication and coordination;
    (3) appropriate self-defense responses;
    (4) use of non-lethal protective devices assigned to crew members whose use is authorized by the Authority;
    (5) understanding of behaviour of terrorists so as to facilitate the ability of crew members to cope with hijacker behaviour and passenger responses;
    (6) live situational training exercises regarding various threat conditions;
    (7) flight crew compartment procedures to protect the aeroplane; and
    (8) aeroplane search procedures and guidance on least-risk bomb locations where practicable.
(d) The operator shall establish and maintain a training programme to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage on an aeroplane so that they contribute to the prevention of acts of sabotage or other forms of unlawful interference.

CAR OPS-1.1345 Reporting acts of unlawful interference

Following an act of unlawful interference on board an aeroplane the commander or, in his absence the operator, shall submit, without delay, a report of such an act to the designated local Authority and the Authority in the Sultanate of Oman.

CAR OPS-1.1350 Aeroplane search procedure checklist

(a) An operator shall ensure that there is on board a checklist of the procedures to be followed in search for a bomb or Improvised Explosive Device (IED) in case of suspected sabotage and for the inspecting of aeroplanes for concealed weapons, explosives or other dangerous devices where a well-founded suspicion exists that the aeroplane may be the object of an act of unlawful interference.
(b) The checklist shall be supported by guidance on the appropriate course of action to be taken should a bomb or suspicious object be found and information on the least-risk bomb location specific to the aeroplane were provided by the Type Certificate holder.

CAR OPS-1.1355 Flight crew compartment security

(a) In all aeroplanes which are equipped with a flight crew compartment door, this door shall be capable of being locked, and means or procedures acceptable to the Authority shall be provided or established by which the cabin crew can notify the flight crew in the event of suspicious activity or security breaches in the cabin.

(b) All passenger-carrying aeroplanes that are engaged in the commercial transportation of passengers shall be equipped with an approved secure flight crew compartment door that is capable of being locked and unlocked from either pilot's station and designed to meet the applicable airworthiness requirements, where such airplanes fall within any of the following categories:

- (1) Aeroplanes with an MCTOM that exceeds 54 500 kg;
- (2) Aeroplanes with an MCTOM that exceeds 45 500 kg and have an MAPSC of more than 19; or
- (3) Aeroplanes with an MAPSC of more than 60.

(c) In all aeroplanes which are equipped with a flight crew compartment door in accordance with sub-paragraph (b):

- (4) This door shall be closed prior to engine start for take-off and will be locked when required by security procedure or the Commander, until engine shut down after landing, except when deemed necessary for authorised persons to access or egress in compliance with National Aviation Security Programme;
- (5) Means shall be provided for monitoring from either pilot's station the area outside the flight crew compartment to the extent necessary to identify persons requesting entry to the flight crew compartment and to detect suspicious behaviour or potential threat.

SECTION 2 – SUBPARTS – AC – SECURITY

AC OPS-1.1340 Training programmes

(See CAR OPS 1.1340)

(a) An operator shall establish, maintain and conduct approved training programmes which enable the operator's crew members to take appropriate action to prevent acts of unlawful interference, such as sabotage or unlawful seizure of aeroplanes and to minimise the consequences of such events, should they occur. The training programme shall be compatible with the National Aviation Security Programme. Individual crew member shall have knowledge and competence of all relevant elements of the training programme.

SUBPART T – SEAPLANE OPERATIONS (COMMERCIAL & PRIVATE)

CAR OPS-1.1401 Applicability

This Subpart is applicable for grant for an AOC holder to operator seaplanes under day-VFR operations.

CAR OPS-1.1405 Glossary of Terms

(a) ***Channel*** is a defined rectangular area on a water aerodrome, intended for the landing and take-off run of aircraft along its length.
(b) ***Floating Platform***is a defined platform anchored inside protected waters for the purpose of embarkation and disembarkation of passengers or cargo by seaplane *Nature Reserved*
(c) ***Designated Area****:* These are marine areas that are environmentally protected and preserved as reserves.
(d) ***Protected Areas****:* These areas are usually located on the atoll ward side near islands, which is protected from large wave by the surrounding reef or lagoon or birds.
(e) **Rescue Fire Fighting Services (RFFS)** and the first effective intervention at the accident site by a rescue and firefighting vehicle.
(f) ***Resort Agent***is a person employed by the Aerodrome operator who will be responsible for handling passengers at the aerodrome and to prepare the load sheet. The resort agent shall have undergone an acceptable training to take such responsibilities and shall be trained for fire-fighting and other safety matters.
(g) ***Response Time***is the time between the initial call to the Rescue and Firefighting
(h) ***Seaplane*** **means** an aeroplane capable normally of taking off from and alighting solely on water.
(i) ***Turn Around***: An aircraft while operating a scheduled or charter flight after having reached its destination and having discharged its passengers, cargo etc. returns to its station from which the flight had earlier originated.
(j) ***Water Aerodrome***is 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 movement of aircraft (See CAR-139, Part 2, Chapter 7).

CAR OPS-1.1410 General

(a) The prospective seaplane operator shall be certified for sea operations and comply with the requirements of all other relevant CAR’s; and
(b) *Seaplanes and amphibians*. An operator shall not operate a seaplane or an amphibian on water unless it is equipped with:
    (1) Life jackets with a survivor locator light attached, for each person on board.
    (2) Each life jacket must be stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.
    (3) Life jackets for infants may be substituted by other approved flotation devices equipped with a survivor locator light.
    (4) Equipment for making sound signals prescribed in the International Regulations for preventing Collision at Sea;
    (5) Equipment necessary to facilitate mooring, anchoring or manoeuvring the aircraft on water, appropriate to its size, weight and handling characteristics;
    (6) One sea anchor; and
    (7) Lights (or black ball) for displaying aircraft at anchor when moored in open water.

CAR OPS-1.1415 Operator Requirements

(a) The operator shall publish their own requirements, which shall not be less than the requirements contained in this CAR, whilst encompassing the nature and area of their operations.
(b) The company requirements for such operations shall be specified in the company Operations Manual and approved by the CAA.

CAR OPS-1.1420 Pilot Qualifications and Experience Requirements

(a) The pilot shall have valid endorsement/ rating on his License for the type of seaplane to be flown in accordance with relevant CARs, the minimum requirements for seaplane operation for pilots:
   (1) Total flying experience - 250 hours
   (2) Total PIC flying experience - 125 hours
   (3) Total flying experience on type - 50 hours.
   (4) Total PIC flying experience on type (under supervision) - 25 hours
   (5) PIC flying experience in the last six months on type - 10 hours/ 20 hours (under supervision)
(b) Initial and Recurrent Pilot Training: Details of checks and training requirements for such operations about pilot competency, specifically in respect of, "engine inoperative or malfunctioning" during take-off, climb, cruise, descent, approach, landing and significant malfunctioning of other systems, shall be specified in the company Operations Manual.
(c) An appropriate entry in the pilot logbook or in a training record shall be made to confirm the compliance of this requirement.

CAR OPS-1.1425 Operational Requirements

(a) All flights shall be operated in accordance with the company Operations Manual.
(b) Night Operations and operations under IFR conditions is **NOT** permitted to water aerodromes.
(c) Aircraft shall display a steady white light visible through 360 degrees any time the aircraft is sea anchored.

CAR OPS-1.1430 Seaplane Preflight Action.

(a) The Pilot-in-command shall be responsible for taking preflight action, which shall include a thorough preflight inspection of the aircraft before determining that the aircraft is in a condition for safe flight.
(b) With some exceptions, the preflight inspection of a seaplane is similar to that for a landplane except for a major difference in checking the floats or hull in accordance with the procedures contained in the airplane flight manual (AFM), pilot’s operating handbook (POH), or manufacturer’s recommendations.
(c) The preflight inspection shall include all items of inspection recommended by the manufacturer.

Note: In general, the preflight should include an inspection of the stern of the floats or hull for obvious or apparent defects or damage, such as dents, cracks, deep scratches, loose rivets, corrosion, separation of seams, punctures, and general condition of the skin for signs of incorrect loading of the seaplane or indication of leak in a float compartment or in the hull.

(d) It is important that all plugs and plates removed for inspection are reinstalled systematically before a water takeoff.

CAR OPS-1.1435 Passenger Briefings.

(See Appendix to CAR OPS-1.1435)

(a) Due to the lack of time of preparation for evacuation and the likelihood of major cabin structural damage from impact with the water, passenger survival in seaplanes accidents is most critical. During such a crisis, the pilot may be too busy coping with the problem to give instructions to evacuate. Furthermore, if the pilot becomes incapacitated in an emergency, it is important for the passengers to know what to do and how to do it without additional prompting from the pilot.
(b) Since seaplanes tend to come to rest inverted in water accidents or incidents but can remain afloat for long periods if the floats are not breached, enough stress on the importance of a thorough preflight passenger briefing is required to be given. The pilot must follow the POH or AFM for any special evacuation procedures.
(c) The Pre-takeoff oral briefing shall preferably be done before engine start so that passengers can easily hear and see the actual or simulated demonstrations. Clear and distinct instructions with physically pointing out the location and operation of both normal and emergency exits and safety equipment on board shall be demonstrated.
(d) When a demonstration is impractical, such as demonstrating the actual inflation of personal flotation gear, the pilot should simulate the actions involved as closely as possible.
(e) In addition to the pre-takeoff briefing, briefing of passengers needing assistance and pre- landing briefing shall also be carried out prior to engine start. These briefings required have been detailed at Appendix 'A' to this CAR.
(f) In addition to the above, the operator shall set-up within a fixed location, a passenger briefing room for conducting the audio-visual briefing of passengers

CAR OPS-1.1440 Use of seatbelts and shoulder harnesses in seaplanes.

(a) The PIC shall be ensured that seatbelts are fastened during takeoff, landing, and while en-route when at the crewmember station unless an absence is necessary to perform duties in connection with the operation of the aircraft.
(b) Crew members are required to keep their shoulder harness fastened during takeoff and landing.

Note: Takeoff and landing are the phases of flight where improper pilot technique, rough water or wind conditions could result in a capsized seaplane.

CAR OPS-1.1445 Minimum Safety Requirements for Seaplane Take-off and Landing Areas.

(a) The Operator shall obtain a no objection letter from the landlord of the proposed locality to use the intended lagoon/reef or protected water as a water aerodrome.
(b) The aerodrome operator shall ensure installation of floating platform, obtain safety equipment and ensure training of personnel before the water aerodrome is used.
(c) ***Section of Water Runway:*** the operator and the pilot in command are responsible to:
  (1) obtain the required permission before the operation commences and shall ensure the landing /takeoff Runway is compliant (if required) with CAR-139, Part 2, Chapter 7.
  (2) The operator shall ensure sure size of ensure the Water Runway is safe for the aircraft operations
(d) ***Size of Water Runway:*** The operator shall ensure sure size of ensure the Water Runway is safe for the aircraft operations. The dimensions of the water runway shall depend on;
  (1) The size of the aircraft intended for operation;
  (2) The performance characteristics of the aircraft;
  (3) Potential obstructions in the approach, departure and surrounding area;
  (4) Water currents and wave action;
  (5) Any obstacle in or out of water, on the water runway or taxiway, that may endanger safety shall be marked with a floating buoy.

CAR OPS-1.1450 Approach and departure paths requirements

(a) The approach and departure paths should be clear of established shipping or boating lanes; and
(b) The approach and departure paths should be clear of hazards.
(c) An over water approach is preferable to an approach – departure path over populated areas, beaches and shore developments

CAR OPS-1.1455 Transfer of passengers

(a) A boat used for the purpose of transferring passengers to and from the floating platforms shall be maintained at least 200 m away from the floating platform and water runway when the aircraft is ready to land or at take-off and shall not obstruct the water runway.
(b) Instructions shall be given to the boat captain about the direction of water runway, and the movements of the aircraft for taxi and the specific time of arrival.

CAR OPS-1.1460 Visual Aids

A Wind Direction Indicator shall be fixed on land at a point that is in the nearest vicinity to the water runway and floating platform to enable the pilot to find the wind direction and have an indication of wind velocity. For this purpose, a Wind Sock of sufficient size shall be installed to be visible from an aeroplane flying at a height of 600 ft (200 m).

CAR OPS-1.1465 Fire Fighting

The Resort Agent shall be trained for fire-fighting and rescue operations and shall be familiar with the aircraft. The Resort Agent shall be made available on the transfer boat during takeoff and landing.

CAR OPS-1.1470 Right-of-way rules: Water operations.

(a) ***General.***Each person operating an aircraft on the water shall, insofar as possible, keep clear of all vessels and avoid impeding their navigation, and shall give way to any vessel or other aircraft that is given the right-of-way by any rule of this section

(b) ***Crossing.***When aircraft, or an aircraft and a vessel, are on crossing courses, the aircraft or vessel to the other's right has the right-of-way.

(c) ***Approaching head-on.***When aircraft, or an aircraft and a vessel, are approaching head-on, or nearly so, each shall alter its course to the right to keep well clear.

(d) ***Overtaking.***Each aircraft or vessel that is being overtaken has the right-of-way, and the one overtaking shall alter course to keep well clear.

(e) ***Special circumstances.***When aircraft, or an aircraft and a vessel, approach so as to involve risk of collision, each aircraft or vessel shall proceed with careful regard to existing circumstances, including the limitations of the respective craft.

CAR OPS-1.1475 Certification of Seaplane Operations

The CAA, on satisfactory compliance by the operator with these requirements, will grant specific operation permission to the operator to conduct passenger charter (seaplane) operations with specific airplanes. If at any time during the approval of such operations it becomes evident to the CAA that there exist unsafe conditions or these operations are carried out jeopardizing the safety, the CAA may alter, suspend, revoke or cancel the permission for specific operation.

SECTION 2 – SUBPART T – SEAPLANE OPERATIONS

Appendix 1 to CAR OPS-1.1435 – Passenger Briefings

(a) Pre-takeoff Briefing shall include:

(1) Smoking policy. No smoking is allowed between departing the land briefing room at departure point and arrival at similar facility at the intended destination.

(2) How to fasten, tighten, and unfasten the safety belt and shoulder harness (if installed) without looking at the mechanism, and how to stow the loose end of the seatbelt so that the loose end does not hinder opening the seatbelt in the event of capsizing.

(3) How to recognize, by feel, seatbelt rollover and that the buckle, in this condition, must be righted so it can be opened.

(4) How to operate seats, forward and backward, to enhance egress.

(5) That the seat back should be upright for takeoff and landing.

(6) The location of each normal and emergency exit.

(7) The operation of each normal and emergency exit by explanation and demonstration, if practical.

(8) To leave carry-on items behind in the event of an evacuation in the water.

(9) To establish "situational awareness." During the preflight briefing, the pilot should help passengers establish a definite frame of reference, such as left hand on the left knee or left armrest or right hand toward the direction of the exit.

i. Once they have established situational awareness, passengers can use a "handoverhand" technique to make their way to an exit when the pilot gives the evacuation order; e.g., "Exit through the left rear door", or "Exit right side". Using positional and situational awareness and the "hand-over-hand" technique decreases the possibility of becoming disoriented.

ii. The pilot should stress the point that whether a passenger is upright or inverted, left and right are still the same; i.e., if the exit is on the passenger's right while upright, it will still be on the passenger's right if inverted.

iii. The pilot should also be sure to make all directional references to the passenger's right or left, **not** the pilot's. Pilots should advise passengers if the door handle on the inside of the airplane will work in reverse when they are upside down and that, when the door is closed and locked as in flight, the door may not be able to be opened from the outside.

(10) The following various aspects of flotation gear:

i. If using flotation cushions, the pilot should brief on the type, location, and how to use in the water, including a physical demonstration, if possible; e.g., how to insert arms through the straps and rest the torso on the cushion once in the water and **not** to wear the cushion on one's back.

ii. If using some form of Personal Flotation Device (PFD), the pilot should brief on the type, location, and use of the available PFD, including a demonstration of how to don the device and a simulated demonstration of how to inflate an inflatable device either by carbon dioxide (CO2) or by oral or manual methods after entering the water.

Note: *It shall be emphasized that an inflatable PFD should NOT be inflated until clear of the wreckage after exiting the aircraft since these devices can easily get hung up on wreckage, block an exit, or prevent a passenger from exiting an inverted seaplane.*

iii. *A* policy shall be established by the operator requiring all occupants to wear an inflatable PFD anytime the seaplane operates on or near the water.

(11) The use and operation of any fire extinguishers on board, location of survival gear;

i. Including the Emergency Locator Transmitter (ELT) and pyrotechnic signaling device (flares) *(contained in a "Grab Bag")*;

ii. The appropriate brace position in the event of an imminent crash landing; and

iii. The proper location for carry-on items

(12) Seaplanes are dangerous at both ends. Exercise extreme caution when around the propeller and the elevator. Serious injuries, amputations, and death have resulted from propeller strikes and the horizontal stabilizer when unwary passengers attempt to help in the launching or docking of a seaplane.

i. The elevator balance weight on many seaplanes is an effective finger guillotine. In the preflight briefing ***pilots should instruct passengers not to assist unless specifically requested to do so by the pilot*.** If the pilot anticipates needing passenger assistance, the pilot should provide specific instructions on the passenger's duties, including a precaution about avoiding the spinning propeller, and how to properly handle the horizontal stabilizer.

ii. **Passengers Needing Assistance.** The pilot should individually brief a passenger who may need assistance in exiting. The briefing should include all of the above information and who will be assisting the passenger to exit. If the passenger is accompanied by an attendant, the pilot should brief both the passenger and the attendant on the above information, including the most appropriate route to an exit, when to move toward the exit, and the most appropriate manner of assisting the passenger.

iii. **Pre-landing Briefing.** At a minimum time before each landing, the pilot should ensure that all passengers have been briefed to fasten seatbelts and shoulder harnesses (if installed), place seat backs in the upright position, and stow carry on items. This briefing shall be conducted prior to "top of descent" or in the event of no descent, prior to the commencing of pre-landing checks.