Foreword

These requirements MCAR-AOCR (Aircraft Operator Certificate Requirements) have been published to supplement the provisions Part III (Air Operator Certificate) of the Civil Aviation Regulations 2007 for the State of Mauritius and they will gradually replace the Aircraft Operator Certification Requirements (AOCRs) dated 2008, which has been reformatted and the requirements reviewed in line with recent amendment to ICAO Annex 6. This document is aimed at both fixed wing and helicopter operations; however specific helicopter requirements have been published separately as MCAR-AOCR (Helicopter)

Helicopter operators should comply with general requirements of this MCAR-AOCR document plus rotary specific requirements in “MCAR-AOCR (Helicopter)”

The requirements are prefixed with “AOCR” standing for “Aircraft Operator Certificate Requirements” followed by the subpart then the reference number, e.g. AOCR.GEN.200 which stands for “Aircraft Operator Certificate Requirements, General, 200”. A subpart may be further subdivided, e.g. AOCR.SPA.RVSM.105.

To facilitate in the understanding and compliance of these requirements, acceptable means of compliance (AMC) and guidance material (GM) have been embodied into the text immediately after the requirement. AMC has been coloured brown, whilst GM is coloured Green. An operator may propose an “alternative means of compliance” which will be reviewed and assessed by the Authority. If found acceptable will be included in this document for the use of all organisations.

This Air Operator Certification Requirements has been issued by the Authority pursuant to Regulation 135 of the Civil Aviation Regulations 2007 and is effective as from 04 March 2015. The operators will have to demonstrate full compliance with these requirements by 31st December 2015.

The MCAR AOCR issue 1 will no longer be valid as from 01st January 2016.

[Signature]
I POKHUN
Ag Director of Civil Aviation

Issue 2 – Rev 0
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## TABLE OF CONTENTS

**Foreword**  
Table of Contents  
Record of Revision  
Chapter 1 - Definition  
Chapter 2  
  A Organisation Requirements – General  
  B Management  
  C Aircraft Operator Certification  
  D Manuals, Logs and Records  
  E Flight Crew  
  F Cabin Crew  
  G Security  
  H Technical crew in hems, hho or nvis operations  
Chapter 3  
  Aircraft Operations  
  A Motor Powered Aircraft – General  
  B Operating Procedures  
  C Performance and Operating Limitations  
  General  
Performance Class A  
Performance Class B  
Performance Class C  
D Mass and Balance  
Chapter 4  
  Instruments, Data and Equipment  
Chapter 5  
  Specific Approvals  
  A General
B  Performance-Based Navigation (PBN) Operations  649
C  Operations with Minimum Navigation Performance Specification (MNPS)  654
D  Operations in Airspace with Reduced Vertical Separation Minima (RVSM)  656
E  Low Visibility Operations (LVO)  665
F  Extended Twin Engined Operations (ETOPS)  708
G  Transport of Dangerous Goods  710
H  Management of Crew Fatigue including Flight Time Limitations  714

Chapter 6  The Avoidance Of Excessive Fatigue Flight Crew  724

Part A  724
1  Introduction – Requirements Of The Civil Aviation Regulations  725
2  General Principles Of Control Of Flight, Duty And Rest Time  726
3  Responsibilities Of Crew Members  726
4  Standard Provisions Required For An Operator's Scheme Of Limitations  727
5  Limitations On Single Flying Duty Periods - Flight Crew  727
6  Discretion To Extend A Fdp  731
7  Rest Periods  731
8  Cumulative Limits  732
9  Days Off  733
10  Records And Reporting  734

Part B Cabin Crew  735
1  General  735
2  Flight Duty Period (Fdp)  735
3  Rest Period After A Fdp  736
4  Days Off  736
|   | Duty Hour Limitation |   
|---|---------------------|---|
| 5 |                     | 737 |
| 6 | Records To Be Kept  | 737 |
### RECORD OF REVISIONS

<table>
<thead>
<tr>
<th>REV NO.</th>
<th>DATE</th>
<th>INSERTED BY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issue 1</td>
<td>2008 MARCH</td>
<td>DCA</td>
</tr>
<tr>
<td>Issue 2</td>
<td>2015 MARCH</td>
<td>DCA</td>
</tr>
</tbody>
</table>
Chapter 1

Definitions

For the purpose of this Regulation, the following definitions shall apply:

(1) “accelerate-stop distance available (ASDA)” means the length of the take-off run available plus the length of stopway, if such stopway is declared available by the State of the aerodrome and is capable of bearing the mass of the aeroplane under the prevailing operating conditions;

(2) “acceptable means of compliance (AMC)” means non-binding standards adopted to illustrate means to establish compliance;

(3) “acceptance checklist” means 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 with;

(4) “adequate aerodrome” means an aerodrome on which the aircraft can be operated, taking account of the applicable performance requirements and runway characteristics;

(5) For the purpose of passenger classification:

(a) “adult” means a person of an age of 12 years and above;

(b) “child/children” means persons who are of an age of two years and above but who are less than 12 years of age;

(c) “infant” means a person under the age of two years;

(6) “aeroplane” means an engine-driven fixed-wing aircraft heavier than air that is supported in flight by the dynamic reaction of the air against its wings;

(7) “aided night vision imaging system (NVIS) flight” means, in the case of NVIS operations, that portion of a visual flight rules (VFR) flight performed at night when a crew member is using night vision goggles (NVG);

(8) “aircraft” means a machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth’s surface;
“alternative means of compliance” means those means that propose an alternative to an existing acceptable means of compliance or those that propose new means to establish compliance for which no associated AMC have been adopted by the Authority;

“anti-icing”, in the case of ground procedures, means a procedure that provides protection against the formation of frost or ice and accumulation of snow on treated surfaces of the aircraft for a limited period of time (hold-over time);

“approach procedure with vertical guidance” means a performance-based navigation (PBN) instrument approach procedure designed for 3D instrument approach operations Type A;

“cabin crew member” means an appropriately qualified crew member, other than a flight crew or technical crew member, who is assigned by an operator to perform duties related to the safety of passengers and flight during operations;

“category I (CAT I) approach operation” means a precision instrument approach and landing using an instrument landing system (ILS), microwave landing system (MLS), GLS (ground-based augmented global navigation satellite system (GNSS/GBAS) landing system), precision approach radar (PAR) or GNSS using a satellite-based augmentation system (SBAS) with a decision height (DH) not lower than 200 ft and with a runway visual range (RVR) not less than 550 m for aeroplanes and 500 m for helicopters;

“category II (CAT II) operation” means a precision instrument approach and landing operation using ILS or MLS with:

(a) DH below 200 ft but not lower than 100 ft; and

(b) RVR of not less than 300 m;

“category IIIA (CAT IIIA) operation” means a precision instrument approach and landing operation using ILS or MLS with:

(a) DH lower than 100 ft; and

(b) RVR not less than 200 m;

“category IIIB (CAT IIIB) operation” means a precision instrument approach and landing operation using ILS or MLS with:

(a) DH lower than 100 ft, or no DH; and

(b) RVR lower than 200 m but not less than 75 m;
“category A with respect to helicopters” means a multi-engined helicopter designed with engine and system isolation features specified in the applicable airworthiness codes and capable of operations using take-off and landing data scheduled under a critical engine failure concept that assures adequate designated surface area and adequate performance capability for continued safe flight or safe rejected take-off in the event of engine failure;

“category B with respect to helicopters” means a single-engined or multi-engined helicopter that does not meet category A standards. Category B helicopters have no guaranteed capability to continue safe flight in the event of an engine failure, and unscheduled landing is assumed;

“certification specifications” (CS) means technical standards adopted by the Authority indicating means to show compliance with which can be used by an organisation for the purpose of certification;

“circling” means the visual phase of an instrument approach to bring an aircraft into position for landing on a runway/FATO that is not suitably located for a straight-in approach;

“clearway” means a defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height;

“cloud base” means the height of the base of the lowest observed or forecast cloud element in the vicinity of an aerodrome or operating site or within a specified area of operations, normally measured above aerodrome elevation or, in the case of offshore operations, above mean sea level;

“code share” means an arrangement under which an operator places its designator code on a flight operated by another operator, and sells and issues tickets for that flight;

“congested area” means in relation to a city, town or settlement, any area which is substantially used for residential, commercial or recreational purposes;

“contaminated runway” means a runway of which more than 25 % of the runway surface area within the required length and width being used is covered by the following:

(a) 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;
(b) 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

(c) ice, including wet ice;

(26) “contingency fuel” means the fuel required to compensate for unforeseen factors that could have an influence on the fuel consumption to the destination aerodrome;

(27) “continuous descent final approach (CDFA)” means a technique, consistent with specialise approach procedures, for flying the final-approach segment of a non-precision instrument approach 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 shall begin for the type of aircraft flown;

(28) “converted meteorological visibility (CMV)” means a value, equivalent to an RVR, which is derived from the reported meteorological visibility;

(29) “crew member” means a person assigned by an operator to perform duties on board an aircraft;

(30) “critical phases of flight” in the case of aeroplanes means the take-off run, the take-off flight path, the final approach, the missed approach, the landing, including the landing roll, and any other phases of flight as determined by the pilot-in-command or commander;

(31) “critical phases of flight” in the case of helicopters means taxiing, hovering, take-off, final approach, missed approach, the landing and any other phases of flight as determined by the pilot-in-command or commander;

(32) “damp runway” means a runway where the surface is not dry, but when the moisture on it does not give it a shiny appearance;

(33) “dangerous goods (DG)” means articles or substances which are capable of posing a risk to health, safety, property or the environment and which are shown in the list of dangerous goods in the technical instructions or which are classified according to those instructions;
“dangerous goods accident” means an occurrence associated with and related to the transport of dangerous goods by air which results in fatal or serious injury to a person or major property damage;

“dangerous goods incident” means:

(a) an occurrence other than a dangerous goods accident associated with and related to the transport of dangerous goods by air, 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;

(b) any occurrence relating to the transport of dangerous goods which seriously jeopardises an aircraft or its occupants;

“de-icing”, in the case of ground procedures, means a procedure by which frost, ice, snow or slush is removed from an aircraft in order to provide uncontaminated surfaces;

“defined point after take-off (DPATO)” means the point, within the take-off and initial climb phase, before which the helicopter’s ability to continue the flight safely, with the critical engine inoperative, is not assured and a forced landing may be required;

“defined point before landing (DPBL)” means the point within the approach and landing phase, after which the helicopter’s ability to continue the flight safely, with the critical engine inoperative, is not assured and a forced landing may be required;

“distance DR” means the horizontal distance that the helicopter has travelled from the end of the take-off distance available;

“dry lease agreement” means an agreement between undertakings pursuant to which the aircraft is operated under the air operator certificate (AOC) of the lessee;

“dry operating mass” means the total mass of the aircraft ready for a specific type of operation, excluding usable fuel and traffic load;

“dry runway” means a runway which is neither wet nor contaminated, and includes those paved runways which have been specially prepared with grooves or porous pavement and maintained to retain “effectively dry” braking action even when moisture is present;

“elevated final approach and take-off area (elevated FATO)” means a FATO that is at least 3 m above the surrounding surface;
(44) “en-route alternate (ERA) aerodrome” means an adequate aerodrome along the route, which may be required at the planning stage;

(45) “enhanced vision system (EVS)” means a system to display electronic real-time images of the external scene achieved through the use of imaging sensors;

(46) “final approach and take-off area (FATO)” means a defined area for helicopter operations, over which the final phase of the approach manoeuvre to hover or land is completed, and from which the take-off manoeuvre is commenced. In the case of helicopters operating in performance class 1, the defined area includes the rejected take-off area available;

(47) “flight data monitoring (FDM)” means the proactive and non-punitve use of digital flight data from routine operations to improve aviation safety;

(48) “flight simulation training device (FSTD)” means a training device which is:

(a) in the case of aeroplanes, a full flight simulator (FFS), a flight training device (FTD), a flight and navigation procedures trainer (FNPT), or a basic instrument training device (BITD);

(b) in the case of helicopters, a full flight simulator (FFS), a flight training device (FTD) or a flight and navigation procedures trainer (FNPT);

(49) “fuel ERA aerodrome” means an ERA aerodrome selected for the purpose of reducing contingency fuel;

(50) “GBAS landing system (GLS)” means an approach landing system using ground based augmented global navigation satellite system (GNSS/GBAS) 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;

(51) “ground emergency service personnel” means any ground emergency service personnel (such as policemen, firemen, etc.) involved with helicopter emergency medical services (HEMSs) and whose tasks are to any extent pertinent to helicopter operations;

(52) “grounding” means the formal prohibition of an aircraft to take-off and the taking of such steps as are necessary to detain it;
(53) “head-up display (HUD)” means a display system which presents flight information to the pilot’s forward external field of view and which does not significantly restrict the external view;

(54) “head-up guidance landing system (HUDLS)” means the total airborne system that provides head-up guidance to the pilot during the approach and landing and/or missed approach procedure. It includes all sensors, computers, power supplies, indications and controls;

(55) “helicopter” means a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power-driven rotors on substantially vertical axes;

(56) “helicopter hoist operation (HHO) crew member” means a technical crew member who performs assigned duties relating to the operation of a hoist;

(57) “helideck” means a FATO located on a floating or fixed offshore structure;

(58) “HEMS crew member” means a technical crew member who is assigned to a HEMS flight for the purpose of attending to any person in need of medical assistance carried in the helicopter and assisting the pilot during the mission;

(59) “HEMS flight” means a flight by a helicopter operating under a HEMS approval, the purpose of which is to facilitate emergency medical assistance, where immediate and rapid transportation is essential, by carrying:

(a) medical personnel;

(b) medical supplies (equipment, blood, organs, drugs); or

(c) ill or injured persons and other persons directly involved;

(60) “HEMS operating base” means an aerodrome at which the HEMS crew members and the HEMS helicopter may be on stand-by for HEMS operations;

(61) “HEMS operating site” means a site selected by the commander during a HEMS flight for helicopter hoist operations, landing and take-off;

(62) “HHO flight” means a flight by a helicopter operating under an HHO approval, the purpose of which is to facilitate the transfer of persons and/or cargo by means of a helicopter hoist;
“HHO offshore” means a flight by a helicopter operating under an HHO approval, the purpose of which is to facilitate the transfer of persons and/or cargo by means of a helicopter hoist from or to a vessel or structure in a sea area or to the sea itself;

“HHO passenger” means a person who is to be transferred by means of a helicopter hoist;

“HHO site” means a specified area at which a helicopter performs a hoist transfer;

“hold-over time (HoT)” means the estimated time the anti-icing fluid will prevent the formation of ice and frost and the accumulation of snow on the protected (treated) surfaces of an aeroplane;

“hostile environment” means:

(a) an environment in which:

(i) a safe forced landing cannot be accomplished because the surface is inadequate;

(ii) the helicopter occupants cannot be adequately protected from the elements;

(iii) search and rescue response/capability is not provided consistent with anticipated exposure; or

(iv) there is an unacceptable risk of endangering persons or property on the ground;

(b) in any case, the following areas:

(i) for overwater operations, the open sea areas north of 45N and south of 45S designated by the authority of the State concerned;

(ii) those parts of a congested area without adequate safe forced landing areas;

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

(a) a two-dimensional (2D) instrument approach operation, using lateral navigation guidance only; and
(b) a three-dimensional (3D) instrument approach operation, using both lateral and vertical navigation guidance.

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

(a) a ground-based radio navigation aid; or

(b) computer-generated navigation data from ground-based, space-based, self-contained navigation aids or a combination of these Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows:

(a) Type A: a minimum descent height or decision height at or above 75 m (250 ft); and

(b) Type B: a decision height below 75 m (250 ft).

(69) “landing decision point (LDP)” means the point used in determining landing performance from which, an engine failure having been recognised at this point, the landing may be safely continued or a balked landing initiated;

(70) “landing distance available (LDA)” means the length of the runway which is declared available by the State of the aerodrome and suitable for the ground run of an aeroplane landing;

(71) “landplane” means a fixed wing aircraft which is designed for taking off and landing on land and includes amphibians operated as landplanes;

(72) “local helicopter operation” means a commercial air transport operation of helicopters with a maximum certified take-off mass (MCTOM) over 3175 kg and a maximum operational passenger seating configuration (MOPSC) of nine or less, by day, over routes navigated by reference to visual landmarks, conducted within a local and defined geographical area specified in the operations manual;

(73) “low visibility procedures (LVP)” means 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;

(74) “low visibility take-off (LVTO)” means a take-off with an RVR lower than 400 m but not less than 75 m;
“lower than standard category I (LTS CAT I) operation” means 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 but not lower than 400 m;

“maximum operational passenger seating configuration (MOPSC)” means the maximum passenger seating capacity of an individual aircraft, excluding crew seats, established for operational purposes and specified in the operations manual. Taking as a baseline the maximum passenger seating configuration established during the certification process conducted for the type certificate (TC), supplemental type certificate (STC) or change to the TC or STC as relevant to the individual aircraft, the MOPSC may establish an equal or lower number of seats, depending on the operational constraints;

“medical passenger” means a medical person carried in a helicopter during a HEMS flight, including but not limited to doctors, nurses and paramedics;

“night” means the period 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, as defined by the Member State;

“night vision goggles (NVG)” means a head-mounted, binocular, light intensification appliance that enhances the ability to maintain visual surface references at night;

“night vision imaging system (NVIS)” means the integration of all elements required to successfully and safely use NVGs while operating a helicopter. The system includes as a minimum: NVGs, NVIS lighting, helicopter components, training and continuing airworthiness;

“non-hostile environment” means an environment in which:

(a) a safe forced landing can be accomplished;

(b) the helicopter occupants can be protected from the elements; and

(c) search and rescue response/capability is provided consistent with the anticipated exposure.

In any case, those parts of a congested area with adequate safe forced landing areas shall be considered non-hostile;

“non-precision approach (NPA) operation” means an instrument approach with a minimum descent height (MDH), or DH when flying a
CDFA technique, not lower than 250 ft and an RVR/CMV of not less than 750 m for aeroplanes and 600 m for helicopters;

(83) “NVIS crew member” means a technical crew member assigned to an NVIS flight;

(84) “NVIS flight” means a flight under night visual meteorological conditions (VMC) with the flight crew using NVGs in a helicopter operating under an NVIS approval;

(85) “offshore operations” means operations which routinely have a substantial proportion of the flight conducted over sea areas to or from offshore locations;

(86) “operating site” means a site, other than an aerodrome, selected by the operator or pilot-in-command or commander for landing, take-off and/or external load operations;

(87) “operation in performance class 1” means an operation that, in the event of failure of the critical engine, the helicopter is able to land within the rejected take-off distance available or safely continue the flight to an appropriate landing area, depending on when the failure occurs;

(88) “operation in performance class 2” means an operation that, in the event of failure of the critical engine, performance is available to enable the helicopter to safely continue the flight, except when the failure occurs early during the take-off manoeuvre or late in the landing manoeuvre, in which cases a forced landing may be required;

(89) “operation in performance class 3” means an operation that, in the event of an engine failure at any time during the flight, a forced landing may be required in a multi-engined helicopter and will be required in a single-engined helicopter;

(90) “operational control” means the responsibility for the initiation, continuation, termination or diversion of a flight in the interest of safety;

(91) “other than standard category II (OTS CAT II) operation” means a precision instrument approach and landing operation using ILS or MLS where some or all of the elements of the precision approach category II light system are not available, and with:

(a) DH below 200 ft but not lower than 100 ft; and

(b) RVR of not less than 350 m;
“performance class A aeroplanes” means multi-engined aeroplanes powered by turbo-propeller engines with an MOPSC of more than nine or a maximum take-off mass exceeding 5 700 kg, and all multi-engined turbo-jet powered aeroplanes;

“performance class B aeroplanes” means aeroplanes powered by propeller engines with an MOPSC of nine or less and a maximum take-off mass of 5 700 kg or less;

“performance class C aeroplanes” means aeroplanes powered by reciprocating engines with an MOPSC of more than nine or a maximum take-off mass exceeding 5 700 kg;

“pilot-in-command” means the pilot designated as being in command and charged with the safe conduct of the flight. For the purpose of commercial air transport operations, the “pilot-in-command” shall be termed the “commander”;

“principal place of business” means the head office or registered office of the organisation within which the principal financial functions and operational control of the activities referred to in this Regulation are exercised;

“prioritisation of ramp inspections” means the dedication of an appropriate portion of the total number of ramp inspections conducted by or on behalf of Authority on an annual basis;

“public interest site (PIS)” means a site used exclusively for operations in the public interest;

“ramp inspection” means the inspection of aircraft, of flight and cabin crew qualifications and of flight documentation in order to verify the compliance with the applicable requirements;

“rectification interval” means a limitation on the duration of operations with inoperative equipment;

“rejected take-off distance available (RTODAH)” means the length of the final approach and take-off area declared available and suitable for helicopters operated in performance class 1 to complete a rejected take-off;

“rejected take-off distance required (RTODRH)” means the horizontal distance required from the start of the take-off to the point where the helicopter comes to a full stop following an engine failure and rejection of the take-off at the take-off decision point;
“runway visual range (RVR)” means the range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line;

“safe forced landing” means an unavoidable landing or ditching with a reasonable expectancy of no injuries to persons in the aircraft or on the surface;

“seaplane” means a fixed wing aircraft which is designed for taking off and landing on water and includes amphibians operated as seaplanes;

“separate runways” means 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;

“special VFR flight” means a VFR flight cleared by air traffic control to operate within a control zone in meteorological conditions below VMC;

“stabilised approach (Sap)” means an approach that 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 ft above the threshold or the point where the flare manoeuvre is initiated if higher;

“take-off alternate aerodrome” means an alternate aerodrome at which an aircraft can land should this become necessary shortly after take-off and if it is not possible to use the aerodrome of departure;

“take-off decision point (TDP)” means the point used in determining take-off performance from which, an engine failure having been recognised at this point, either a rejected take-off may be made or a take-off safely continued;

“take-off distance available (TODA)” in the case of aeroplanes means the length of the take-off run available plus the length of the clearway, if provided;

“take-off distance available (TODAH)” in the case of helicopters means the length of the final approach and take-off area plus, if provided, the length of helicopter clearway declared available and suitable for helicopters to complete the take-off;
(113) “take-off distance required (TODRH)” in the case of helicopters means the horizontal distance required from the start of the take-off to the point at which take-off safety speed (V TOSS), a selected height and a positive climb gradient are achieved, following failure of the critical engine being recognised at the TDP, the remaining engines operating within approved operating limits;

(114) “take-off flight path” means the vertical and horizontal path, with the critical engine inoperative, from a specified point in the take-off for aeroplanes to 1 500 ft above the surface and for helicopters to 1 000 ft above the surface;

(115) “take-off mass” means the mass including everything and everyone carried at the commencement of the take-off for helicopters and take-off run for aeroplanes;

(116) “take-off run available (TORA)” means the length of runway that is declared available by the State of the aerodrome and suitable for the ground run of an aeroplane taking off;

(117) “technical crew member” means a crew member in commercial air transport HEMS, HHO or NVIS operations other than a flight or cabin crew member, assigned by the operator to duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, HHO or NVIS operations, which may require the operation of specialised on-board equipment;

(118) “technical instructions (TI)” means the latest effective edition of the “Technical instructions for the safe transport of dangerous goods by air”, including the supplement and any addenda, approved and published by the International Civil Aviation Organisation;

(119) “traffic load” means the total mass of passengers, baggage, cargo and carry-on specialist equipment, including any ballast;

(120) “unaided NVIS flight” means, in the case of NVIS operations, that portion of a VFR flight performed at night when a crew member is not using NVG;

(121) “undertaking” means any natural or legal person, whether profit-making or not, or any official body whether having its own personality or not;

(122) “V1” means the maximum speed in the take-off at which the pilot must take the first action to stop the aeroplane within the accelerate-stop distance. V1 also means the minimum speed in the take-off, following a failure of the critical engine at VEF, at which the pilot can
continue the take-off and achieve the required height above the take-off surface within the take-off distance;

(123) “**VEF**” means the speed at which the critical engine is assumed to fail during take-off;

(124) “**visual approach**” means 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;

(125) “**wet lease agreement**” means an agreement between air carriers pursuant to which the aircraft is operated under the AOC of the lessor;

(126) “**wet runway**” means a runway of which the surface is covered with water, or equivalent, less than specified by the “contaminated runway” definition or when there is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water.
Chapter 2-
Organisation Requirements

A. GENERAL

AOCR.Gen.105 Competent authority

For the purpose of these requirements, the Department of Civil Aviation (DCA) is the competent authority exercising oversight over operators subject to a certification obligation shall be for operators having their principal place of business in Mauritius.

AOCR.Gen.110 - Operator responsibilities

(a) The operator is responsible for the operation of the aircraft in accordance with Regulations, the relevant requirements of these requirements and its certificate.

(b) Every flight shall be conducted in accordance with the provisions of the operations manual.

(c) The operator shall establish and maintain a system for exercising operational control over any flight operated under the terms of its certificate.

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

(e) The 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.

(f) The operator shall establish procedures and instructions for the safe operation of each aircraft type, containing ground staff and crew member duties and responsibilities for all types of operation on the ground and in flight. These procedures shall not require crew members to perform any activities during critical phases of flight other than those required for the safe operation of the aircraft.

(g) The operator shall ensure that all personnel are made aware that they shall comply with the laws, regulations and procedures of those States in which operations are conducted and that are pertinent to the performance of their duties.
DEPARTMENT OF CIVIL AVIATION
AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

(h) The operator shall establish a checklist system for each aircraft type to be used by crew members in all phases of flight under normal, abnormal and emergency conditions to ensure that the operating procedures in the operations manual are followed. The design and utilisation of checklists shall observe human factors principles and take into account the latest relevant documentation from the aircraft manufacturer.

(i) The operator shall specify flight planning procedures to provide for the safe conduct of the flight based on considerations of aircraft performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes or operating sites concerned. These procedures shall be included in the operations manual.

(j) The operator shall establish and maintain dangerous goods training programmes for personnel as required by the technical instructions which shall be subject to review and approval by the Authority. Training programmes shall be commensurate with the responsibilities of personnel.

AMC2 AOCR.GEN.110 (a) Operator responsibilities

SECURITY TRAINING PROGRAMME FOR GROUND PERSONNEL — CAT OPERATIONS

In accordance with National Aviation Security Programme of the Republic of Mauritius and GM1 AOCR.SEC.100 Training Programmes, the CAT operator should establish and maintain a security training programme for ground personnel to acquaint appropriate employees with preventive measures and techniques in relation to passengers, baggage, cargo, mail, equipment, stores and supplies intended for carriage so that they contribute to the prevention of acts of sabotage or other forms of unlawful interference.

GM1 AOCR.GEN.110 (a) Operator responsibilities

SECURITY TRAINING PROGRAMME FOR CREW MEMBERS

ICAO Security Manual Doc 9811 (restricted access) contains guidance on the development of training programmes

AMC1 AOCR.GEN.110(c) -Operator responsibilities

OPERATIONAL CONTROL

The organisation and methods established to exercise operational control should be included in the operations manual and should cover at least a
description of responsibilities concerning the initiation, continuation and termination or diversion of each flight.

**GM1 AOCR.GEN.110 (c) Operator responsibilities**

**OPERATIONAL CONTROL**

(a) AOCR.GEN.110(c) does not imply a requirement for licensed flight dispatchers or a full flight watch system.

(b) If the operator employs flight operations officers in conjunction with a method of operational control, training for these personnel should be based on relevant parts of ICAO Doc 7192 Training Manual, Part D-3. This training should be described in the operations manual.

**AMC1 AOCR.GEN.110 (e) Operator responsibilities**

**MEL TRAINING PROGRAMME**

(a) The operator should develop a training programme for ground personnel dealing with the use of the MEL and detail such training in the continuing airworthiness maintenance exposition CAME and OM as appropriate. Such training programme should include:

(1) the scope, extent and use of the MEL;

(2) placarding of inoperative equipment;

(3) deferral procedures;

(4) dispatching; and

(5) any other operator’s MEL related procedures.

(b) The operator should develop a training programme for crew members and detail such training in the Operations Manual. Such training programme should include:

(1) the scope, extent and use of the MEL;

(2) the operator’s MEL procedures;

(3) elementary maintenance procedures in accordance with Civil Aviation Regulations; and

(4) pilot-in-command/commander responsibilities.

**GM1 AOCR.GEN.110 (e) Operator responsibilities**
GROUND PERSONNEL

For the purpose of the MEL training programme referred to in AMC1 AOCR.GEN.110 (e) ground personnel include maintenance personnel, flight dispatchers and operations officers.

AMC2 AOCR.GEN.110 (e) Operator responsibilities

GROUND OPERATIONS WITH PASSENGERS ON BOARD IN THE ABSENCE OF FLIGHT CREW

For ground operations, whenever passengers are embarking, on board or disembarking in the absence of flight crew members, the operator should:

(a) establish procedures to alert the aerodrome services in the event of ground emergency or urgent need; and

(b) ensure that at least one person on board the aircraft is qualified to apply these procedures and ensure proper coordination between the aircraft and the aerodrome services.

GM2 AOCR.GEN.110 (e) Operator responsibilities

AERODROME SERVICES

Aerodrome services refer to units available at an aerodrome that could be of assistance in responding to an urgent need or an emergency, such as rescue and firefighting services, medical and ambulance services, air traffic services, security services, police, aerodrome operations, air operators.

AMC1 AOCR.GEN.110 (f) Operator responsibilities

STERILE FLIGHT CREW COMPARTMENT

(a) Sterile flight crew compartment procedures should ensure that:

(1) flight crew activities are restricted to essential operational activities; and

(2) cabin crew and technical crew communications to flight crew or entry into the flight crew compartment are restricted to safety or security matters.

(b) The sterile flight crew compartment procedures should be applied:

(1) during critical phases of flight;
(2) during taxiing (aeroplanes);

(3) below 10000 feet above the aerodrome of departure after take-off and the aerodrome of destination before landing, except for cruise flight; and

(4) during any other phases of flight as determined by the pilot-in-command or commander.

(c) All crew members should be trained on sterile flight crew compartment procedures established by the operator, as appropriate to their duties.

**GM1 AOCR.GEN.110 (f) Operator responsibilities**

**STERILE FLIGHT CREW COMPARTMENT**

(a) Establishment of procedures

The operator should establish procedures for flight, cabin, and technical crew that emphasise the objectives and importance of the sterile flight crew compartment. These procedures should also emphasise that, during periods of time when the sterile flight deck compartment procedures are applied, cabin crew and technical crew members should call the flight crew or enter the flight crew compartment only in cases related to safety or security matters. In such cases, information should be timely and accurate.

(b) Flight crew activities

When sterile flight crew compartment procedures are applied, flight crew members are focused on their essential operational activities without being disturbed by non-safety related matters. Examples of activities that should not be performed are:

(1) radio calls concerning passenger connections, fuel loads, catering, etc;

(2) non-critical paperwork; and

(3) mass and balance corrections and performance calculations, unless required for safety reasons.

(c) Communication to the flight crew

Cabin crew and technical crew use their own discretion to determine whether the situation is related to safety or security matters and whether to call the flight crew. Situations requiring information to the flight crew may include:
(1) any outbreak of fire inside the cabin or in an engine;

(2) a burning smell in the cabin or presence of smoke inside or outside;

(3) fuel or fluid leakage;

(4) exit door unable to be armed or disarmed;

(5) localised extreme cabin temperature changes;

(6) evidence of airframe icing;

(7) cabin/galley equipment or furniture malfunction/breakage posing a hazard to the occupants;

(8) suspicious object;

(9) disruptive passenger;

(10) security threat;

(11) abnormal vibration or noise;

(12) medical emergency;

(13) general drop-down of the oxygen masks in the cabin; and

(14) any other condition deemed relevant by a cabin crew or technical crew member.

**AMC1 AOCR.GEN.110 (f) (h) Operator responsibilities**

**ESTABLISHMENT OF PROCEDURES**

(a) An operator should establish procedures to be followed by cabin crew covering at least:

(1) arming and disarming of slides;

(2) operation of cabin lights, including emergency lighting;

(3) prevention and detection of cabin, oven and toilet fires;

(4) actions to be taken when turbulence is encountered; and
(5) actions to be taken in the event of an emergency and/or an evacuation.

(b) When establishing procedures and a checklist system for cabin crew with respect to the aircraft cabin, the operator should take into account at least the following duties:

<table>
<thead>
<tr>
<th>Duties</th>
<th>Pre-take-off</th>
<th>In-flight</th>
<th>Pre-landing</th>
<th>Post-landing</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Briefing of cabin crew by the senior cabin crew member prior to commencement of a flight or series of flights</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Check of safety and emergency equipment in accordance with operator’s policies and procedures</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Security checks as applicable</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>(4) Passenger embarkation and disembarkation</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>(5) Securing of passenger cabin (e.g. seat belts, cabin cargo/baggage)</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>(6) Securing of galleys and stowage of equipment</td>
<td>x</td>
<td>if required</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>(7) Arming of door/exit slides</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) Safety briefing / information to passengers</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>(9) “Cabin secure” report to flight crew</td>
<td>x</td>
<td>if required</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>(10) Operation of cabin lights</td>
<td>x</td>
<td>if required</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>(11) Cabin crew at assigned crew stations</td>
<td>x</td>
<td>if required</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>(12) Surveillance of passenger cabin</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>(13) Prevention and detection of fire in the</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION

### AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Cabin (including the combi-cargo area, crew rest areas, galleys, lavatories and any other cabin remote areas) and instructions for actions to be taken</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(14) Actions to be taken when turbulence is encountered</td>
<td>x</td>
</tr>
<tr>
<td>(15) Actions to be taken in case of in-flight incidents (e.g. medical emergency)</td>
<td>x</td>
</tr>
<tr>
<td>(16) Actions to be taken in the event of emergency situations</td>
<td>x</td>
</tr>
<tr>
<td>(17) Disarming of door/exit slides</td>
<td>x</td>
</tr>
<tr>
<td>(18) Reporting of any deficiency and/or unserviceability of equipment and/or any incident</td>
<td>x</td>
</tr>
</tbody>
</table>

The operator should specify the contents of safety briefings for all cabin crew members prior to the commencement of a flight or series of flights.

#### AOCR.GEN.115 Application for an operator certificate

(a) The application for an operator certificate or an amendment to an existing certificate shall be made in writing to the Authority.

(b) Applicants for an initial certificate shall provide the Authority with documentation demonstrating how they will comply with the requirements. Such documentation shall include a procedure describing how changes not requiring prior approval will be managed and notified to the Authority.

#### AOCR.GEN.120 Means of compliance

(a) Alternative means of compliance to those adopted by the Authority may be used by an operator to establish compliance with regulations.

(b) When an operator subject to certification wishes to use an alternative means of compliance to the acceptable means of compliance (AMC) adopted by the Authority to establish compliance with regulations, it shall, prior to implementing it, provide the Authority with a full description of the alternative means of compliance. The description shall include any revisions to manuals or procedures that may be relevant, as well as an assessment demonstrating that the requirements are met.
The operator may implement these alternative means of compliance subject to prior approval by the Authority.

**AMC1 AOCR.GEN.120 (a) Means of compliance**

**DEMONSTRATION OF COMPLIANCE**

In order to demonstrate that the Implementing Rules are met, a risk assessment should be completed and documented. The result of this risk assessment should demonstrate that an equivalent level of safety to that established by the Acceptable Means of Compliance (AMC) adopted by the Agency is reached.

**AOCR.GEN.125 Terms of approval and privileges of an operator**

A certified operator shall comply with the scope and privileges defined in the operations specifications attached to the operator’s certificate.

**AMC1 AOCR.GEN.125 Terms of approval and privileges of an operator**

**MANAGEMENT SYSTEM DOCUMENTATION**

The management system documentation should contain the privileges and detailed scope of activities for which the operator is certified, as relevant to the applicable requirements. The scope of activities defined in the management system documentation should be consistent with the terms of approval.

**AOCR.GEN.130 Changes**

(a) Any change affecting:

(1) the scope of the certificate or the operations specifications of an operator; or

(2) any of the elements of the operator’s management system as required in AOCR.GEN.200 (a) (1) and (a) (2),

shall require prior approval by the Authority.

(b) For any changes requiring prior approval, the operator shall apply for and obtain an approval issued by the Authority. The application shall be submitted before any such change takes place, in order to enable the Authority to determine continued compliance with regulations and to amend, if necessary, the operator certificate and related terms of approval attached to it.

The operator shall provide the Authority with any relevant documentation.
The change shall only be implemented upon receipt of formal approval by the Authority. The operator shall operate under the conditions prescribed by the Authority during such changes, as applicable.

All changes not requiring prior approval shall be managed and notified to the Authority as defined in the procedure approved by the Authority.

**AMC1 AOCR.GEN.130 Changes**

**APPLICATION TIME FRAMES**

(a) The application for the amendment of an operator certificate should be submitted at least 30 days before the date of the intended changes.

(b) In the case of a planned change of a nominated person, the operator should inform the Authority at least 10 days before the date of the proposed change.

I Unforeseen changes should be notified at the earliest opportunity, in order to enable the Authority to determine continued compliance with the applicable requirements and to amend, if necessary, the operator certificate and related terms of approval.

**GM1 AOCR.GEN.130 (a) Changes**

**GENERAL**

(a) Typical examples of changes that may affect the certificate or the operations specifications or the operator’s management system as required in AOCR.GEN.200 (a) (1) and (a) (2) are listed below:

(1) the name of the operator;

(2) a change of legal entity;

(3) the operator’s principal place of business;

(4) the operator’s scope of activities;

(5) additional locations of the operator;

(6) the accountable manager;

(7) any of the persons referred to in AOCR.GEN.210 (a) and (b);
(8) the operator’s documentation as required by this Annex, safety policy and procedures;

(9) the facilities.

(b) Prior approval by the Authority is required for any changes to the operator’s procedure describing how changes not requiring prior approval will be managed and notified to the Authority.

Changes requiring prior approval may only be implemented upon receipt of formal approval by the Authority.

**GM2 AOCR.GEN.130 (a) Changes**

**CHANGE OF NAME**

A change of name requires the operator to submit a new application as a matter of urgency. Where this is the only change to report, the new application can be accompanied by a copy of the documentation previously submitted to the Authority under the previous name, as a means of demonstrating how the operator complies with the applicable requirements.

**GM3 AOCR.GEN.130 (b) Changes**

**CHANGES REQUIRING PRIOR APPROVAL**

For commercial operations, the following GM is a non-exhaustive checklist, in alphabetical order, of items that require prior approval from the Authority as specified in the applicable Requirements:

(a) alternative means of compliance;

(b) procedures regarding items to be notified to the Authority;

(c) cabin crew:

(1) evacuation procedures with a reduced number of required cabin crew during ground operations or in unforeseen circumstances;

(2) for commercial air transport (CAT) operators, conduct of the training, examination and checking required by Part-CC and issue of cabin crew attestations;

(3) procedures for cabin crew to operate on four aircraft types;

(4) training programmes, including syllabi;

(d) leasing agreements;
(e) non-commercial operations by air operator certificate (AOC) holders;

(f) specific approvals in accordance with Part-SPA;

(g) dangerous goods training programmes;

(h) flight crew:
   (1) alternative training and qualification programmes (ATQPs);
   (2) procedures for flight crew to operate on more than one type or variant;
   (3) training and checking programmes, including syllabi and use of flight simulation training devices (FSTDs);

(i) fuel policy;

(j) helicopter operations:
   (1) airborne radar approaches;
   (2) over a hostile environment located outside a congested area, unless the operator holds an approval to operate according to (SPA.HEMS);
   (3) procedures for selecting off-shore alternates;
   (4) to/from a public interest site;
   (5) without an assured safe forced landing capability;

(k) mass and balance:
   (1) standard masses for load items other than standard masses for passengers and checked baggage;
   (2) use of on-board mass and balance computer systems;

(l) minimum equipment list (MEL):
   (1) MEL;
   (2) operating other than in accordance with the MEL, but within the constraints of the master minimum equipment list (MMEL);
   (3) rectification interval extension (RIE) procedures;
(m) minimum flight altitudes:

(1) the method for establishing minimum flight altitudes;

(2) descent procedures to fly below specified minimum altitudes;

(n) performance:

(1) increased bank angles at take-off (for performance class A aeroplanes);

(2) short landing operations (for performance class A and B aeroplanes);

(3) steep approach operations (for performance class A and B aeroplanes);

(o) isolated aerodrome: using an isolated aerodrome as destination aerodrome for operations with aeroplanes;

(p) approach flight technique:

(1) all approaches not flown as stabilised approaches for a particular approach to a particular runway;

(2) non-precision approaches not flown with the continuous descent final approach (CDFA) technique for each particular approach/runway combination without an extended range operation with two-engined aeroplanes (ETOPS) approval;

(3) air operations with two-engined performance class A aeroplanes with a maximum operational passenger seating configuration (MOPSC) of 19 or less and a maximum take-off mass less than 45 360 kg, over a route that contains a point further than 120 minutes from an adequate aerodrome, under standard conditions in still air;

(q) aircraft categories:

(1) Applying a lower landing mass than the maximum certified landing mass for determining the indicated airspeed at threshold (VAT).

(r) aircraft categories:
AOCR.GEN.135 Continued validity

(a) The operator’s certificate shall remain valid subject to:

(1) the operator remaining in compliance with the relevant requirements of regulations, taking into account the provisions related to the handling of findings as specified under AOCR.GEN.150;

(2) the Authority being granted access to the operator as defined in AOCR.GEN.140 to determine continued compliance with the relevant requirements; and

(3) the certificate not being surrendered or revoked.

(b) Upon revocation or surrender the certificate shall be returned to the Authority without delay.

AOCR.GEN.140 Access

(a) For the purpose of determining compliance with the relevant requirements of, the operator shall grant access at any time to any facility, aircraft, document, records, data, procedures or any other material relevant to its activity subject to certification, whether it is contracted or not, to any person authorised by one of the following authorities:

(1) the Authority defined in AOCR.GEN.105;

(2) an authority acting under the provisions of a SAFA ramp inspection programme.

(b) Access to the aircraft mentioned under (a) shall include the possibility to enter and remain in the aircraft during flight operations unless otherwise decided by the commander for the flight crew compartment in accordance with AOCR.GEN.MPA.135 in the interest of safety.

AOCR.GEN.150 Findings

After receipt of notification of findings, the operator shall:

(a) identify the root cause of the non-compliance;

(b) define a corrective action plan; and
(c) demonstrate corrective action implementation to the satisfaction of the Authority within a period agreed with the Authority.

AMC1 AOCR.GEN.150 (b) Findings

**GENERAL**

The corrective action plan defined by the operator should address the effects of the non-compliance, as well as its root-cause.

**GM1 AOCR.GEN.150 Findings**

**GENERAL**

(a) Preventive action is the action to eliminate the cause of a potential non-compliance or other undesirable potential situation.

(b) Corrective action is the action to eliminate or mitigate the root cause(s) and prevent recurrence of an existing detected non-compliance or other undesirable condition or situation. Proper determination of the root cause is crucial for defining effective corrective actions to prevent reoccurrence.

(c) Correction is the action to eliminate a detected non-compliance.

**AOCR.GEN.155 Immediate reaction to a safety problem**

The operator shall implement:

(a) any safety measures mandated by the Authority; and

(b) any relevant mandatory safety information issued by the Authority, including airworthiness directives.

**AOCR.GEN.160 Occurrence reporting**

(a) The operator shall report to the Authority, and to any other organisation required by the State of the operator to be informed, any accident, serious incident and occurrence.

(b) Without prejudice to point (a) the operator shall report to the Authority and to the organisation responsible for the design of the aircraft any incident, malfunction, technical defect, exceeding of technical limitations, occurrence that would highlight inaccurate, incomplete or ambiguous information contained in data established in accordance with requirements, other irregular circumstance that has or may have
endangered the safe operation of the aircraft and that has not resulted in an accident or serious incident.

(c) Without prejudice, the reports referred in paragraphs (a) and (b) shall be made in a form and manner established by the Authority and contains all pertinent information about the condition known to the operator.

(d) Reports shall be made as soon as practicable, but in any case within 72 hours of the operator identifying the condition to which the report relates, unless exceptional circumstances prevent this.

(e) Where relevant, the operator shall produce a follow-up report to provide details of actions it intends to take to prevent similar occurrences in the future, as soon as these actions have been identified. This report shall be produced in a form and manner established by the Authority.

**AMC1 AOCR.GEN.160 Occurrence reporting**

**GENERAL**

(a) The operator should report all occurrences defined in AMC 20-8, and as required by the applicable national rules.

(b) In addition to the reports required by AMC 20-8, the operator should report volcanic ash clouds encountered during flight.
B. MANAGEMENT

AOCR.GEN.200 Management system

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

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

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

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

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

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

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

(7) any additional requirements that are prescribed in these requirements or other legislations established in Mauritius.

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

AMC1 AOCR.GEN.200 (a) (1) ;( 2) ;( 3) ;( 5) Management system

NON-COMPLEX OPERATORS – GENERAL

(a) Safety risk management may be performed using hazard checklists or similar risk management tools or processes, which are integrated into the activities of the operator.
(b) The operator should manage safety risks related to a change. The management of change should be a documented process to identify external and internal change that may have an adverse effect on safety. It should make use of the operator’s existing hazard identification, risk assessment and mitigation processes.

c) The operator should identify a person who fulfils the role of safety manager and who is responsible for coordinating the safety management system. This person may be the accountable manager or a person with an operational role within the operator.

d) Within the operator, responsibilities should be identified for hazard identification, risk assessment and mitigation.

e) The safety policy should include a commitment to improve towards the highest safety standards, comply with all applicable legal requirements, meet all applicable standards, consider best practices and provide appropriate resources.

(f) The operator should, in cooperation with other stakeholders, develop, coordinate and maintain an emergency response plan (ERP) that ensures orderly and safe transition from normal to emergency operations and return to normal operations. The ERP should provide the actions to be taken by the operator or specified individuals in an emergency and reflect the size, nature and complexity of the activities performed by the operator.

AMC1 AOCR.GEN.200 (a) (1) Management system

COMPLEX OPERATORS – ORGANISATION AND ACCOUNTABILITIES

The management system of an operator should encompass safety by including a safety manager and a safety review board in the organisational structure.

(a) Safety manager

(1) The safety manager should act as the focal point and be responsible for the development, administration and maintenance of an effective safety management system.

(2) The functions of the safety manager should be to:

   (i) facilitate hazard identification, risk analysis and management;

   (ii) monitor the implementation of actions taken to mitigate risks, as listed in the safety action plan;
(iii) provide periodic reports on safety performance;

(iv) ensure maintenance of safety management documentation;

(v) ensure that there is safety management training available and that it meets acceptable standards;

(vi) provide advice on safety matters; and

(vii) ensure initiation and follow-up of internal occurrence / accident investigations.

(b) Safety review board

(1) The Safety review board should be a high level committee that considers matters of strategic safety in support of the accountable manager’s safety accountability.

(2) The board should be chaired by the accountable manager and be composed of heads of functional areas.

(3) The safety review board should monitor:

   (i) safety performance against the safety policy and objectives;

   (ii) that any safety action is taken in a timely manner; and

   (iii) the effectiveness of the operator’s safety management processes.

(c) The safety review board should ensure that appropriate resources are allocated to achieve the established safety performance.

(d) The safety manager or any other relevant person may attend, as appropriate, safety review board meetings. He/she may communicate to the accountable manager all information, as necessary, to allow decision making based on safety data.

GM1 AOCR.GEN.200 (a) (1) Management system

SAFETY MANAGER

(a) Depending on the size of the operator and the nature and complexity of its activities, the safety manager may be assisted by additional safety personnel for the performance of all safety management related tasks.

(b) Regardless of the organisational set-up it is important that the safety manager remains the unique focal point as regards the development,
administration and maintenance of the operator’s safety management system.

**GM2 AOCR.GEN.200 (a) (1) Management system**

**COMPLEX OPERATORS – SAFETY ACTION GROUP**

(a) A safety action group may be established as a standing group or as an ad-hoc group to assist or act on behalf of the safety review board.

(b) More than one safety action group may be established depending on the scope of the task and specific expertise required.

(c) The safety action group should report to and take strategic direction from the safety review board and should be comprised of managers, supervisors and personnel from operational areas.

(d) The safety action group should:

   (1) monitor operational safety;

   (2) resolve identified risks;

   (3) assess the impact on safety of operational changes; and

   (4) ensure that safety actions are implemented within agreed timescales.

(e) The safety action group should review the effectiveness of previous safety recommendations and safety promotion.

**AMC1 AOCR.GEN.200 (a) (2) Management system**

**COMPLEX OPERATORS – SAFETY POLICY**

(a) The safety policy should:

   (1) be endorsed by the accountable manager;

   (2) reflect organisational commitments regarding safety and its proactive and systematic management;

   (3) be communicated, with visible endorsement, throughout the operator; and

   (4) include safety reporting principles.

(b) The safety policy should include a commitment:
(1) to improve towards the highest safety standards;

(2) to comply with all applicable legislation, meet all applicable standards and consider best practices;

(3) to provide appropriate resources;

(4) to enforce safety as one primary responsibility of all managers; and

(5) not to blame someone for reporting something which would not have been otherwise detected.

(c) Senior management should:

(1) continually promote the safety policy to all personnel and demonstrate their commitment to it;

(2) provide necessary human and financial resources for its implementation; and

(3) establish safety objectives and performance standards.

GM1 AOCR.GEN.200 (a) (2) Management system

SAFETY POLICY

The safety policy is the means whereby the operator states its intention to maintain and, where practicable, improve safety levels in all its activities and to minimise its contribution to the risk of an aircraft accident as far as is reasonably practicable.

The safety policy should state that the purpose of safety reporting and internal investigations is to improve safety, not to apportion blame to individuals.

AMC1 AOCR.GEN.200 (a) (3) Management system

COMPLEX OPERATORS – SAFETY RISK MANAGEMENT

(a) Hazard identification processes

(1) Reactive and proactive schemes for hazard identification should be the formal means of collecting, recording, analysing, acting on and generating feedback about hazards and the associated risks that affect the safety of the operational activities of the operator.
(2) All reporting systems, including confidential reporting schemes, should include an effective feedback process.

(b) Risk assessment and mitigation processes

(1) A formal risk management process should be developed and maintained that ensures analysis (in terms of likelihood and severity of occurrence), assessment (in terms of tolerability) and control (in terms of mitigation) of risks to an acceptable level.

(2) The levels of management who have the authority to make decisions regarding the tolerability of safety risks, in accordance with (b) (1), should be specified.

(c) Internal safety investigation

(1) The scope of internal safety investigations should extend beyond the scope of occurrences required to be reported to the Authority.

(d) Safety performance monitoring and measurement

(1) Safety performance monitoring and measurement should be the process by which the safety performance of the operator is verified in comparison to the safety policy and objectives.

(2) This process should include:

(i) safety reporting, addressing also the status of compliance with the applicable requirements;

(ii) safety studies, that is, rather large analyses encompassing broad safety concerns;

(iii) safety reviews including trends reviews, which would be conducted during introduction and deployment of new technologies, change or implementation of procedures, or in situations of structural change in operations;

(iv) safety audits focusing on the integrity of the operator’s management system, and periodically assessing the status of safety risk controls; and

(v) safety surveys, examining particular elements or procedures of a specific operation, such as problem areas or bottlenecks in daily operations, perceptions and opinions of operational personnel and areas of dissent or confusion.
(e) The management of change The operator should manage safety risks related to a change. The management of change should be a documented process to identify external and internal change that may have an adverse effect on safety. It should make use of the operator’s existing hazard identification, risk assessment and mitigation processes.

(f) Continuous improvement

The operator should continuously seek to improve its safety performance. Continuous improvement should be achieved through:

(1) proactive and reactive evaluations of facilities, equipment, documentation and procedures through safety audits and surveys;

(2) proactive evaluation of individuals’ performance to verify the fulfilment of their safety responsibilities; and

(3) reactive evaluations in order to verify the effectiveness of the system for control and mitigation of risk.

(g) The emergency response plan (ERP)

(1) An ERP should be established that provides the actions to be taken by the operator or specified individuals in an emergency. The ERP should reflect the size, nature and complexity of the activities performed by the operator.

(2) The ERP should ensure:

(i) an orderly and safe transition from normal to emergency operations;

(ii) safe continuation of operations or return to normal operations as soon as practicable; and

(iii) coordination with the emergency response plans of other organisations, where appropriate.

GM1 AOCR.GEN.200 (a) (3) Management system

INTERNAL OCCURRENCE REPORTING SCHEME

(a) The overall purpose of the scheme is to use reported information to improve the level of safety performance of the operator and not to attribute blame.
(b) The objectives of the scheme are to:

(1) enable an assessment to be made of the safety implications of each relevant incident and accident, including previous similar occurrences, so that any necessary action can be initiated; and

(2) ensure that knowledge of relevant incidents and accidents is disseminated, so that other persons and operators may learn from them.

(c) The scheme is an essential part of the overall monitoring function and 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 instances where routine procedures have failed.

(d) All occurrence reports judged reportable by the person submitting the report should be retained as the significance of such reports may only become obvious at a later date.

**GM2 AOCR.GEN.200 (a) (3) M anagement system**

**RISK MANAGEMENT OF FLIGHT OPERATIONS WITH KNOWN OR FORECAST VOLCANIC ASH CONTAMINATION**

(a) Responsibilities

The operator is responsible for the safety of its operations, including within an area with known or forecast volcanic ash contamination.

The operator should complete this assessment of safety risks related to known or forecast volcanic ash contamination as part of its management system before initiating operations into airspace forecast to be or aerodromes/operating sites known to be contaminated with volcanic ash.

This process is intended to ensure the operator takes account of the likely accuracy and quality of the information sources it uses in its management system and to demonstrate its own competence and capability to interpret data from different sources in order to achieve the necessary level of data integrity reliably and correctly resolve any conflicts among data sources that may arise.

In order to decide whether or not to operate into airspace forecast to be or aerodromes/operating sites known to be contaminated with volcanic ash, the operator should make use of the safety risk assessment within its management system, as required by AOCR.GEN.200.
The operator’s safety risk assessment should take into account all relevant data including data from the type certificate holders (TCHs) regarding the susceptibility of the aircraft they operate to volcanic cloud related airworthiness effects, the nature and severity of these effects and the related pre-flight, in-flight and post-flight precautions to be observed by the operator.

The operator should ensure that personnel required to be familiar with the details of the safety risk assessments receives all relevant information (both pre-flight and in-flight) in order to be in a position to apply appropriate mitigation measures as specified by the safety risk assessments.

(b) Procedures

The operator should have documented procedures for the management of operations into airspace forecast to be or aerodromes/operating sites known to be contaminated with volcanic ash.

These procedures should ensure that, at all times, flight operations remain within the accepted safety boundaries as established through the management system allowing for any variations in information sources, equipment, operational experience or organisation. Procedures should include those for flight crew, flight planners, dispatcher, operations, continuing airworthiness personnel such that they are in a position to evaluate correctly the risk of flights into airspace forecast to be contaminated by volcanic ash and to plan accordingly.

Continuing airworthiness personnel should be provided with procedures allowing them to correctly assess the need for and to execute relevant continuing airworthiness interventions.

The operator should retain sufficient qualified and competent staff to generate well supported operational risk management decisions and ensure that their staffs are appropriately trained and current. It is recommended that the operator make the necessary arrangements for its relevant staff to take up opportunities to be involved in volcanic ash exercises conducted in their areas of operation.

(c) Volcanic activity information and operator’s potential response

Before and during operations, information valuable to the operator is generated by various volcano agencies worldwide. The operator’s risk assessment and mitigating actions need to take account of, and respond appropriately to, the information likely to be available during each phase of the eruptive sequence from pre-eruption through to end of
eruptive activity. It is nevertheless noted that eruptions rarely follow a deterministic pattern of behaviour. A typical operator’s response may consist of the following:

(1) Pre-eruption

The operator should have in place a robust mechanism for ensuring that it is constantly vigilant for any alerts of pre-eruption volcanic activity relevant to its operations. The staff involved need to understand the threat to safe operations that such alerts represent.

An operator whose routes traverse large, active volcanic areas, for which immediate International Airways Volcano Watch (IAVW) alerts may not be available, should define its strategy for capturing information about increased volcanic activity before pre-eruption alerts are generated. For example, an operator may combine elevated activity information with information concerning the profile and history of the volcano to determine an operating policy, which could include re-routing or restrictions at night. This would be useful when dealing with the 60% of volcanoes which are unmonitored.

Such an operator should also ensure that its crews are aware that they may be the first to observe an eruption and so need to be vigilant and ready to ensure that this information is made available for wider dissemination as quickly as possible.

(2) Start of an eruption

Given the likely uncertainty regarding the status of the eruption during the early stages of an event and regarding the associated volcanic cloud, the operator’s procedures should include a requirement for crews to initiate re-routes to avoid the affected airspace.

The operator should ensure that flights are planned to remain clear of the affected areas and that consideration is given to available aerodromes/operating sites and fuel requirements.

It is expected that the following initial actions will be taken by the operator:

(i) determine if any aircraft in flight could be affected, alert the crew and provide advice on rerouting and available aerodromes/operating sites as required;
(ii) alert management;

(iii) for flight departures, brief flight crew and revise flight and fuel planning in accordance with the safety risk assessment;

(iv) alert flight crew and operations staff to the need for increased monitoring of information (e.g. special air report (AIREP), volcanic activity report (VAR), significant weather information (SIGMET), NOTAMs and company messages);

(v) initiate the gathering of all data relevant to determining the risk; and

(vi) apply mitigations identified in the safety risk assessment.

(3) On-going eruption

As the eruptive event develops, the operator can expect the responsible Volcanic Ash Advisory Centre (VAAC) to provide volcanic ash advisory messages (VAA/VAGs) defining, as accurately as possible, the vertical and horizontal extent of areas and layers of volcanic clouds. As a minimum, the operator should monitor, and take account of, this VAAC information as well as of relevant SIGMETs and NOTAMs.

Other sources of information are likely to be available such as VAR/AIREPs, satellite imagery and a range of other information from State and commercial organisations. The operator should plan its operations in accordance with its safety risk assessment taking into account the information that it considers accurate and relevant from these additional sources.

The operator should carefully consider and resolve differences or conflicts among the information sources, notably between published information and observations (pilot reports, airborne measurements, etc.).

Given the dynamic nature of the volcanic hazards, the operator should ensure that the situation is monitored closely and operations adjusted to suit changing conditions.

The operator should be aware that the affected or danger areas may be established and presented in a different way than the one currently used in Europe, as described in EUR Doc 019-NAT Doc 006 or as published by the authority.
The operator should require reports from its crews concerning any encounters with volcanic emissions. These reports should be passed immediately to the appropriate air traffic services (ATS) unit and to the operator’s competent authority.

For the purpose of flight planning, the operator should treat the horizontal and vertical limits of the temporary danger area (TDA) or airspace forecast to be contaminated by volcanic ash as applicable, to be overflown as it would mountainous terrain, modified in accordance with its safety risk assessment. The operator should take account of the risk of cabin depressurisation or engine failure resulting in the inability to maintain level flight above a volcanic cloud, especially when conducting ETOPS operations. Additionally, minimum equipment list (MEL) provisions should be considered in consultation with the TCHs.

Flying below volcanic ash contaminated airspace should be considered on a case-by-case basis. It should only be planned to reach or leave an aerodrome/operating site close to the boundary of this airspace or where the ash contamination is very high and stable. The establishment of Minimum Sector Altitude (MSA) and the availability of aerodromes/operating sites should be considered.

(d) Safety risk assessment

When directed specifically at the issue of intended flight into airspace forecast to be or aerodromes/operating sites known to be contaminated with volcanic ash, the process should involve the following:

(1) Identifying the hazards

The generic hazard, in the context of this document, is airspace forecast to be or aerodromes/operating sites known to be contaminated with volcanic ash, and whose characteristics are harmful to the airworthiness and operation of the aircraft.

This GM is referring to volcanic ash contamination since it is the most significant hazard for flight operations in the context of a volcanic eruption. Nevertheless, it might not be the only hazard and therefore the operator should consider additional hazards which could have an adverse effect on aircraft structure or passengers safety such as gases.

Within this generic hazard, the operator should develop its own list of specific hazards taking into account its specific aircraft, experience, knowledge and type of operation, and any other relevant data stemming from previous eruptions.
(2) Considering the severity and consequences of the hazard occurring (i.e. the nature and actual level of damage expected to be inflicted on the particular aircraft from exposure to that volcanic ash cloud).

(3) Evaluating the likelihood of encountering volcanic ash clouds with characteristics harmful to the safe operation of the aircraft.

For each specific hazard within the generic hazard, the likelihood of adverse consequences should be assessed, either qualitatively or quantitatively.

(4) Determining whether the consequent risk is acceptable and within the operator’s risk performance criteria.

At this stage of the process, the safety risks should be classified as acceptable or unacceptable. The assessment of tolerability will be subjective, based on qualitative data and expert judgement, until specific quantitative data are available in respect of a range of parameters.

(5) Taking action to reduce the safety risk to a level that is acceptable to the operator’s management.

Appropriate mitigation for each unacceptable risk identified should then be considered in order to reduce the risk to a level acceptable to the operator’s management.

(e) Procedures to be considered when identifying possible mitigations actions When conducting a volcanic ash safety risk assessment, the operator should consider the following non-exhaustive list of procedures and processes as mitigation:

(1) Type certificate holders

Obtaining advice from the TCHs and other engineering sources concerning operations in potentially contaminated airspace and/or aerodromes/operating sites contaminated by volcanic ash.

This advice should set out:

(i) the features of the aircraft that are susceptible to airworthiness effects related to volcanic ash;

(ii) the nature and severity of these effects;
(iii) the effect of volcanic ash on operations to/from contaminated aerodromes/operating sites, including the effect on take-off and landing aircraft performance;

(iv) the related pre-flight, in-flight and post-flight precautions to be observed by the operator including any necessary amendments to aircraft operating manuals, aircraft maintenance manuals, master minimum equipment list/dispatch deviation or equivalents; and

(v) the recommended inspections associated with operations in volcanic ash potentially contaminated airspace and operations to/from volcanic ash contaminated aerodromes/operating sites; this may take the form of instructions for continuing airworthiness or other advice.

(2) Operator/contracted organisations’ personnel

Definition of procedures for flight planning, operations, engineering and maintenance ensuring that:

(i) personnel responsible for flight planning are in a position to evaluate correctly the risk of encountering volcanic ash contaminated airspace, or aerodromes/operating sites, and can plan accordingly;

(ii) flight planning and operational procedures enable crews to avoid areas and aerodromes/operating sites with unacceptable volcanic ash contamination;

(iii) flight crew are aware of the possible signs of entry into a volcanic ash cloud and execute the associated procedures;

(iv) continuing airworthiness personnel are able to assess the need for and to execute any necessary maintenance or other required interventions; and

(v) crews are provided with appropriate aircraft performance data when operating to/from aerodromes/operating sites contaminated with volcanic ash.

(3) Provision of enhanced flight watch

This should ensure:

(i) close and continuous monitoring of VAA, VAR/AIREP, SIGMET, NOTAM, ASHTAM and other relevant information,
and information from crews, concerning the volcanic ash cloud hazard;

(ii) access to plots of the affected areas from SIGMETs, NOTAMs and relevant company information for crews and personnel responsible for the management and the supervision of the flight operations; and

(iii) communication of the latest information to crews and personnel responsible for the management and the supervision of the flight operations in a timely fashion.

(4) Flight planning

Flexibility of the process to allow re-planning at short notice should conditions change.

(5) Departure, destination and alternate aerodromes

For the airspace to be traversed, or the aerodromes/operating sites in use, parameters to evaluate and take account of:

(i) the probability of contamination;

(ii) any additional aircraft performance requirements;

(iii) required maintenance considerations;

(iv) fuel requirements for re-routeing and extended holding.

(6) Routing policy

Parameters to evaluate and take account of:

(i) the shortest period in and over the forecast contaminated area;

(ii) the hazards associated with flying over the contaminated area;

(iii) drift down and emergency descent considerations;

(iv) the policy for flying below the contaminated airspace and the associated hazards.

(7) Diversion policy

Parameters to evaluate and take account of:
(i) maximum allowed distance from a suitable aerodrome/operating site;

(ii) availability of aerodromes/operating sites outside the forecast contaminated area;

(iii) diversion policy after a volcanic ash encounter.

(8) Minimum equipment list (MEL)

Additional provisions in the MEL for dispatching aircraft with unserviceabilities that might affect the following non-exhaustive list of systems:

(i) air conditioning packs;

(ii) engine bleeds;

(iii) pressurisation system;

(iv) electrical power distribution system;

(v) air data system;

(vi) standby instruments;

(vii) navigation systems;

(viii) de-icing systems;

(ix) engine-driven generators;

(x) auxiliary power unit (APU);

(xi) airborne collision avoidance system (ACAS);

(xii) terrain awareness warning system (TAWS);

(xiii) autoland systems;

(xiv) provision of crew oxygen;

(xv) supplemental oxygen for passengers.

(9) Standard operating procedures
Crew training to ensure they are familiar with normal and abnormal operating procedures and particularly any changes regarding but not limited to:

(i) pre-flight planning;
(ii) in-flight monitoring of volcanic ash cloud affected areas and avoidance procedures;
(iii) diversion;
(iv) communications with ATC;
(v) in-flight monitoring of engine and systems potentially affected by volcanic ash cloud contamination;
(vi) recognition and detection of volcanic ash clouds and reporting procedures;
(vii) in-flight indications of a volcanic ash cloud encounter;
(viii) procedures to be followed if a volcanic ash cloud is encountered;
(ix) unreliable or erroneous airspeed;
(x) non-normal procedures for engines and systems potentially affected by volcanic ash cloud contamination;
(xi) engine-out and engine relight;
(xii) escape routes; and
(xiii) operations to/from aerodromes/operating sites contaminated with volcanic ash.

(10) Provision for aircraft technical log

This should ensure:

(i) systematic entry in the aircraft technical log related to any actual or suspected volcanic ash encounter whether in-flight or at an aerodrome/operating site; and

(ii) checking, prior to flight, of the completion of maintenance actions related to an entry in the aircraft technical log for a volcanic ash cloud encounter on a previous flight.
(11) **Incident reporting**

Crew requirements for:

(i) reporting an airborne volcanic ash cloud encounter (VAR);

(ii) post-flight volcanic ash cloud reporting (VAR);

(iii) reporting non-encounters in airspace forecast to be contaminated; and

(iv) filing a mandatory occurrence report in accordance with AOGR.GEN.160.

(12) **Continuing airworthiness procedures**

Procedures when operating in or near areas of volcanic ash cloud contamination:

(i) enhancement of vigilance during inspections and regular maintenance and appropriate adjustments to maintenance practices;

(ii) definition of a follow-up procedure when a volcanic ash cloud encounter has been reported or suspected;

(iii) thorough investigation for any sign of unusual or accelerated abrasions or corrosion or of volcanic ash accumulation;

(iv) reporting to TCHs and the relevant authorities observations and experiences from operations in areas of volcanic ash cloud contamination;

(v) completion of any additional maintenance recommended by the TCH or by the Competent Authority.

(f) **Reporting**

The operator should ensure that reports are immediately submitted to the nearest ATS unit using the VAR/AIREP procedures followed up by a more detailed VAR on landing together with, as applicable, and an aircraft technical log entry for:

(1) any incident related to volcanic clouds;

(2) any observation of volcanic ash activity; and
(3) any time that volcanic ash is not encountered in an area where it was forecast to be.

(g) References

Further guidance on volcanic ash safety risk assessment is given in ICAO Doc. 9974 (Flight safety and volcanic ash – Risk management of flight operations with known or forecast volcanic ash contamination)
SAFETY RISK ASSESSMENT — RISK REGISTER
The results of the assessment of the potential adverse consequences or outcome of each hazard may be recorded by the operator in a risk register, an example of which is provided below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Incident Sequence Description</th>
<th>Existing Controls</th>
<th>Outcome (Pre-Mitigation)</th>
<th>Additional Mitigation Required</th>
<th>Outcome (Pre-Mitigation)</th>
<th>Actions and Owners</th>
<th>Monitoring and Review Requirements</th>
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</table>
AMC1 AOCR.GEN.200 (a) (4) Management system

TRAINING AND COMMUNICATION ON SAFETY

(a) Training

(1) All personnel should receive safety training as appropriate for their safety responsibilities.

(2) Adequate records of all safety training provided should be kept.

(b) Communication

(1) The operator should establish communication about safety matters that:

(i) ensures that all personnel are aware of the safety management activities as appropriate for their safety responsibilities;

(ii) conveys safety critical information, especially relating to assessed risks and analysed hazards;

(iii) explains why particular actions are taken; and

(iv) explains why safety procedures are introduced or changed.

(2) Regular meetings with personnel where information, actions and procedures are discussed may be used to communicate safety matters.

GM1 AOCR.GEN.200 (a) (4) Management system

TRAINING AND COMMUNICATION ON SAFETY
The safety training programme may consist of self-instruction via the media (newsletters, flight safety magazines), class-room training, e-learning or similar training provided by training service providers.

AMC1 AOCR.GEN.200 (a) (5) Management system

MANAGEMENT SYSTEM DOCUMENTATION – GENERAL

(a) The operator’s management system documentation should at least include the following information:
(1) a statement signed by the accountable manager to confirm that the operator will continuously work in accordance with the applicable requirements and the operator’s documentation as required by this Annex;

(2) the operator’s scope of activities;

(3) the titles and names of persons referred to in AOCR.GEN.210 (a) and (b);

(4) an operator chart showing the lines of responsibility between the persons referred to in AOCR.GEN.210;

(5) a general description and location of the facilities referred to in AOCR.GEN.215;

(6) procedures specifying how the operator ensures compliance with the applicable requirements;

(7) the amendment procedure for the operator’s management system documentation.

(b) The operator’s management system documentation may be included in a separate manual or in (one of) the manual(s) as required by the applicable Subpart(s). A cross reference should be included.

**AMC2 AOCR.GEN.200 (a) (5) Management system**

**COMPLEX OPERATORS – SAFETY MANAGEMENT MANUAL**

(a) The safety management manual (SMM) should be the key instrument for communicating the approach to safety for the whole of the operator. The SMM should document all aspects of safety management, including the safety policy, objectives, procedures and individual safety responsibilities.

(b) The contents of the safety management manual should include all of the following:

(1) scope of the safety management system;

(2) safety policy and objectives;

(3) safety accountability of the accountable manager;

(4) safety responsibilities of key safety personnel;
(5) documentation control procedures;

(6) hazard identification and risk management schemes;

(7) safety action planning;

(8) safety performance monitoring;

(9) incident investigation and reporting;

(10) emergency response planning;

(11) management of change (including organisational changes with regard to safety responsibilities);

(12) safety promotion.

(c) The SMM may be contained in (one of) the manual(s) of the operator.

**GM1 AOCR.GEN.200 (a) (5) Management system**

**MANAGEMENT SYSTEM DOCUMENTATION – GENERAL**

(a) It is not required to duplicate information in several manuals. The information may be contained in any of the operator manuals (e.g. operations manual, training manual), which may also be combined.

(b) The operator may also choose to document some of the information required to be documented in separate documents (e.g. procedures). In this case, it should ensure that manuals contain adequate references to any document kept separately. Any such documents are then to be considered an integral part of the operator’s management system documentation.

**AMC1 AOCR.GEN.200 (a) (6) Management system**

**COMPLIANCE MONITORING – GENERAL**

(a) Compliance monitoring

The implementation and use of a compliance monitoring function should enable the operator to monitor compliance with the relevant requirements of this Annex and other applicable Annexes.

(1) The operator should specify the basic structure of the compliance monitoring function applicable to the activities conducted.
(2) The compliance monitoring function should be structured according to the size of the operator and the complexity of the activities to be monitored.

(b) Organisations should monitor compliance with the procedures they have designed to ensure safe activities. In doing so, they should as a minimum, and where appropriate, monitor compliance with:

1. privileges of the operator;
2. manuals, logs, and records;
3. training standards;
4. management system procedures and manuals.

(c) Organisational set up

1. To ensure that the operator continues to meet the requirements of this Part and other applicable Parts, the accountable manager should designate a compliance monitoring manager. The role of the compliance monitoring manager is to ensure that the activities of the operator are monitored for compliance with the applicable regulatory requirements, and any additional requirements as established by the operator, and that these activities are being carried out properly under the supervision of the relevant head of functional area.

2. The compliance monitoring manager should be responsible for ensuring that the compliance monitoring programme is properly implemented, maintained and continually reviewed and improved.

3. The compliance monitoring manager should:

   (i) have direct access to the accountable manager;

   (ii) not be one of the other persons referred to in AOCR.GEN.210 (b);

   (iii) be able to demonstrate relevant knowledge, background and appropriate experience related to the activities of the operator, including knowledge and experience in compliance monitoring; and
(iv) have access to all parts of the operator, and as necessary, any contracted operator.

(4) In the case of a non-complex operator, this task may be exercised by the accountable manager provided he/she has demonstrated having the related competence as defined in (c)(3)(iii).

(5) In the case the same person acts as compliance monitoring manager and as safety manager, the accountable manager, with regards to his/her direct accountability for safety, should ensure that sufficient resources are allocated to both functions, taking into account the size of the operator and the nature and complexity of its activities.

(6) The independence of the compliance monitoring function should be established by ensuring that audits and inspections are carried out by personnel not responsible for the function, procedure or products being audited.

(d) Compliance monitoring documentation

(1) Relevant documentation should include the relevant part(s) of the operator’s management system documentation.

(2) In addition, relevant documentation should also include the following:

(i) terminology;

(ii) specified activity standards;

(iii) a description of the operator;

(iv) the allocation of duties and responsibilities;

(v) procedures to ensure regulatory compliance;

(vi) the compliance monitoring programme, reflecting:

(A) schedule of the monitoring programme;

(B) audit procedures;

(C) reporting procedures;

(D) follow-up and corrective action procedures; and
(E) recording system.

(vii) the training syllabus referred to in (e) (2);

(viii) document control.

(e) Training

(1) Correct and thorough training is essential to optimise compliance in every operator. In order to achieve significant outcomes of such training, the operator should ensure that all personnel understand the objectives as laid down in the operator’s management system documentation.

(2) Those responsible for managing the compliance monitoring function should receive training on this task. Such training should cover the requirements of compliance monitoring, manuals and procedures related to the task, audit techniques, reporting and recording.

(3) Time should be provided to train all personnel involved in compliance management and for briefing the remainder of the personnel.

(4) The allocation of time and resources should be governed by the volume and complexity of the activities concerned.

GM1 AOXR.GEN.200 (a) (6) Management system

COMPLIANCE MONITORING – GENERAL

(a) The organisational set-up of the compliance monitoring function should reflect the size of the operator and the nature and complexity of its activities. The compliance monitoring manager may perform all audits and inspections himself/herself or appoint one or more auditors by choosing personnel having the related competence as defined in AMC1 AOXR.GEN.200(a)(6) point (c)(3)(iii), either from within or outside the operator.

(b) Regardless of the option chosen it must be ensured that the independence of the audit function is not affected, in particular in cases where those performing the audit or inspection are also responsible for other functions for the operator.
(c) In case external personnel are used to perform compliance audits or inspections:

(1) any such audits or inspections are performed under the responsibility of the compliance monitoring manager; and

(2) the operator remains responsible to ensure that the external personnel have relevant knowledge, background and experience as appropriate to the activities being audited or inspected; including knowledge and experience in compliance monitoring.

(d) The operator retains the ultimate responsibility for the effectiveness of the compliance monitoring function in particular for the effective implementation and follow-up of all corrective actions.

**GM2 AOCR.GEN.200 (a) (6) Management system**

**COMPLEX OPERATORS – COMPLIANCE MONITORING PROGRAMME**

(a) Typical subject areas for compliance monitoring audits and inspections for operators should be, as applicable:

(1) actual flight operations;

(2) ground de-icing/anti-icing;

(3) flight support services;

(4) load control;

(5) technical standards.

(b) Operators should 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, where appropriate, additionally monitor the following:

(1) operational procedures;

(2) flight safety procedures;

(3) operational control and supervision;

(4) aircraft performance;
(5) all weather operations;
(6) communications and navigational equipment and practices;
(7) mass, balance and aircraft loading;
(8) instruments and safety equipment;
(9) ground operations;
(10) flight and duty time limitations, rest requirements, and scheduling;
(11) aircraft maintenance/operations interface;
(12) use of the MEL;
(13) flight crew;
(14) cabin crew;
(15) dangerous goods;
(16) security.

**GM3 AOCR.GEN.200 (a) (6) Management system**

**NON-COMPLEX OPERATORS – COMPLIANCE MONITORING**

Compliance monitoring audits and inspections may be documented on a “Compliance Monitoring Checklist”, and any findings recorded in a “Non-compliance Report”. The following documents may be used for this purpose.
## Compliance Monitoring Checklist

<table>
<thead>
<tr>
<th>Subject</th>
<th>Date checked</th>
<th>Checked by</th>
<th>Comments / Non-compliance Report No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flight Operations</strong></td>
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<tr>
<td>Aircraft checklists checked for accuracy and validity</td>
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<tr>
<td>Minimum five flight plans checked and verified for proper and correct information</td>
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<tr>
<td>Flight planning facilities checked for updated manuals, documents and access to relevant flight information</td>
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<tr>
<td>Incident reports evaluated and reported to the appropriate competent authority</td>
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<tr>
<td><strong>Ground Handling</strong></td>
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<tr>
<td>Contracts with ground handling organisations established and valid, if applicable</td>
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<tr>
<td>Instructions regarding fuelling and de-icing issued, if applicable</td>
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<tr>
<td>Instructions regarding dangerous goods issued and known by all relevant personnel, if applicable</td>
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<td><strong>Mass &amp; Balance</strong></td>
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<td>Min. five load sheets checked and verified for proper and correct information, if applicable</td>
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<tr>
<td>Aircraft fleet checked for valid weight check, if applicable</td>
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<td>Minimum one check per aircraft of correct loading and distribution, if applicable</td>
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<td><strong>Training</strong></td>
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<tr>
<td>Training records updated and accurate</td>
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<td>All pilot licenses checked for currency, correct ratings and valid medical check</td>
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<tr>
<td>All pilots received recurrent training</td>
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<td>Training facilities &amp; Instructors approved</td>
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<td>All pilots received daily inspection (DI) training</td>
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<tr>
<td><strong>Documentation</strong></td>
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<tr>
<td>All issues of operations manual (OM) checked for correct amendment status</td>
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<tr>
<td>AOC checked for validity and appropriate operations specifications</td>
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<tr>
<td>Aviation requirements applicable and updated</td>
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<tr>
<td>Crew flight and duty time record updated, if applicable</td>
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<td>Flight documents record checked and updated</td>
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<tr>
<td>Compliance monitoring records checked and updated</td>
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### Non-Compliance Report

**To Compliance Monitoring Manager**

**Reported by:**

**Date:**

<table>
<thead>
<tr>
<th>Category</th>
<th>Description:</th>
<th>Reference:</th>
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<tr>
<td>Flight Operations</td>
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<td>Ground Handling</td>
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<td>Mass &amp; Balance</td>
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<tr>
<td>Other</td>
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</table>

**Level of finding:**

**Root-cause of non-compliance:**

**Suggested correction:**

**Compliance Monitoring Manager:**

- [ ] Corrective action required
- [ ] Corrective action not required

**Responsible Person:**

**Corrective action:**

**Time limitation:**

**Reference:**

**Signature Responsible Person:**

**Date:**

**Compliance Monitoring Manager**

- [ ] Correction and corrective action verified
- [ ] Report Closed

**Signature Compliance Monitoring Manager:**

**Date:**
AUDIT AND INSPECTION

(a) “Audit” means a systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which requirements are complied with.

(b) “Inspection” means an independent documented conformity evaluation by observation and judgement accompanied as appropriate by measurement, testing or gauging, in order to verify compliance with applicable requirements.

AMC1 AOAR.GEN.200 (b) Management system

SIZE, NATURE AND COMPLEXITY OF THE ACTIVITY

(a) An operator should be considered as complex when it has a workforce of more than 20 full time equivalents (FTEs).

(b) Operators with up to 20 FTEs may also be considered complex based on an assessment of the following factors:

(1) in terms of complexity, the extent and scope of contracted activities subject to the approval;

(2) in terms of risk criteria, whether any of the following are present:

(i) operations requiring the following specific approvals: performance-based navigation (PBN), low visibility operation (LVO), extended range operations with two-engined aeroplanes (ETOPS), helicopter hoist operation (HHO), helicopter emergency medical service (HEMS), night vision imaging system (NVIS) and dangerous goods (DG);

(ii) different types of aircraft used;

(iii) the environment (offshore, mountainous area etc.).

AOAR.GEN.205 Contracted activities

(a) Contracted activities include all activities within the operator’s scope of approval that are performed by another organisation either itself certified to carry out such activity or if not certified, working under the operator’s approval. The operator shall ensure that when contracting
or purchasing any part of its activity, the contracted or purchased service or product conforms to the applicable requirements.

(b) When the certified operator contracts any part of its activity to an organisation that is not itself certified in accordance with these requirements to carry out such activity, the contracted organisation shall work under the approval of the operator. The contracting organisation shall ensure that the Authority is given access to the contracted organisation, to determine continued compliance with the applicable requirements.

**AMC1 AOCR.GEN.205 Contracted activities**

**RESPONSIBILITY WHEN CONTRACTING ACTIVITIES.**

(a) The operator may decide to contract certain activities to external organisations.

(b) A written agreement should exist between the operator and the contracted organisation clearly defining the contracted activities and the applicable requirements.

(c) The contracted safety related activities relevant to the agreement should be included in the operator’s safety management and compliance monitoring programmes.

(d) The operator should ensure that the contracted organisation has the necessary authorisation or approval when required, and commands the resources and competence to undertake the task.

**GM1 AOCR.GEN.205 Contracted activities**

**CONTRACTING – GENERAL**

(a) Operators may decide to contract certain activities to external organisations for the provision of services related to areas such as:

(1) ground de-icing/anti-icing;

(2) ground handling;

(3) flight support (including performance calculations, flight planning, navigation database and dispatch);

(4) training; and
(5) manual preparation.

(b) The ultimate responsibility for the product or service provided by external organisations should always remain with the operator.

**GM2 AOCR.GEN.205 Contracted activities**

**RESPONSIBILITY WHEN CONTRACTING ACTIVITIES**

(a) Regardless of the approval status of the contracted organisation, the contracting operator is responsible to ensure that all contracted activities are subject to hazard identification and risk management as required by AOCR.GEN.200 (a)(3) and to compliance monitoring as required by AOCR.GEN.200 (a)(6).

(b) When the contracted organisation is itself certified to carry out the contracted activities, the operator’s compliance monitoring should at least check that the approval effectively covers the contracted activities and that it is still valid.

**AOCR.GEN.210 Personnel requirements**

(a) The operator shall appoint an accountable manager, who has the authority for ensuring that all activities can be financed and carried out in accordance with the applicable requirements. The accountable manager shall be responsible for establishing and maintaining an effective management system.

(b) A person or group of persons shall be nominated by the operator, with the responsibility of ensuring that the operator remains in compliance with the applicable requirements. Such person(s) shall be ultimately responsible to the accountable manager.

(c) The operator shall have sufficient qualified personnel for the planned tasks and activities to be performed in accordance with the applicable requirements.

(d) The operator shall maintain appropriate experience, qualification and training records to show compliance with point I.

(e) The operator shall ensure that all personnel are aware of the rules and procedures relevant to the exercise of their duties.

**AOCR.GEN.215 Facility requirements**
The operator shall have facilities allowing the performance and management of all planned tasks and activities in accordance with the applicable requirements.

**AOCR.GEN.220 Record-keeping**

(a) The operator shall establish a system of record-keeping that allows adequate storage and reliable traceability of all activities developed, covering in particular all the elements indicated in AOCR.GEN.200.

(b) The format of the records shall be specified in the operator's procedures.

(c) Records shall be stored in a manner that ensures protection from damage, alteration and theft.

**AMC1 AOCR.GEN.220 (b) Record-keeping**

**GENERAL**

(a) The record-keeping system should ensure that all records are accessible whenever needed within a reasonable time. These records should be organised in a way that ensures traceability and retrievability throughout the required retention period.

(b) Records should be kept in paper form or in electronic format or a combination of both. Records stored on microfilm or optical disc format are also acceptable. The records should remain legible throughout the required retention period. The retention period starts when the record has been created or last amended.

(c) Paper systems should use robust material which can withstand normal handling and filing. Computer systems should have at least one backup system which should be updated within 24 hours of any new entry. Computer systems should include safeguards against the ability of unauthorised personnel to alter the data.

(d) All computer hardware used to ensure data backup should be stored in a different location from that containing the working data and in an environment that ensures they remain in good condition. When hardware or software changes take place, special care should be taken that all necessary data continues to be accessible at least through the full period specified in the relevant Subpart. In the absence of such indication, all records should be kept for a minimum period of 5 years.
**GM1 AOCR.GEN.220 (b) Record-keeping**

**RECORDS**

*Microfilming or optical storage of records may be carried out at any time. The records should be as legible as the original record and remain so for the required retention period.*

**C. AIRCRAFT OPERATOR CERTIFICATION**

**AOCR.AOC.100 Application for an air operator certificate**

(a) Prior to commencing commercial air operations, the operator shall apply for and obtain an air operator certificate (AOC) issued by the Authority.

(b) The operator shall provide the following information to the Authority:

1. the official name and business name, address, and mailing address of the applicant;
2. a description of the proposed operation, including the type(s), and number of aircraft to be operated;
3. a description of the management system, including organisational structure;
4. the name of the accountable manager;
5. the names of the nominated persons required by AOCR.AOC.135 (a) together with their qualifications and experience; and
6. a copy of the operations manual required by AOCR.MLR.100.
7. a statement that all the documentation sent to the Authority have been verified by the applicant and found in compliance with the applicable requirements.

(c) Applicants shall demonstrate to the Authority that:

1. they comply with all the applicable requirements.
2. all aircraft operated have a certificate of airworthiness (CofA) in accordance with MCAR-PART-21; and
(3) its organisation and management are suitable and properly matched to the scale and scope of the operation.

**AMC1 AOCR.AOC.100 Application for an air operator certificate (AOC)**

**APPLICATION TIME FRAMES**

The application for the initial issue of an AOC should be submitted at least 180 days before the intended start date of operation. The operations manual may be submitted later, but in any case not later than 60 days before the intended start date of operation.

**AMC1 ORO.AOC.100 (a) Application for an air operator certificate**

**OPERATOR SECURITY PROGRAMME**

In accordance with National Aviation Security Programme of the Republic of Mauritius and GM1 AOCR.SEC.100 Training Programmes, as part of granting the AOC, the CAT operator should provide the competent authority with the operator’s security programme, including security training. The security programme should be adapted to the type and area of operation, as well as to the aircraft operated.

**AOCR.AOC.105 Operations specifications and privileges of an AOC holder**

The privileges of the operator, including those granted in accordance with Chapter 5, shall be specified in the operations specifications of the certificate.

**AOCR.AOC.110 Leasing agreement**

**Any lease-in**

(a) Any lease agreement concerning aircraft used by an operator certified in accordance with these requirements shall be subject to prior approval by the Authority.

(b) The operator certified in accordance with this Part shall only wet lease-in aircraft from an operator that is not subject to an operating ban.
Wet lease-in

(c) The applicant for the approval of the wet lease-in of an aircraft of a third country operator shall demonstrate to the Authority that:

(1) the third country operator holds a valid AOC issued in accordance with ICAO Annex 6;

(2) the safety standards of the third country operator with regard to continuing airworthiness and air operations are equivalent to the applicable requirements established by this Regulation; and

(3) the aircraft has a standard CofA issued in accordance with ICAO Annex 8.

Dry lease-in

(d) An applicant for the approval of the dry lease-in of an aircraft registered in a third country shall demonstrate to the Authority that:

(1) an operational need has been identified that cannot be satisfied through leasing an aircraft registered in Mauritius;

(2) the duration of the dry lease-in does not exceed seven months in any 12 consecutive month period; and

(3) compliance with the applicable requirements of MCAR-Airworthiness is ensured.

Dry lease-out

(e) The operator certified in accordance with these requirements intending to dry lease-out one of its aircraft shall apply for prior approval by the Authority. The application shall be accompanied by copies of the intended lease agreement or description of the lease provisions, except financial arrangements, and all other relevant documentation.

Wet lease-out

(f) Prior to the wet lease-out of an aircraft, the operator certified in accordance with these requirements shall notify the Authority.
AMC1 AOCR.AOC.110 Leasing agreement

GENERAL

The operator intending to lease-in an aircraft should provide the Authority with the following information:

(a) the aircraft type, registration markings and serial number;
(b) the name and address of the registered owner;
(c) a copy of the valid certificate of airworthiness;
(d) a copy of the lease agreement or description of the lease provisions, except financial arrangements;
(e) duration of the lease; and
(f) in case of wet lease-in a copy of the AOC of the third country operator and the areas of operation.

The information mentioned above should be accompanied by a statement signed by the lessee that the parties to the lease agreement fully understand their respective responsibilities under the applicable regulations.

AMC1 AOCR.AOC.110(c) Leasing agreement

WET LEASE-IN

An Operator should demonstrate to the Authority that the standards complied with are equivalent to the following requirements:

(a) for commercial air transport (CAT) operations;

(b) Subparts:

(1) GEN.110 and Section 2 of Subpart GEN;
(2) MLR, excluding MLR.105;
(3) FC;
(4) CC, excluding CC.200 and CC.210 (a);
(5) TC;
(6) **FTL, including related CS-FTL; and**

(7) **SEC;**

(8) **SPA, if applicable;**

(c) **for continuing airworthiness management of the third country operator, Part-M5 Subpart-B, Subpart-C and Subpart-G, excluding M.A.707, and M.A.710;**

(d) **for the maintenance organisation used by the third country operator during the lease period: Part-145; and**

(e) **the operator shall provide the Authority with a full description of the flight time limitation scheme(s), operating procedures and safety assessment demonstrating compliance with the safety objectives set out in points (b) (1)-(8).**

**AMC2 AOCR.AOC.110(c) Leasing agreement**

**WET LEASE-IN**

The lessee should maintain a record of occasions when lessors are used, for inspection by the State that issued its AOC.

**GM1 AOCR.AOC.110(c) Leasing agreement**

**SHORT TERM WET LEASE-IN**

In anticipation of an operational need the operator may enter into a framework agreement with more than one third country operator provided that these operators comply with AOCR.AOC.110 (c). These third country operators should be placed in a list maintained by the lessee.

**AMC1 AOCR.AOC.110 (f) Leasing agreement**

**WET LEASE-OUT**

When notifying the Authority. The operator intending to wet lease-out an aircraft should provide the Authority with the following information:

(a) **the aircraft type, registration markings and serial number;**

(b) **the name and address of the lessee;**
(c) a copy of the lease agreement or description of the lease provisions, except financial arrangements; and

(d) the duration of the lease agreement.

**AOCR.AOC.115 Code-share agreements**

(a) An operator certified in accordance with these requirements shall enter into a code-share agreement with a third country operator only after:

(1) having verified that the third country operator complies with the applicable ICAO standards; and

(2) having provided the Authority with documented information enabling the authority to comply with requirements.

(b) When implementing the code-share agreement the operator shall monitor and regularly assess the ongoing compliance of the third country operator with the applicable ICAO standards.

(c) The operator certified in accordance with these requirements shall not sell and issue tickets for a flight operated by a third country operator when the third country operator is subject to an operating ban or is failing to maintain compliance with the applicable ICAO standards.

**AMC1 AOCR.AOC.115 (a) (1) Code share agreements**

**INITIAL VERIFICATION OF COMPLIANCE**

(a) In order to verify the third country operator’s compliance with the applicable ICAO standards, in particular ICAO annexes 1, 2, 6, Part I and III, as applicable, 8 and 18, the Mauritian operator should conduct an audit of the third country operator, including interviews of personnel and inspections carried out at the third country operator’s facilities.

(b) The audit should focus on the operational, management and control systems of the operator.

**AMC1 AOCR.AOC.115 (b) Code share arrangements**

**CODE-SHARE AUDIT PROGRAMME**

(a) Operators should establish a code-share audit programme for monitoring continuous compliance of the third country operator with the
applicable ICAO standards. Such code-share audit programme should include:

(1) the audit methodology (audit report + compliance statements);
(2) details of the specific operational areas to audit;
(3) criteria for defining satisfactory audit results;
(4) a system for reporting and correcting findings;
(5) a continuous monitoring system;
(6) auditor qualification and authorisation; and
(7) the frequency of audits.

(b) The third country code-share operator should be audited at periods not exceeding 24 months. The beginning of the first 24-month oversight planning cycle is determined by the date of the first audit and should then determine the start and end dates of the recurrent 24-month planning cycle. The interval between two audits should not exceed 24 months.

(c) The operator should ensure a renewal audit of each third country code-share operator prior to the audit expiry date of the previous audit. The audit expiry date for the previous audit becomes the audit effective date for the renewal audit provided the closing meeting for the renewal audit is within 150 days prior to the audit expiry date for the previous audit. If the closing meeting for the renewal audit is more than 150 days prior to the audit expiry date from the previous audit, then the audit effective date for the renewal audit is the day of the closing meeting of the renewal audit. Renewal audits are valid for 24 consecutive months beginning with the audit effective date and ending with the audit expiry date.

(d) A code-share audit could be shared by several operators. In case of a shared audit the report should be made available for review by all duly identified sharing operators by any means.

(e) After closure of all findings identified during the audit, the operator should submit an audit compliance statement to the Authority demonstrating that the third country operator meets all the applicable safety standards.
AMC2 AOCR.AOC.115 (b) Code share agreements

THIRD PARTY PROVIDERS

(a) The initial audit and/or the continuous monitoring may be performed by a third party provider on behalf of the operator when it is demonstrated that:

(1) a documented arrangement has been established with the third party provider;

(2) the audit standards applied by the third party provider addresses the scope of the regulation in sufficient detail;

(3) the third party provider uses an evaluation system, designed to assess the operational, management and control systems of the third country code-share operator;

(4) independence of the third party provider, its evaluation system as well as the impartiality of the auditors is ensured;

(5) the auditors are appropriately qualified and have sufficient knowledge, experience and training, including on-the-job training, to perform their allocated tasks;

(6) audits are performed on-site;

(7) access to the relevant data and facilities is granted to the level of detail necessary to verify compliance with the applicable requirements;

(8) access to the full audit report is granted to the operator;

(9) procedures have been established for monitoring continued compliance of the third country code-share operator with the applicable requirements, taking into account the timelines in AMC1 AOCR.AOC.115(b)(b) and (c);

(10) procedures have been established to notify the third country code-share operator of any non-compliance with the applicable requirements, the corrective actions to be taken, the follow up of these corrective actions and closure of findings;

(b) The use of a third party provider for the initial audit or the monitoring of continuous compliance of the third country code-share operator does not exempt the operator from its responsibility under AOCR.AOC.115.
(c) The operator should maintain a list of the third country code-share operators monitored by the third party provider. This list and the full audit report prepared by the third party provider should be made available to the Authority upon request.

AOCR.AOC.120 Approvals to provide cabin crew training and to issue cabin crew attestations

(a) When intending to provide the training course required in Part-CC, the operator shall apply for and obtain an approval issued by the Authority. For this purpose, the applicant shall demonstrate compliance with the requirements for the conduct and content of training course established in CC.TRA.215 and CC.TRA.220 of these requirements and shall provide the Authority with:

(1) the date of intended commencement of activity;

(2) the personal details and qualifications of the instructors as relevant to the training elements to be covered;

(3) the name(s) and address(es) of the training site(s) at which the training is to be conducted;

(4) a description of the facilities, training methods, manuals and representative devices to be used; and

(5) the syllabi and associated programmes for the training course.

(b) The operator may be approved to issue cabin crew attestations, the applicant shall, in addition to (a):

(1) demonstrate to the Authority that:

(i) the organisation has the capability and accountability to perform this task;

(ii) the personnel conducting examinations are appropriately qualified and free from conflict of interest; and

(2) provide the procedures and the specified conditions for:

(i) conducting the examination required by CC.TRA.220;

(ii) issuing cabin crew attestations; and
(iii) supplying the Authority with all relevant information and documentation related to the attestations it will issue and their holders, for the purpose of record-keeping, oversight and enforcement actions by that authority.

(c) The approvals referred to in (a) and (b) shall be specified in the operations specifications.

**AOCR.AOC.125 Non-commercial operations of aircraft listed in the operations specifications by the holder of an AOC**

The holder of an AOC may conduct non-commercial operations with an aircraft otherwise used for commercial air transport operations that is listed in the operations specifications of its AOC, provided that the operator:

(a) describes such operations in detail in the operations manual, including:

1. identification of the applicable requirements;

2. a clear identification of any differences between operating procedures used when conducting commercial and non-commercial operations;

3. a means of ensuring that all personnel involved in the operation are fully familiar with the associated procedures;

(b) submits the identified differences between the operating procedures referred to in (a)(2) to the Authority for prior approval.

**AOCR.AOC.130 Flight data monitoring — aeroplanes**

(a) The operator shall establish and maintain a flight data monitoring system, which shall be integrated in its management system, for aeroplanes with a maximum certificated take-off mass of more than 27 000 kg.

(b) The flight data monitoring system shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

**AMC1 AOCR.AOC.130 Flight data monitoring — aeroplanes**

**FLIGHT DATA MONITORING (FDM) PROGRAMME**

(a) The safety manager, as defined under AMC1-AOCR.GEN.200(a)(1), should be responsible for the identification and assessment of issues
and their transmission to the manager(s) responsible for the process(es) concerned. The latter should be responsible for taking appropriate and practicable safety action within a reasonable period of time that reflects the severity of the issue.

(b) An FDM programme should allow an operator to:

(1) identify areas of operational risk and quantify current safety margins;

(2) identify and quantify operational risks by highlighting occurrences of non-standard, unusual or unsafe circumstances;

(3) use the FDM information on the frequency of such occurrences, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues;

(4) put in place appropriate procedures for remedial action once an unacceptable risk, either actually present or predicted by trending, has been identified; and

(5) confirm the effectiveness of any remedial action by continued monitoring.

(c) FDM analysis techniques should comprise the following:

(1) Exceedance detection: searching for deviations from aircraft 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 provided in Appendix 1 to AMC1 AOCR.AOC.130. The event detection limits should be continuously reviewed to reflect the operator’s current operating procedures.

(2) All flights measurement: a system defining what is normal practice. This may be accomplished by retaining various snapshots of information from each flight.

(3) Statistics – a series of data collected to support the analysis process: this technique should include the number of flights flown per aircraft and sector details sufficient to generate rate and trend information.

(d) DM analysis, assessment and process control tools: the effective assessment of information obtained from digital flight data should be
dependent on the provision of appropriate information technology tool sets.

(e) Education and publication: sharing safety information should be 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.

(f) Accident and incident data requirements specified in AOCR.GEN.MPA.195 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.

(g) Every crew member should be responsible to report events. Significant risk-bearing incidents detected by FDM should 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 should be included under the normal process for reporting and analysing hazards, incidents and accidents.

(h) 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.

(i) The data retention strategy should aim to provide the greatest safety benefits practicable from the available data. A full dataset should be retained until the action and review processes are complete; thereafter, a reduced dataset relating to closed issues should 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.).

(j) The 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.

(k) The procedure to prevent disclosure of crew identity should be written in a document, which should be signed by all parties (airline management, flight crew member representatives nominated either by the union or the flight crew themselves). This procedure should, as a minimum, define:

(1) the aim of the FDM programme;
(2) a data access and security policy that should restrict access to information to specifically authorised persons identified by their position;

(3) the method to obtain de-identified crew feedback on those occasions that require specific flight follow-up for contextual information; where such crew contact is required the authorised person(s) need not necessarily be the programme manager or safety manager, but could be a third party (broker) mutually acceptable to unions or staff and management;

(4) the data retention policy and accountability including the measures taken to ensure the security of the data;

(5) the conditions under which advisory briefing or remedial training should take place; this should always be carried out in a constructive and non-punitive manner;

(6) the conditions under which the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern;

(7) the participation of flight crew member representative(s) in the assessment of the data, the action and review process and the consideration of recommendations; and

(8) the policy for publishing the findings resulting from FDM.

Airborne systems and equipment used to obtain FDM data should range from an already installed full quick access recorder (QAR), 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 should ensure that FDM use does not adversely affect the serviceability of equipment required for accident investigation.

GM1 AOCR.AOC.130 Flight data monitoring – aeroplanes

DEFINITION OF AN FDM PROGRAMME

For the purposes of this Guidance Material, an FDM programme may be defined as a proactive and non-punitive programme for gathering and analysing data recorded during routine flights to improve aviation safety.

(a) FDM analysis techniques
(1) Exceedance detection

(i) FDM programmes are used for detecting exceedances, such as deviations from flight manual limits, standard operating procedures (SOPs), or good airmanship. Typically, a set of core events establishes the main areas of interest to operators.

Examples: high lift-off rotation rate, stall warning, ground proximity warning system (GPWS) warning, flap limit speed exceedance, fast approach, high/low on glideslope, and heavy landing.

(ii) Trigger logic expressions may be simple exceedances such as redline values. The majority, however, are composites that define a certain flight mode, aircraft configuration or payload related condition. Analysis software can also assign different sets of rules dependent on airport or geography. For example, noise sensitive airports may use higher than normal glideslopes on approach paths over populated areas. In addition, it might be valuable to define several levels of exceedance severity (such as low, medium and high).

(iii) Exceedance detection provides useful information, which can complement that provided in crew reports.

Examples: reduced flap landing, emergency descent, engine failure, rejected take-off, go-around, airborne collision avoidance system (ACAS) or GPWS warning, and system malfunctions.

(iv) The operator may also modify the standard set of core events to account for unique situations they regularly experience, or the SOPs they use.

Example: to avoid nuisance exceedance reports from a non-standard instrument departure.

(v) The operator may also define new events to address specific problem areas.

Example: restrictions on the use of certain flap settings to increase component life.
(2) All-flights measurements

FDM data are retained from all flights, not just the ones producing significant events. A selection of parameters is retained that is sufficient to characterise each flight and allow a comparative analysis of a wide range of operational variability. Emerging trends and tendencies may be identified and monitored before the trigger levels associated with exceedances are reached.

Examples of parameters monitored: take-off weight, flap setting, temperature, rotation and lift-off speeds versus scheduled speeds, maximum pitch rate and attitude during rotation, and gear retraction speeds, heights and times.

Examples of comparative analyses: pitch rates from high versus low take-off weights, good versus bad weather approaches, and touchdowns on short versus long runways.

(3) Statistics

Series of data are collected to support the analysis process: these usually include the numbers of flights flown per aircraft and sector details sufficient to generate rate and trend information.

(4) Investigation of incidents flight data

Recorded flight data provide valuable information for follow-up to incidents and other technical reports. They are useful in adding to the impressions and information recalled by the flight crew. They also provide an accurate indication of system status and performance, which may help in determining cause and effect relationships.

Examples of incidents where recorded data could be useful:

- high cockpit workload conditions as corroborated by such indicators as late descent, late localizer and/or glideslope interception, late landing configuration;

- unstabilised and rushed approaches, glide path excursions, etc.;

- exceedances of prescribed operating limitations (such as flap limit speeds, engine over temperatures); and

- wake vortex encounters, turbulence encounters or other vertical accelerations.
It should be noted that recorded flight data have limitations, e.g. not all the information displayed to the flight crew is recorded, the source of recorded data may be different from the source used by a flight instrument, the sampling rate or the recording resolution of a parameter may be insufficient to capture accurate information.

(5) Continuing airworthiness

Data of all-flight measurements and exceedance detections can be utilized to assist the continuing airworthiness function. For example, engine-monitoring programmes look at measures of engine performance to determine operating efficiency and predict impending failures.

Examples of continuing airworthiness uses: engine thrust level and airframe drag measurements, avionics and other system performance monitoring, flying control performance, and brake and landing gear usage.

(b) FDM equipment

(1) General

FDM programmes generally involve systems that capture flight data, transform the data into an appropriate format for analysis, and generate reports and visualization to assist in assessing the data. Typically, the following equipment capabilities are needed for effective FDM programmes:

(i) an on-board device to capture and record data on a wide range of in-flight parameters;

(ii) a means to transfer the data recorded on board the aircraft to a ground-based processing station.

(iii) a ground-based computer system to analyse the data, identify deviations from expected performance, generate reports to assist in interpreting the read-outs, etc.; and

(iv) optional software for a flight animation capability to integrate all data, presenting them as a simulation of in-flight conditions, thereby facilitating visualisation of actual events.
(2) Airborne equipment

(i) The flight parameters and recording capacity required for flight data recorders (FDR) to support accident investigations may be insufficient to support an effective FDM programme. Other technical solutions are available, including the following:

(A) Quick access recorders (QARs). QARs are installed in the aircraft and record flight data onto a low-cost removable medium.

(B) Some systems automatically download the recorded information via secure wireless systems when the aircraft is in the vicinity of the gate. There are also systems that enable the recorded data to be analysed on board while the aircraft is airborne.

(ii) Fleet composition, route structure and cost considerations will determine the most cost-effective method of removing the data from the aircraft.

(3) Ground replay and analysis equipment

(i) Data are downloaded from the aircraft recording device into a ground-based processing station, where the data are held securely to protect this sensitive information.

(ii) FDM programmes generate large amounts of data requiring specialized analysis software.

(iii) The analysis software checks the downloaded flight data for abnormalities.

(iv) The analysis software 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.

(c) FDM in practice

(1) FDM process

Typically, operators follow a closed-loop process in applying an FDM programme, for example:
(i) **Establish a baseline:** initially, operators establish a baseline of operational parameters against which changes can be detected and measured.

Examples: rate of unstable approaches or hard landings.

(ii) **Highlight unusual or unsafe circumstances:** the user determines when non-standard, unusual or basically unsafe circumstances occur; by comparing them to the baseline margins of safety, the changes can be quantified.

Example: increases in unstable approaches (or other unsafe events) at particular locations.

(iii) **Identify unsafe trends:** based on the frequency and severity of occurrence, trends are identified. Combined with an estimation of the level of severity, the risks are assessed to determine which may become unacceptable if the trend continues.

Example: a new procedure has resulted in high rates of descent that are nearly triggering GPWS warnings.

(iv) **Mitigate risks:** once an unacceptable risk has been identified, appropriate risk mitigation actions are decided on and implemented.

Example: having found high rates of descent, the SOPs are changed to improve aircraft control for optimum/maximum rates of descent.

(v) **Monitor effectiveness:** once a remedial action has been put in place, its effectiveness is monitored, confirming that it has reduced the identified risk and that the risk has not been transferred elsewhere.

Example: confirm that other safety measures at the aerodrome with high rates of descent do not change for the worse after changes in approach procedures.

(2) **Analysis and follow-up**

(i) **FDM data are typically compiled every month or at shorter intervals.** The data are then reviewed to identify specific
exceedances and emerging undesirable trends and to disseminate the information to flight crews.

(ii) If deficiencies in pilot handling technique are evident, the information is usually de-identified in order to protect the identity of the flight crew. The information on specific exceedances is passed to a person (safety manager, agreed flight crew representative, honest broker) assigned by the operator for confidential discussion with the pilot. The person assigned by the operator provides the necessary contact with the pilot in order to clarify the circumstances, obtain feedback and give advice and recommendations for appropriate action. Such appropriate action could include re-training for the pilot (carried out in a constructive and non-punitive way), revisions to manuals, changes to ATC and airport operating procedures.

(iii) Follow-up monitoring enables the effectiveness of any corrective action to be assessed. Flight crew feedback is essential for the identification and resolution of safety problems and could be collected through interviews, for example by asking the following:

(A) Are the desired results being achieved soon enough?

(B) Have the problems really been corrected, or just relocated to another part of the system?

(C) Have new problems been introduced?

(iv) All events are usually archived in a database. The database is used to sort, validate and display the data in easy-to-understand management reports. Over time, this archived data can provide a picture of emerging trends and hazards that would otherwise go unnoticed.

(v) Lessons learned from the FDM programme may warrant inclusion in the operator’s safety promotion programmes. Safety promotion media may include newsletters, flight safety magazines, highlighting examples in training and simulator exercises, periodic reports to industry and the Authority. Care is required, however, to ensure that any information acquired through FDM is de-identified before using it in any training or promotional initiative.
(vi) All successes and failures are recorded, comparing planned program objectives with expected results. This provides a basis for review of the FDM programme and the foundation for future programme development.

(d) Preconditions for an effective FDM programme

(1) Protection of FDM data

The integrity of FDM programmes rests upon protection of the FDM data. Any disclosure for purposes other than safety management can compromise the voluntary provision of safety data, thereby compromising flight safety.

(2) Essential trust

The trust established between management and flight crew is the foundation for a successful FDM programme. This trust can be facilitated by:

(i) early participation of the flight crew representatives in the design, implementation and operation of the FDM programme;

(ii) a formal agreement between management and flight crew, identifying the procedures for the use and protection of data; and

(iii) data security, optimised by:

(A) adhering to the agreement;

(B) the operator strictly limiting data access to selected individuals;

(C) maintaining tight control to ensure that identifying data is kept securely; and

(D) ensuring that operational problems are promptly addressed by management.

(3) Requisite safety culture

Indicators of an effective safety culture typically include:
(i) top management’s demonstrated commitment to promoting a proactive safety culture;

(ii) a non-punitive operator policy that cover the FDM programme;

(iii) FDM programme management by dedicated staff under the authority of the safety manager, with a high degree of specialisation and logistical support;

(iv) involvement of persons with appropriate expertise when identifying and assessing the risks (for example, pilots experienced on the aircraft type being analysed);

(v) monitoring fleet trends aggregated from numerous operations, not focusing only on specific events;

(vi) a well-structured system to protect the confidentiality of the data; and

(vii) an efficient communication system for disseminating hazard information (and subsequent risk assessments) internally and to other organisations to permit timely safety action.

(e) Implementing an FDM programme

(1) General considerations

(i) Typically, the following steps are necessary to implement an FDM programme:

(A) implementation of a formal agreement between management and flight crew;

(B) establishment and verification of operational and security procedures;

(C) installation of equipment;

(D) selection and training of dedicated and experienced staff to operate the programme; and

(E) commencement of data analysis and validation.
(ii) An operator with no FDM experience may need a year to achieve an operational FDM programme. Another year may be necessary before any safety and cost benefits appear. Improvements in the analysis software, or the use of outside specialist service providers, may shorten these time frames.

(2) Aims and objectives of an FDM programme

(i) As with any project there is a need to define the direction and objectives of the work. A phased approach is recommended so that the foundations are in place for possible subsequent expansion into other areas. Using a building block approach will allow expansion, diversification and evolution through experience.

Example: with a modular system, begin by looking at basic safety-related issues only. Add engine health monitoring, etc. in the second phase. Ensure compatibility with other systems.

(ii) A staged set of objectives starting from the first week’s replay and moving through early production reports into regular routine analysis will contribute to a sense of achievement as milestones are met.

Examples of short-term, medium-term and long-term goals:

(A) Short-term goals:

- establish data download procedures, test replay software and identify aircraft defects;

- validate and investigate exceedance data; and

- establish a user-acceptable routine report format to highlight individual exceedances and facilitate the acquisition of relevant statistics.

(B) Medium-term goals:

- Produce an annual report — include key performance indicators;

- add other modules to the analysis (e.g. continuing airworthiness); and
- plan for the next fleet to be added to programme.

(C) Long-term goals:

- Network FDM information across all of the operator’s safety information systems;

- ensure FDM provision for any proposed alternative training and qualification programme (ATQP); and

- use utilisation and condition monitoring to reduce spares holdings.

(iii) Initially, focusing on a few known areas of interest will help prove the system’s effectiveness. In contrast to an undisciplined “scatter-gun” approach, a focused approach is more likely to gain early success.

Examples: rushed approaches, or rough runways at particular aerodromes. Analysis of such known problem areas may generate useful information for the analysis of other areas.

(3) The FDM team

(i) Experience has shown that the “team” necessary to run an FDM programme could vary in size from one person for a small fleet, to a dedicated section for large fleets. The descriptions below identify various functions to be fulfilled, not all of which need a dedicated position.

(A) Team leader: it is essential that the team leader earns the trust and full support of both management and flight crew. The team leader acts independently of others in line management to make recommendations that will be seen by all to have a high level of integrity and impartiality. The individual requires good analytical, presentation and management skills.

(B) Flight operations interpreter: this person is usually a current pilot (or perhaps a recently retired senior captain or instructor), who knows the operator’s route network and aircraft. This team member’s in depth knowledge of SOPs, aircraft handling
characteristics, aerodromes and routes is used to place the FDM data in a credible context.

(C) Technical interpreter: this person interprets FDM data with respect to the technical aspects of the aircraft operation and is familiar with the power plant, structures and systems departments” requirements for information and any other engineering monitoring programmes in use by the operator.

(D) Gate-keeper: this person provides the link between the fleet or training managers and flight crew involved in events highlighted by FDM. The position requires good people skills and a positive attitude towards safety education. The person is typically a representative of the flight crew association or an “honest broker” and is the only person permitted to connect the identifying data with the event. It is essential that this person earns the trust of both management and flight crew.

(E) Engineering technical support: this person is usually an avionics specialist, involved in the supervision of mandatory serviceability requirements for FDR systems. This team member is knowledgeable about FDM and the associated systems needed to run the programme.

(F) Replay operative and administrator: this person is responsible for the day-to-day running of the system, producing reports and analysis.

(ii) All FDM team members need appropriate training or experience for their respective area of data analysis. Each team member is allocated a realistic amount of time to regularly spend on FDM tasks.
### TABLE OF FDM EVENTS

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.

<table>
<thead>
<tr>
<th>Event Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejected take-off</td>
<td>High speed rejected take-off</td>
</tr>
<tr>
<td>Take-off pitch</td>
<td>Pitch rate high on take-off</td>
</tr>
<tr>
<td></td>
<td>Pitch attitude high during take-off</td>
</tr>
<tr>
<td>Unstick speeds</td>
<td>Unstick speed high</td>
</tr>
<tr>
<td></td>
<td>Unstick speed low</td>
</tr>
<tr>
<td>Height loss in climb-out</td>
<td>Initial climb height loss 20 ft above ground level (AGL) to 400 ft above aerodrome level (AAL)</td>
</tr>
<tr>
<td></td>
<td>Initial climb height loss 400 ft to 1 500 ft AAL</td>
</tr>
<tr>
<td>Slow climb-out</td>
<td>Excessive time to 1 000 ft AAL after take-off</td>
</tr>
<tr>
<td>Climb-out speeds</td>
<td>Climb-out speed high below 400 ft AAL</td>
</tr>
<tr>
<td></td>
<td>Climb-out speed high 400 ft AAL to 1 000 ft AAL</td>
</tr>
<tr>
<td></td>
<td>Climb-out speed low 35 ft AGL to 400 ft AAL</td>
</tr>
<tr>
<td></td>
<td>Climb-out speed low 400 ft AAL to 1 500 ft AAL</td>
</tr>
<tr>
<td>High rate of descent</td>
<td>High rate of descent below 2 000 ft AGL</td>
</tr>
<tr>
<td>Missed approach</td>
<td>Missed approach below 1 000 ft AAL</td>
</tr>
<tr>
<td></td>
<td>Missed approach above 1 000 ft AAL</td>
</tr>
<tr>
<td>Low approach</td>
<td>Low on approach</td>
</tr>
<tr>
<td>Category</td>
<td>Requirements</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Glideslope</td>
<td>Deviation under glideslope</td>
</tr>
<tr>
<td></td>
<td>Deviation above glideslope (below 600 ft AGL)</td>
</tr>
<tr>
<td>Approach power</td>
<td>Low power on approach</td>
</tr>
<tr>
<td>Approach speeds</td>
<td>Approach speed high within 90 seconds of touchdown</td>
</tr>
<tr>
<td></td>
<td>Approach speed high below 500 ft AAL</td>
</tr>
<tr>
<td></td>
<td>Approach speed high below 50 ft AGL</td>
</tr>
<tr>
<td></td>
<td>Approach speed low within 2 minutes of touchdown</td>
</tr>
<tr>
<td>Landing flap</td>
<td>Late land flap (not in position below 500 ft AAL)</td>
</tr>
<tr>
<td></td>
<td>Reduced flap landing</td>
</tr>
<tr>
<td></td>
<td>Flap load relief system operation</td>
</tr>
<tr>
<td>Landing pitch</td>
<td>Pitch attitude high on landing</td>
</tr>
<tr>
<td></td>
<td>Pitch attitude low on landing</td>
</tr>
<tr>
<td>Bank angles</td>
<td>Excessive bank below 100 ft AGL</td>
</tr>
<tr>
<td></td>
<td>Excessive bank 100 ft AGL to 500 ft AAL</td>
</tr>
<tr>
<td></td>
<td>Excessive bank above 500 ft AGL</td>
</tr>
<tr>
<td></td>
<td>Excessive bank near ground (below 20 ft AGL)</td>
</tr>
<tr>
<td>Normal acceleration</td>
<td>High normal acceleration on ground</td>
</tr>
<tr>
<td></td>
<td>High normal acceleration in flight flaps up (+/- increment)</td>
</tr>
<tr>
<td></td>
<td>High normal acceleration in flight flaps down (+/- increment)</td>
</tr>
<tr>
<td></td>
<td>High normal acceleration at landing</td>
</tr>
<tr>
<td>Abnormal configuration</td>
<td>Take-off configuration warning</td>
</tr>
<tr>
<td></td>
<td>Early configuration change after take-off (flap)</td>
</tr>
<tr>
<td></td>
<td>Speed brake with flap</td>
</tr>
<tr>
<td></td>
<td>Speed brake on approach below 800 ft AAL</td>
</tr>
<tr>
<td></td>
<td>Speed brake not armed below 800 ft AAL</td>
</tr>
</tbody>
</table>

| Ground proximity warning              | Ground proximity warning system (GPWS) operation - hard warning |
|                                        | GPWS operation - soft warning |
|                                        | GPWS operation - windshear warning |
|                                        | GPWS operation - false warning |

| Ground proximity warning              | ACAS operation – Resolution Advisory |
|                                        | ACAS 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 20 000 ft) |

| Aircraft flight manual limitations   | Maximum operating speed limit (VMO) exceedance |
|                                        | Maximum operating speed limit (MMO) exceedance |
|                                        | Flap placard speed exceedance |
|                                        | Gear down speed exceedance |
|                                        | Gear selection up/down speed exceedance |
|                                        | Flap/SLat altitude exceedance |
|                                        | Maximum operating altitude exceedance |
**GM2 AOCR.AOC.130 Flight data monitoring - aeroplanes**

**FLIGHT–DATA MONITORING**

Additional guidance material for the establishment of flight data monitoring can be found in UK Civil Aviation Authority CAP 739 (Flight Data Monitoring).

**AOCR.AOC.135 Personnel requirements**

(a) In accordance with AOCR.GEN.210(b), the operator shall nominate persons responsible for the management and supervision of the following areas:

1. flight operations;
2. crew training;
3. ground operations; and
4. continuing airworthiness in accordance with MCAR-Part-M.

(b) Adequacy and competency of personnel

1. The operator shall employ sufficient personnel for the planned ground and flight operations.

2. All personnel assigned to, or directly involved in, ground and flight operations shall:
   
   (i) be properly trained;
   
   (ii) demonstrate their capabilities in the performance of their assigned duties; and
   
   (iii) be aware of their responsibilities and the relationship of their duties to the operation as a whole.

(c) Supervision of personnel

1. The operator shall appoint a sufficient number of personnel supervisors, taking into account the structure of the operator's organisation and the number of personnel employed.

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

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

AMC1 AOCR.AOC.135(a) Personnel requirements

NOMINATED PERSONS

(a) The person may hold more than one of the nominated posts if such an arrangement is considered suitable and properly matched to the scale and scope of the operation.

(b) A description of the functions and the responsibilities of the nominated persons, including their names, should be contained in the operations manual.

(c) The holder of an AOC should make arrangements to ensure continuity of supervision in the absence of nominated persons.

(d) The person nominated by the holder of an AOC should not be nominated by another holder of an AOC, unless agreed with the Authorities concerned.

(e) Persons nominated should be contracted to work sufficient hours to fulfil the management functions associated with the scale and scope of the operation.

AMC2 AOCR.AOC.135(a) Personnel requirements

COMBINATION OF NOMINATED PERSONS RESPONSIBILITIES

(a) The acceptability of a single person holding several posts, possibly in combination with being the accountable manager, should depend upon the nature and scale of the operation. The two main areas of concern should be competence and an individual’s capacity to meet his/her responsibilities.

(b) As regards competence in different areas of responsibility, there should not be any difference from the requirements applicable to persons holding only one post.
(c) The capacity of an individual to meet his/her responsibilities should primarily be dependent upon the scale of the operation. However the complexity of the organisation or of the operation may prevent, or limit, combinations of posts which may be acceptable in other circumstances.

(d) In most circumstances, the responsibilities of a nominated person should rest with a single individual. However, in the area of ground operations, it may be acceptable for responsibilities to be split, provided that the responsibilities of each individual concerned are clearly defined.

GM1 AOCR.AOC.135(a) Personnel requirements

NOMINATED PERSONS

The smallest organisation that can be considered is the one-man organisation where all of the nominated posts are filled by the accountable manager, and audits are conducted by an independent person.

GM2 AOCR.AOC.135(a) Personnel requirements

COMPETENCE OF NOMINATED PERSONS

(a) nominated persons in accordance with AOCR.AOC.135 should be expected to possess the experience and licensing provisions that are listed in (b) to (f). Exceptionally, in particular cases, the Authority may accept a nomination that does not meet these provisions in full. In that circumstance, the nominee should have comparable experience and also the ability to perform effectively the functions associated with the post and with the scale of the operation.

(b) Nominated persons should have:

(1) practical experience and expertise in the application of aviation safety standards and safe operating practices;

(2) comprehensive knowledge of:

(i) the applicable safety regulations and any associated requirements and procedures;

(ii) the AOC holder’s operations specifications; and

(iii) the need for, and content of, the relevant parts of the AOC holder’s operations manual;
(3) familiarity with management systems preferably in the area of aviation;

(4) appropriate management experience, preferably in a comparable organisation; and

(5) 5 years of relevant work experience of which at least 2 years should be from the aeronautical industry in an appropriate position.

(c) Flight operations. The nominated person should hold or have held a valid flight crew licence and the associated ratings appropriate to a type of operation conducted under the AOC. In case the nominated person’s licence and ratings are not current, his/her deputy should hold a valid flight crew licence and the associated ratings.

(d) Crew training. The nominated person or his/her deputy should be a current type rating instructor on a type/class operated under the AOC. The nominated person should have a thorough knowledge of the AOC holder’s crew training concept for flight, cabin and when relevant other crew.

(e) Ground operations. The nominated person should have a thorough knowledge of the AOC holder’s ground operations concept.

(f) Continuing airworthiness. The nominated person should have the relevant knowledge and appropriate experience requirements related to aircraft continuing airworthiness as detailed in Part-M.

**AOCR.AOC.140 Facility requirements**

In accordance with AOCR.GEN.215, the operator shall:

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

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

(c) ensure that the available working space at each operating base is sufficient for personnel whose actions may affect the safety of flight operations. Consideration shall be given to the needs of ground crew, personnel concerned with operational control, the storage and display of essential records and flight planning by crews.

**AOCR.AOC.150 Documentation requirements**
(a) The operator shall make arrangements for the production of manuals and any other documentation required and associated amendments.

(b) The operator shall be capable of distributing operational instructions and other information without delay.
D. MANUALS, LOGS AND RECORDS

AOCR.MLR.100 Operations manual — general

(a) The operator shall establish an operations manual (OM).

(b) The content of the OM shall reflect the requirements set out in these requirements, as applicable, and shall not contravene the conditions contained in the operations specifications to the air operator certificate (AOC).

(c) The OM may be issued in separate parts.

(d) All operations personnel shall have easy access to the portions of the OM that are relevant to their duties.

(e) The OM shall be kept up to date. All personnel shall be made aware of the changes that are relevant to their duties.

(f) Each crew member shall be provided with a personal copy of the relevant sections of the OM pertaining to their duties. Each holder of an OM, or appropriate part of it, shall be responsible for keeping their copy up to date with the amendments or revisions supplied by the operator.

(g) For AOC holders:

(1) for amendments required to be notified in accordance with AOCR.GEN.115(b) and AOCR.GEN.130(c), the operator shall supply the Authority with intended amendments in advance of the effective date; and

(2) for amendments to procedures associated with prior approval items in accordance with AOCR.GEN.130, approval shall be obtained before the amendment becomes effective.

(h) Notwithstanding (g), 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.

(i) The operator shall incorporate all amendments and revisions required by the Authority.

(j) The operator shall ensure that information taken from approved documents, and any amendment thereof, is correctly reflected in the
OM. This does not prevent the operator from publishing more conservative data and procedures in the OM.

(k) The operator shall ensure that all personnel are able to understand the language in which those parts of the OM which pertain to their duties and responsibilities are written. The content of the OM shall be presented in a form that can be used without difficulty and observes human factors principles.

**AMC1 AOGR.MLR.100 Operations manual - general**

**GENERAL**

(a) The operations manual (OM) may vary in detail according to the complexity of the operation and of the type and number of aircraft operated.

(b) The OM or parts thereof may be presented in any form, including electronic form. In all cases, the accessibility, usability and reliability should be assured.

(c) The OM should be such that:

1. all parts of the manual are consistent and compatible in form and content;
2. the manual can be readily amended; and
3. the content and amendment status of the manual is controlled and clearly indicated.

(d) The OM should include a description of its amendment and revision process specifying:

1. the person(s) who may approve amendments or revisions;
2. the conditions for temporary revisions and/or immediate amendments or revision required in the interest of safety; and
3. the methods by which operator personnel are advised of the changes.

(e) The OM content may be based on, or may refer to, industry codes of practice.
(f) When compiling an OM, the operator may take advantage of the contents of other relevant documents. Material produced by the operator for the type-related part of the OM may be supplemented with, or substituted by, applicable parts of the aircraft flight manual (AFM) or, where such a document exists, by an aircraft operating manual produced by the manufacturer of the aircraft.

(g) In the case of commercial operations with other-than-complex motor-powered aircraft or non-commercial operations, a ‘pilot operating handbook’ (POH), or equivalent document, may be used as the type related part of the OM, provided that the POH covers the normal and abnormal/emergency operating procedures.

(h) For the route and aerodrome part of the OM, material produced by the operator may be supplemented with or substituted by applicable route guide material produced by a specialist company.

(i) If the operator chooses to use material from another source in the OM, either the applicable material should be copied and included directly in the relevant part of the OM, or the OM should contain a reference to the appropriate section of that applicable material.

(j) If the operator chooses to make use of material from another source (e.g. a route manual producer, an aircraft manufacturer or a training organisation) this does not absolve the operator from the responsibility of verifying the applicability and suitability of this material. Any material received from an external source should be given its status by a statement in the OM.

**AMC2 AOCR.MLR.100 Operations manual – General**

CONTENTS – NON-COMMERCIAL OPERATIONS WITH COMPLEX MOTOR-POWERED AIRCRAFT

Reserved.

**AMC3 AOCR.MLR.100 Operations manual – general**

CONTENTS –CAT OPERATIONS

1 The OM should contain at least the following information, where applicable, as relevant for the area and type of operation:

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 (AOC).

(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 or paragraphs and their effective dates.

(e) A list of effective pages or paragraphs.

(f) Annotation of changes (in the text 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 organogram and operations departments’ organograms. The organogram should depict the
relationship between the operations departments and the other departments of the operator. In particular, the subordination and reporting lines of all divisions, departments etc., which pertain to the safety of flight operations, should be shown.

1.2 Nominated persons. The name of each nominated person responsible for flight operations, crew training and ground operations, as prescribed in AOCR.AOC.135. A description of their function and responsibilities should 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 pilot-in-command/commander. A statement defining the authority, duties and responsibilities of the pilot-in-command/ commander.

1.5 Duties and responsibilities of crew members other than the pilot-in-command/ 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 AOCR.GEN.110(c)). This should show how the safety of flight operations and the qualifications of personnel are supervised. In particular, the procedures related to the following items should be described:

(a) licence and qualification validity,

(b) competence of operations personnel,

(c) control, analysis and storage of the required records.

2.2 System and responsibility for promulgation of additional operational instructions and information. A description of any system for promulgating information which may be of an operational nature, but which is supplementary to that in the OM.

The applicability of this information and the responsibilities for its promulgation should be included.
2.3 Operational control. A description of the procedures and responsibilities necessary to exercise operational control with respect to flight safety.

2.4 Powers of the authority. A description of the powers of the competent authority and guidance to staff on how to facilitate inspections by authority personnel.

3 MANAGEMENT SYSTEM

A description of the management system, including at least the following:

(a) safety policy;

(b) the process for identifying safety hazards and for evaluating and managing the associated risks;

(c) compliance monitoring system;

(d) allocation of duties and responsibilities;

(e) documentation of all key management system processes.

4 CREW COMPOSITION

4.1 Crew composition. An explanation of the method for determining crew compositions, taking account of the following:

(a) the type of aircraft being used;

(b) the area and type of operation being undertaken;

(c) the phase of the flight;

(d) the minimum crew requirement and flight duty period planned;

(e) experience (total and on type), recency and qualification of the crew members;

(f) the designation of the pilot-in-command/commander and, if necessitated by the duration of the flight, the procedures for the relief of the pilot-in-command/commander or other members of the flight crew. (see AOCR.FC.105);
(g) the designation of the senior cabin crew member and, if necessitated by the duration of the flight, the procedures for the relief of the senior cabin crew member and any other member of the cabin crew.

4.2 Designation of the pilot-in-command/commander. The rules applicable to the designation of the pilot-in-command/commander.

4.3 Flight crew incapacitation. Instructions on the succession of command in the event of flight crew incapacitation.

4.4 Operation on more than one type. A statement indicating which aircraft are considered as one type for the purpose of:

(a) flight crew scheduling; and
(b) cabin crew scheduling.

5 QUALIFICATION REQUIREMENTS

5.1 A description of the required licence, rating(s), qualification/competency (e.g. for routes and aerodromes), experience, training, checking and recency for operations personnel to conduct their duties. Consideration should be given to the aircraft type, kind of operation and composition of the crew.

5.2 Flight crew:

(a) Pilot-in-command/commander,
(b) Pilot relieving the pilot-in-command/commander,
(c) Co-pilot,
(d) Pilot relieving the co-pilot,
(e) Pilot under supervision,
(f) System panel operator,
(g) Operation on more than one type or variant.

5.3 Cabin crew:

(a) Senior cabin crew member,
(b) Cabin crew member:

   (i) Required cabin crew member,

   (ii) Additional cabin crew member and cabin crew member during familiarisation flights,

(c) Operation on more than one type or variant.

5.4 Training, checking and supervision personnel:

(a) for flight crew; and

(b) for cabin crew.

5.5 Other operations personnel (including technical crew and crew members other than flight, cabin and technical crew).

6 CREW HEALTH PRECAUTIONS

6.1 Crew health precautions. The relevant regulations and guidance to crew members concerning health, including the following:

(a) alcohol and other intoxicating liquids,

(b) narcotics,

(c) drugs,

(d) sleeping tablets,

(e) anti-depressants,

(f) pharmaceutical preparations,

(g) immunisation,

(h) deep-sea diving,

(i) blood/bone marrow donation,

(j) meal precautions prior to and during flight,

(k) sleep and rest,

(l) surgical operations.
7  **FLIGHT TIME LIMITATIONS**

7.1  Flight and duty time limitations and rest requirements.

7.2  Exceedance of flight and duty time limitations and/or reductions of rest periods. Conditions under which flight and duty time may be exceeded or rest periods may be reduced, and the procedures used to report these modifications.

8  **OPERATING PROCEDURES**

8.1  Flight preparation instructions. As applicable to the operation:

8.1.1  Minimum flight altitudes. A description of the method of determination and application of minimum altitudes including:

(a)  a procedure to establish the minimum altitudes/flight levels for visual flight rules (VFR) flights; and

(b)  a procedure to establish the minimum altitudes/flight levels for instrument flight rules (IFR) flights.

8.1.2  Criteria and responsibilities for determining the adequacy of aerodromes to be used.

8.1.3  Methods and responsibilities for establishing aerodrome operating minima. Reference should be made to procedures for the determination of the visibility and/or runway visual range (RVR) and for the applicability of the actual visibility observed by the pilots, the reported visibility and the reported RVR.

8.1.4  En-route operating minima for VFR flights or VFR portions of a flight and, where single-engined aircraft are used, instructions for route selection with respect to the availability of surfaces that permit a safe forced landing.

8.1.5  Presentation and application of aerodrome and en-route operating minima.

8.1.6  Interpretation of meteorological information. Explanatory material on the decoding of meteorological (MET) forecasts and MET reports relevant to the area of operations, including the interpretation of conditional expressions.
8.1.7 Determination of the quantities of fuel, oil and water methanol carried. The methods by which the quantities of fuel, oil and water methanol to be carried are determined and monitored in-flight. This section should also include instructions on the measurement and distribution of the fluid carried on board. Such instructions should take account of all circumstances likely to be encountered on the flight, including the possibility of in-flight replanning and of failure of one or more of the aircraft’s power plants. The system for maintaining fuel and oil records should also be described.

8.1.8 Mass and centre of gravity. The general principles of mass and centre of gravity including the following:

(a) definitions;
(b) methods, procedures and responsibilities for preparation and acceptance of mass and centre of gravity calculations;
(c) the policy for using standard and/or actual masses;
(d) the method for determining the applicable passenger, baggage and cargo mass;
(e) the applicable passenger and baggage masses for various types of operations and aircraft type;
(f) general instructions and information necessary for verification of the various types of mass and balance documentation in use;
(g) last-minute changes procedures;
(h) specific gravity of fuel, oil and water methanol;
(i) seating policy/procedures;
(j) for helicopter operations, standard load plans.

8.1.9 Air traffic services (ATS) flight plan.

Procedures and responsibilities for the preparation and submission of the ATS flight plan. Factors to be considered include the means of submission for both individual and repetitive flight plans.
8.1.10 Operational flight plan.

Procedures and responsibilities for the preparation and acceptance of the operational flight plan. The use of the operational flight plan should be described including samples of the operational flight plan formats in use.

8.1.11 Operator’s aircraft technical log.

The responsibilities and the use of the operator’s aircraft technical log should be described, including samples of the format used.

8.1.12 List of documents, forms and additional information to be carried.

8.2 Ground handling instructions. As applicable to the operation:

8.2.1 Fuelling procedures. A description of fueling procedures, including:

(a) safety precautions during refueling and defueling including when an auxiliary power unit is in operation or when rotors are running or when an engine is or engines are running and the prop-brakes are on;

(b) refueling and defueling when passengers are embarking, on board or disembarking; and

(c) precautions to be taken to avoid mixing fuels.

8.2.2 Aircraft, passengers and cargo handling procedures related to safety. A description of the handling procedures to be used when allocating seats, embarking and disembarking passengers and when loading and unloading the aircraft. Further procedures, aimed at achieving safety whilst the aircraft is on the ramp, should also be given. Handling procedures should include:

(a) special categories of passengers, including children/infants, persons with reduced mobility, inadmissible passengers, deportees and persons in custody;

(b) permissible size and weight of hand baggage;

(c) loading and securing of items in the aircraft;
(d) positioning of ground equipment;
(e) operation of aircraft doors;
(f) safety on the aerodrome/operating site, including fire prevention and safety in blast and suction areas;
(g) start-up, ramp departure and arrival procedures including, for aeroplanes, push-back and towing operations;
(h) servicing of aircraft;
(i) documents and forms for aircraft handling;
(j) special loads and classification of load compartments; and
(k) multiple occupancy of aircraft seats.

8.2.3 Procedures for the refusal of embarkation. Procedures to ensure that persons who appear to be intoxicated, or who demonstrate by manner or physical indications that they are under the influence of drugs, are refused embarkation. This does not apply to medical patients under proper care.

8.2.4 De-icing and anti-icing on the ground. A description of the de-icing and anti-icing policy and procedures for aircraft on the ground. These should include descriptions of the types and effects of icing and other contaminants on aircraft whilst stationary, during ground movements and during take-off. In addition, a description of the fluid types used should be given, including the following:

(a) proprietary or commercial names,
(b) characteristics,
(c) effects on aircraft performance,
(d) hold-over times,
(e) precautions during usage.

8.3.1 VFR/IFR Policy. A description of the policy for allowing flights to be made under VFR, or for requiring flights to be made under IFR, or for changing from one to the other.
8.3.2 Navigation Procedures. A description of all navigation procedures, relevant to the type(s) and area(s) of operation. Special consideration should be given to:

(a) standard navigational procedures, including policy for carrying out independent cross-checks of keyboard entries where these affect the flight path to be followed by the aircraft; and

(b) required navigation performance (RNP), minimum navigation performance specification (MNPS) and polar navigation and navigation in other designated areas;

(c) in-flight re-planning;

(d) procedures in the event of system degradation; and

(e) reduced vertical separation minima (RVSM), for aeroplanes.

8.3.3 Altimeter setting procedures, including, where appropriate, use of:

(a) metric altimetry and conversion tables; and

(b) QFE operating procedures.

8.3.4 Altitude alerting system procedures for aeroplanes or audio voice alerting devices for helicopters.

8.3.5 Ground proximity warning system (GPWS)/terrain avoidance warning system (TAWS), for aeroplanes. Procedures and instructions required for the avoidance of controlled flight into terrain, including limitations on high rate of descent near the surface (the related training requirements are covered in OM-D 2.1).

8.3.6 Policy and procedures for the use of traffic collision avoidance system (TCAS)/airborne collision avoidance system (ACAS) for aeroplanes and, when applicable, for helicopters.

8.3.7 Policy and procedures for in-flight fuel management.

8.3.8 Adverse and potentially hazardous atmospheric conditions. Procedures for operating in, and/or avoiding, adverse and potentially hazardous atmospheric conditions, including the following:
(a) thunderstorms,
(b) icing conditions,
(c) turbulence,
(d) windshear,
(e) jet stream,
(f) volcanic ash clouds,
(g) heavy precipitation,
(h) sand storms,
(i) mountain waves,
(j) significant temperature inversions.

8.3.9 Wake turbulence. Wake turbulence separation criteria, taking into account aircraft types, wind conditions and runway/final approach and take-off area (FATO) location. For helicopters, consideration should also be given to rotor downwash.

8.3.10 Crew members at their stations. The requirements for crew members to occupy their assigned stations or seats during the different phases of flight or whenever deemed necessary in the interest of safety and, for aeroplane operations, including procedures for controlled rest in the flight crew compartment.

8.3.11 Use of restraint devices for crew and passengers. The requirements for crew members and passengers to use safety belts and/or restraint systems during the different phases of flight or whenever deemed necessary in the interest of safety.

8.3.12 Admission to flight crew compartment. The conditions for the admission to the flight crew compartment of persons other than the flight crew. The policy regarding the admission of inspectors from an authority should also be included.

8.3.13 Use of vacant crew seats. The conditions and procedures for the use of vacant crew seats.

8.3.14 Incapacitation of crew members. Procedures to be followed in the event of incapacitation of crew members in-flight. Examples of the
types of incapacitation and the means for recognising them should be included.

8.3.15 Cabin safety requirements. Procedures:

(a) covering cabin preparation for flight, in-flight requirements and preparation for landing, including procedures for securing the cabin and galleys;

(b) to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aircraft;

(c) to be followed during passenger embarkation and disembarkation;

(d) when refueling/defueling with passengers embarking, on board or disembarking;

(e) covering the carriage of special categories of passengers;

(f) covering smoking on board;

(g) covering the handling of suspected infectious diseases.

8.3.16 Passenger briefing procedures. The contents, means and timing of passenger briefing in accordance with Annex IV (Part-CAT).

8.3.17 Procedures for aircraft operated whenever required cosmic or solar radiation detection equipment is carried.

8.3.18 Policy on the use of autopilot and autothrottle for aircraft fitted with these systems.

8.4 Low visibility operations (LVO). A description of the operational procedures associated with LVO.

8.5 Extended-range operations with two-engined aeroplanes (ETOPS). A description of the ETOPS operational procedures. (Refer to EASA AMC 20-6)

8.6 Use of the minimum equipment and configuration deviation list(s).

8.7 Non-revenue flights. Procedures and limitations, for example, for the following:
8.8 Oxygen Requirements:

8.8.1 An explanation of the conditions under which oxygen should be provided and used.

8.8.2 The oxygen requirements specified for the following persons:

(a) flight crew;
(b) cabin crew;
(c) passengers.

9 DANGEROUS GOODS AND WEAPONS

9.1 Information, instructions and general guidance on the transport of dangerous goods, in accordance with Subpart G of Annex V (SPA.DG) including:

(a) operator’s policy on the transport of dangerous goods;
(b) guidance on the requirements for acceptance, labelling, handling, stowage and segregation of dangerous goods;
(c) special notification requirements in the event of an accident or occurrence when dangerous goods are being carried;
(d) procedures for responding to emergency situations involving dangerous goods;
(e) duties of all personnel involved; and

(f) instructions on the carriage of the operator’s personnel on cargo aircraft when dangerous goods are being carried.

9.2 The conditions under which weapons, munitions of war and sporting weapons may be carried.

10 SECURITY

Security instructions, guidance, procedures, training and responsibilities, taking into account Civil Aviation Regulations. Some parts of the security instructions and guidance may be kept confidential.

11 HANDLING, NOTIFYING AND REPORTING ACCIDENTS, INCIDENTS AND OCCURRENCES

Procedures for handling, notifying and reporting accidents, incidents and occurrences. This section should include the following:

(a) definition of accident, incident and occurrence and of the relevant responsibilities of all persons involved;

(b) illustrations of forms to be used for reporting all types of accident, incident and occurrence (or copies of the forms themselves), instructions on how they are to be completed, the addresses to which they should be sent and the time allowed for this to be done;

(c) in the event of an accident, descriptions of which departments, authorities and other organisations have to be notified, how this will be done and in what sequence;

(d) procedures for verbal notification to air traffic service units of incidents involving ACAS resolution advisories (RAs), bird hazards, dangerous goods and hazardous conditions;

(e) procedures for submitting written reports on air traffic incidents, ACAS RAs, bird strikes, dangerous goods incidents or accidents, and unlawful interference;

(f) reporting procedures. These procedures should include internal safety-related reporting procedures to be followed by crew members, designed to ensure that the pilot-in-command/commander is informed immediately of any incident that has endangered, or may have endangered, safety during the flight, and that the pilot-in-command/commander is provided with all relevant information.
(g) Procedures for the preservation of recordings following a reportable event.

12 RULES OF THE AIR

(a) Visual and instrument flight rules

(b) Territorial application of the rules of the air

(c) Communication procedures, including communication-failure procedures

(d) Information and instructions relating to the interception of civil aircraft

(e) The circumstances in which a radio listening watch is to be maintained

(f) Signals

(g) Time system used in operation

(h) ATC clearances, adherence to flight plan and position reports

(i) Visual signals used to warn an unauthorised aircraft flying in or about to enter a restricted, prohibited or danger area

(j) Procedures for flight crew observing an accident or receiving a distress transmission

(k) The ground/air visual codes for use by survivors, and description and use of signal aids

(l) Distress and urgency signals.

13 LEASING / CODE-SHARE

A description of the operational arrangements for leasing and code-share, associated procedures and management responsibilities.

B AIRCRAFT OPERATING MATTERS – TYPE RELATED

Taking account of the differences between types/classes, and variants of types, under the following headings:
0 GENERAL INFORMATION AND UNITS OF MEASUREMENT

0.1 General information (e.g. aircraft dimensions), including a description of the units of measurement used for the operation of the aircraft type concerned and conversion tables.

1 LIMITATIONS

1.1 A description of the certified limitations and the applicable operational limitations should include the following:

(a) certification status (e.g. EASA (supplemental) type certificate, environmental certification, etc.);

(b) passenger seating configuration for each aircraft type including a pictorial presentation;

(c) types of operation that are approved (e.g. VFR/IFR, CAT II/III, RNP, flights in known icing conditions etc.);

(d) crew composition;

(e) mass and centre of gravity;

(f) speed limitations;

(g) flight envelope(s);

(h) wind limits including operations on contaminated runways;

(i) performance limitations for applicable configurations;

(j) (runway) slope;

(k) for aeroplanes, limitations on wet or contaminated runways;

(l) airframe contamination;

(m) system limitations.

2 NORMAL PROCEDURES

The normal procedures and duties assigned to the crew, the appropriate checklists, the system for their use and a statement covering the necessary coordination procedures between flight and cabin/other crew
members. The normal procedures and duties should include the following:

(a) pre-flight,
(b) pre-departure,
(c) altimeter setting and checking,
(d) taxi, take-off and climb,
(e) noise abatement,
(f) cruise and descent,
(g) approach, landing preparation and briefing,
(h) VFR approach,
(i) IFR approach,
(j) visual approach and circling,
(k) missed approach,
(l) normal landing,
(m) post-landing,
(n) for aeroplanes, operations on wet and contaminated runways.

3 ABNORMAL AND/OR EMERGENCY PROCEDURES

The abnormal and/or emergency procedures and duties assigned to the crew, the appropriate checklists, the system for their use and a statement covering the necessary coordination procedures between flight and cabin/other crew members. The abnormal and/or emergency procedures and duties should include the following:

(a) crew incapacitation,
(b) fire and smoke drills,
(c) for aeroplanes, un-pressurised and partially pressurised flight,
(d) for aeroplanes, exceeding structural limits such as overweight landing,

(e) lightning strikes,

(f) distress communications and alerting ATC to emergencies,

(g) engine/burner failure,

(h) system failures,

(i) guidance for diversion in case of serious technical failure,

(j) ground proximity warning, including for helicopters audio voice alerting device (AVAD) warning,

(k) ACAS/TCAS warning for aeroplanes/audio voice alerting device (AVAD) warning for helicopters,

(l) windshear,

(m) emergency landing/ditching,

(n) for aeroplanes, departure contingency procedures.

4 PERFORMANCE

4.0 Performance data should be provided in a form that can be used without difficulty.

4.1 Performance data. Performance material that provides the necessary data for compliance with the performance requirements prescribed in Annex IV (Part- CAT). For aeroplanes, this performance data should be included to allow the determination of the following:

(a) take-off climb limits – mass, altitude, temperature;

(b) take-off field length (for dry, wet and contaminated runway conditions);

(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 (for dry, wet and contaminated runway conditions) including the effects of an in-flight failure of a system or device, if it affects the landing distance;
(i) brake energy limits;
(j) speeds applicable for the various flight stages (also considering dry, wet and contaminated runway conditions).

4.1.1 Supplementary data covering flights in icing conditions. Any certified performance related to an allowable configuration, or configuration deviation, such as anti-skid inoperative.

4.1.2 If performance data, as required for the appropriate performance class, are not available in the AFM, then other data should be included. The OM may contain cross-reference to the data contained in the AFM where such data are not likely to be used often or in an emergency.

4.2 Additional performance data for aeroplanes. Additional performance data, where applicable, including the following:

(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 aircraft with 3 or more engines, one-engine-inoperative ferry flights,
(f) flights conducted under the provisions of the configuration deviation list (CDL).

5 FLIGHT PLANNING

5.1 Data and instructions necessary for pre-flight and in-flight planning including, for aeroplanes, factors 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 Annex IV (Part-CAT)) and flights to isolated aerodromes should be included.

5.2 The method for calculating fuel needed for the various stages of flight.

5.3 When applicable, for aeroplanes, performance data for ETOPS critical fuel reserve and area of operation, including sufficient data to support the critical fuel reserve and area of operation calculation based on approved aircraft performance data. The following data should be included:

(a) detailed engine(s)-inoperative performance data including fuel flow for standard and non-standard atmospheric conditions and as a function of airspeed and power setting, where appropriate, covering:
   (i) drift down (includes net performance), where applicable;
   (ii) cruise altitude coverage including 10000 ft;
   (iii) holding;
   (iv) altitude capability (includes net performance); and
   (v) missed approach;

(b) detailed all-engine-operating performance data, including nominal fuel flow data, for standard and non-standard atmospheric conditions and as a function of airspeed and power setting, where appropriate, covering:
   (i) cruise (altitude coverage including 10000 ft); and
   (ii) holding;

(c) details of any other conditions relevant to ETOPS operations which can cause significant deterioration of performance, such as ice accumulation on the unprotected surfaces of the aircraft, ram air turbine (RAT) deployment, thrust-reverser deployment, etc.; and
(d) the altitudes, airspeeds, thrust settings, and fuel flow used in establishing the ETOPS area of operations for each airframe-engine combination should be used in showing the corresponding terrain and obstruction clearances in accordance with Annex IV (Part-CAT).

6 MASS AND BALANCE

Instructions and data for the calculation of the mass and balance including the following:

(a) calculation system (e.g. index system);

(b) information and instructions for completion of mass and balance documentation, including manual and computer generated types;

(c) limiting masses and centre of gravity for the types, variants or individual aircraft used by the operator;

(d) dry operating mass and corresponding centre of gravity or index.

7 LOADING

Procedures and provisions for loading and unloading and securing the load in the aircraft.

8 CONFIGURATION DEVIATION LIST

The CDL(s), if provided by the manufacturer, taking account of the aircraft types and variants operated including procedures to be followed when an aircraft is being dispatched under the terms of its CDL.

9 MINIMUM EQUIPMENT LIST (MEL)

The MEL for each aircraft type or variant operated and the type(s)/area(s) of operation. The MEL should also include the dispatch conditions associated with operations required for a specific approval (e.g. RNAV, RNP, RVSM, ETOPS). Consideration should be given to using the ATA number system when allocating chapters and numbers.

10 SURVIVAL AND EMERGENCY EQUIPMENT INCLUDING OXYGEN

10.1 A list of the survival equipment to be carried for the routes to be flown and the procedures for checking the serviceability of this
equipment prior to take-off. Instructions regarding the location, accessibility and use of survival and emergency equipment and its associated checklist(s) should 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 should be considered.

11 EMERGENCY EVACUATION PROCEDURES

11.1 Instructions for preparation for emergency evacuation including crew coordination 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 aircraft and the handling of the passengers in the event of a forced landing, ditching or other emergency.

12 AIRCRAFT SYSTEMS

A description of the aircraft systems, related controls and indications and operating instructions. Consideration should be given to use the ATA number system when allocating chapters and numbers.

C ROUTE/ROLE/AREA AND AERODROME/OPERATING SITE INSTRUCTIONS AND INFORMATION

1 Instructions and information relating to communications, navigation and aerodromes/operating sites including minimum flight levels and altitudes for each route to be flown and operating minima for each aerodrome/operating site planned to be used, including the following:

(a) minimum flight level/altitude;

(b) operating minima for departure, destination and alternate aerodromes;

(c) communication facilities and navigation aids;

(d) runway/final approach and take-off area (FATO) data and aerodrome/operating site facilities;

(e) approach, missed approach and departure procedures including noise abatement procedures;
(f) communication-failure procedures;

(g) search and rescue facilities in the area over which the aircraft is to be flown;

(h) a description of the aeronautical charts that should be carried on board in relation to the type of flight and the route to be flown, including the method to check their validity;

(i) availability of aeronautical information and MET services;

(j) en-route communication/navigation procedures;

(k) aerodrome/operating site categorisation for flight crew competence qualification;

(l) special aerodrome/operating site limitations (performance limitations and operating procedures etc.).

D TRAINING

1 Description of scope: Training syllabi and checking programmes for all operations personnel assigned to operational duties in connection with the preparation and/or conduct of a flight.

2 Content: Training syllabi and checking programmes should include the following:

2.1 for flight crew, all relevant items prescribed in MCAR-AOCR (Part-SPA) and AOCR.FC;

2.2 for cabin crew, all relevant items prescribed in MCAR-AOCR (Part-CC);

2.3 for technical crew, all relevant items prescribed in MCAR-AOCR (Part-SPA) and AOCR.TC;

2.4 for operations personnel concerned, including crew members:

(a) all relevant items prescribed in SPA.DG Subpart G of MCAR-AOCR (SPA.DG); and
(b) all relevant items prescribed in MCAR-AOCR.SEC; and

2.5 for operations personnel other than crew members (e.g. dispatcher, handling personnel etc.), all other relevant items prescribed in MCAR-AOCR and in this Annex pertaining to their duties.

3 Procedures:

3.1 Procedures for training and checking.

3.2 Procedures to be applied in the event that personnel do not achieve or maintain the required standards.

3.3 Procedures to ensure that abnormal or emergency situations requiring the application of part or all of the abnormal or emergency procedures, and simulation of instrument meteorological conditions (IMC) by artificial means are not simulated during commercial air transport operations.

4 Description of documentation to be stored and storage periods.

(b) Notwithstanding 1, an OM that is compiled in accordance with JAR-OPS 3 amendment may be considered to be compliant.

(c) If there are sections that, because of the nature of the operation, do not apply, it is recommended that operators maintain the numbering system described in AOCR.MLR.101 and above and insert ‘Not applicable’ or ‘Intentionally blank’ where appropriate.
GM1 AOCA.MLR.100(k) Operations manual - general

HUMAN FACTORS PRINCIPLES

Guidance material on the application of human factors principles can be found in the ICAO Human Factors Training Manual (Doc 9683).

AOCA.MLR.101 Operations manual — structure

The main structure of the OM shall be as follows:

(a) Part A: General/Basic, comprising all non-type-related operational policies, instructions and procedures;

(b) Part B: Aircraft operating matters, comprising all type-related instructions and procedures, taking into account differences between types/classes, variants or individual aircraft used by the operator;

(c) Part C: Commercial air transport operations, comprising route/role/area and aerodrome/operating site instructions and information;

(d) Part D: Training, comprising all training instructions for personnel required for a safe operation.

AMC1 AOCA.MLR.101 Operations manual – general

CONTENTS – COMMERCIAL AIR TRANSPORT OPERATIONS

1 The OM should contain at least the following information, where applicable, as relevant for the area and type of operation:

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 (AOC).
(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 or paragraphs and their effective dates.

(e) A list of effective pages or paragraphs.

(f) Annotation of changes (in the text 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 the general organogram and operations departments” organograms. The organogram should depict the relationship between the operations departments and the other departments of the operator. In particular, the subordination and reporting lines of all divisions, departments etc, which pertain to the safety of flight operations, should be shown.

1.2 Nominated persons. The name of each nominated person responsible for flight operations, crew training and ground operations, as prescribed in AOCR.AOC.135. A description of their function and responsibilities should 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 pilot-in-command/commander. A statement defining the authority, duties and responsibilities of the pilot-in-command/commander.

1.5 Duties and responsibilities of crew members other than the pilot-in-command/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 AOCR.GEN.110(c)). This should show how the safety of flight operations and the qualifications of personnel are supervised. In particular, the procedures related to the following items should be described:

(a) licence and qualification validity,

(b) competence of operations personnel,

(c) control, analysis and storage of the required records.

2.2 System and responsibility for promulgation of additional operational instructions and information. A description of any system for promulgating information which may be of an operational nature, but which is supplementary to that in the OM. The applicability of this information and the responsibilities for its promulgation should be included.

2.3 Operational control. A description of the procedures and responsibilities necessary to exercise operational control with respect to flight safety.

2.4 Powers of the authority. A description of the powers of the Authority and guidance to staff on how to facilitate inspections by authority personnel.

3 MANAGEMENT SYSTEM

A description of the management system, including at least the following:
(a) safety policy;
(b) the process for identifying safety hazards and for evaluating and managing the associated risks;
(c) compliance monitoring system;
(d) allocation of duties and responsibilities;
(e) documentation of all key management system processes.

4 CREW COMPOSITION

4.1 Crew composition. An explanation of the method for determining crew compositions, taking account of the following:

(a) the type of aircraft being used;
(b) the area and type of operation being undertaken;
(c) the phase of the flight;
(d) the minimum crew requirement and flight duty period planned;
(e) experience (total and on type), recency and qualification of the crew members;
(f) the designation of the pilot-in-command/commander and, if necessitated by the duration of the flight, the procedures for the relief of the pilot-in-command/commander or other members of the flight crew. (see AOCR.FC.105);
(g) the designation of the senior cabin crew member and, if necessitated by the duration of the flight, the procedures for the relief of the senior cabin crew member and any other member of the cabin crew.

4.2 Designation of the pilot-in-command/commander. The rules applicable to the designation of the pilot-in-command/commander.

4.3 Flight crew incapacitation. Instructions on the succession of command in the event of flight crew incapacitation.

4.4 Operation on more than one type. A statement indicating which aircraft are considered as one type for the purpose of:
(a) flight crew scheduling; and
(b) cabin crew scheduling.

5 QUALIFICATION REQUIREMENTS

5.1 A description of the required licence, rating(s), qualification/competency (e.g. for routes and aerodromes), experience, training, checking and recency for operations personnel to conduct their duties. Consideration should be given to the aircraft type, kind of operation and composition of the crew.

5.2 Flight crew:

(a) Pilot-in-command/commander,
(b) Pilot relieving the pilot-in-command/commander,
(c) Co-pilot,
(d) Pilot relieving the co-pilot,
(e) Pilot under supervision,
(f) System panel operator,
(g) Operation on more than one type or variant.

5.3 Cabin crew:

(a) Senior cabin crew member,
(b) Cabin crew member:
   (i) Required cabin crew member,
   (ii) Additional cabin crew member and cabin crew member during familiarisation flight,
   (iii) operation on more than one type or variant.

5.4 Training, checking and supervision personnel:

(a) for flight crew; and
(b) for cabin crew.
5.5 Other operations personnel (including technical crew and crew members other than flight, cabin and technical crew).

6 CREW HEALTH PRECAUTIONS

6.1 Crew health precautions. The relevant regulations and guidance to crew members concerning health, including the following:

(a) alcohol and other intoxicating liquids,
(b) narcotics,
(c) drugs,
(d) sleeping tablets,
(e) anti-depressants,
(f) pharmaceutical preparations,
(g) immunisation,
(h) deep sea diving,
(i) blood/bone marrow donation,
(j) meal precautions prior to and during flight,
(k) sleep and rest,
(l) surgical operations.

7 FLIGHT TIME LIMITATIONS

7.1 Flight and duty time limitations and rest requirements.

7.2 Exceedance of flight and duty time limitations and/or reductions of rest periods. Conditions under which flight and duty time may be exceeded or rest periods may be reduced, and the procedures used to report these modifications.

8 OPERATING PROCEDURES

8.1 Flight preparation instructions. As applicable to the operation:
8.1.1 Minimum flight altitudes. A description of the method of determination and application of minimum altitudes including:

(a) a procedure to establish the minimum altitudes/flight levels for visual flight rules (VFR) flights; and

(b) a procedure to establish the minimum altitudes/flight levels for instrument flight rules (IFR) flights.

8.1.2 Criteria and responsibilities for determining the adequacy of aerodromes to be used.

8.1.3 Methods and responsibilities for establishing aerodrome operating minima. Reference should be made to procedures for the determination of the visibility and/or runway visual range (RVR) and for the applicability of the actual visibility observed by the pilots, the reported visibility and the reported RVR.

8.1.4 En-route operating minima for VFR flights or VFR portions of a flight and, where single-engined aircraft are used, instructions for route selection with respect to the availability of surfaces that permit a safe forced landing.

8.1.5 Presentation and application of aerodrome and en-route operating minima.

8.1.6 Interpretation of meteorological information. Explanatory material on the decoding of meteorological (MET) forecasts and MET reports relevant to the area of operations, including the interpretation of conditional expressions.

8.1.7 Determination of the quantities of fuel, oil and water methanol carried. The methods by which the quantities of fuel, oil and water methanol to be carried are determined and monitored in-flight. This section should also include instructions on the measurement and distribution of the fluid carried on board. Such instructions should take account of all circumstances likely to be encountered on the flight, including the possibility of in-flight replanning and of failure of one or more of the aircraft’s power plants. The system for maintaining fuel and oil records should also be described.

8.1.8 Mass and centre of gravity. The general principles of mass and centre of gravity including the following:

(a) definitions;
(b) methods, procedures and responsibilities for preparation and acceptance of mass and centre of gravity calculations;
(c) the policy for using standard and/or actual masses;
(d) the method for determining the applicable passenger, baggage and cargo mass;
(e) the applicable passenger and baggage masses for various types of operations and aircraft type;
(f) general instructions and information necessary for verification of the various types of mass and balance documentation in use;
(g) last-minute changes procedures;
(h) specific gravity of fuel, oil and water methanol;
(i) seating policy/procedures;
(j) for helicopter operations, standard load plans.

8.1.9 Air traffic services (ATS) flight plan. Procedures and responsibilities for the preparation and submission of the ATS flight plan. Factors to be considered include the means of submission for both individual and repetitive flight plans.

8.1.10 Operational flight plan. Procedures and responsibilities for the preparation and acceptance of the operational flight plan. The use of the operational flight plan should be described including samples of the operational flight plan formats in use.

8.1.11 Operator’s aircraft technical log. The responsibilities and the use of the operator’s aircraft technical log should be described, including samples of the format used.

8.1.12 List of documents, forms and additional information to be carried.

8.2 Ground handling instructions. As applicable to the operation:

8.2.1 Fuelling procedures. A description of fueling procedures, including:
(a) safety precaution during refueling and defueling including auxiliary power unit is in operation or when rotors are running or when an engine is or engines are running and the prop-brakes are on;

(b) refueling and defueling when passengers embarking, on board or disembarking; and

(c) precautions to be taken to avoid mixing fuels.

8.2.2 Aircraft, passengers and cargo handling procedures related to safety. A description of the handling procedures to be used when allocating seats, embarking and disembarking passengers and when loading and unloading the aircraft. Further procedures, aimed at achieving safety whilst the aircraft is on the ramp, should also be given. Handling procedures should include:

(a) special categories of passengers, including children/infants, persons with reduced mobility, inadmissible passengers, deportees and persons in custody;

(b) permissible size and weight of hand baggage;

(c) loading and securing of items in the aircraft;

(d) positioning of ground equipment;

(e) operation of aircraft doors;

(f) safety on the aerodrome/operating site, including fire prevention and safety in blast and suction areas;

(g) start-up, ramp departure and arrival procedures including, for aeroplanes, push-back and towing operations;

(h) servicing of aircraft;

(i) documents and forms for aircraft handling;

(j) special loads and classification of load compartments; and

(k) multiple occupancy of aircraft seats.

8.2.3 Procedures for the refusal of embarkation. Procedures to ensure that persons who appear to be intoxicated, or who demonstrate
by manner or physical indications that they are under the influence of drugs, are refused embarkation. This does not apply to medical patients under proper care.

8.2.4 De-icing and anti-icing on the ground. A description of the de-icing and anti-icing policy and procedures for aircraft on the ground. These should include descriptions of the types and effects of icing and other contaminants on aircraft whilst stationary, during ground movements and during take-off. In addition, a description of the fluid types used should be given, including the following:

(a) proprietary or commercial names,

(b) characteristics,

(c) effects on aircraft performance,

(d) hold-over times,

(e) precautions during usage.

8.3 Flight Procedures:

8.3.1 FR/IFR Policy. A description of the policy for allowing flights to be made under VFR, or for requiring flights to be made under IFR, or for changing from one to the other.

8.3.2 Navigation Procedures. A description of all navigation procedures, relevant to the type(s) and area(s) of operation. Special consideration should be given to:

(a) standard navigational procedures, including policy for carrying out independent cross-checks of keyboard entries where these affect the flight path to be followed by the aircraft; and

(b) required navigation performance (RNP), minimum navigation performance specification (MNPS) and polar navigation and navigation in other designated areas;

(c) in-flight re-planning;

(d) procedures in the event of system degradation; and

(e) reduced vertical separation minima (RVSM), for aeroplanes.
8.3.3 Altimeter setting procedures, including, where appropriate, use of:

(a) metric altimetry and conversion tables; and

(b) QFE operating procedures.

8.3.4 Altitude alerting system procedures for aeroplanes or audio voice alerting devices for helicopters.

8.3.5 Ground proximity warning system (GPWS)/terrain avoidance warning system (TAWS), for aeroplanes. Procedures and instructions required for the avoidance of controlled flight into terrain, including limitations on high rate of descent near the surface (the related training requirements are covered in OM-D 2.1).

8.3.6 Policy and procedures for the use of traffic collision avoidance system (TCAS)/airborne collision avoidance system (ACAS) for aeroplanes and, when applicable, for helicopters.

8.3.7 Policy and procedures for in-flight fuel management.

8.3.8 Adverse and potentially hazardous atmospheric conditions. Procedures for operating in, and/or avoiding, adverse and potentially hazardous atmospheric conditions, including the following:

(a) thunderstorms,

(b) icing conditions,

(c) turbulence,

(d) windshear,

(e) jet stream,

(f) volcanic ash clouds,

(g) heavy precipitation,

(h) sand storms,

(i) mountain waves,

(j) significant temperature inversions.
8.3.9 Wake turbulence. Wake turbulence separation criteria, taking into account aircraft types, wind conditions and runway/final approach and take-off area (FATO) location. For helicopters, consideration should also be given to rotor downwash.

8.3.10 Crew members at their stations. The requirements for crew members to occupy their assigned stations or seats during the different phases of flight or whenever deemed necessary in the interest of safety and, for aeroplane operations, including procedures for controlled rest in the flight crew compartment.

8.3.11 Use of restraint devices for crew and passengers. The requirements for crew members and passengers to use safety belts and/or restraint systems during the different phases of flight or whenever deemed necessary in the interest of safety.

8.3.12 Admission to flight crew compartment. The conditions for the admission to the flight crew compartment of persons other than the flight crew. The policy regarding the admission of inspectors from an authority should also be included.

8.3.13 Use of vacant crew seats. The conditions and procedures for the use of vacant crew seats.

8.3.14 Incapacitation of crew members. Procedures to be followed in the event of incapacitation of crew members in-flight. Examples of the types of incapacitation and the means for recognising them should familiarized

8.3.15 Cabin Safety Requirements. Procedures:

(a) covering cabin preparation for flight, in-flight requirements and preparation for landing, including procedures for securing the cabin and galleys;

(b) to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aircraft;

(c) to be followed during passenger embarkation and disembarkation;

(d) when refueling/defueling with passengers embarking, on board or disembarking;
(e) covering the carriage of special categories of passengers;
(f) covering smoking on board;
(g) covering the handling of suspected infectious diseases.

8.3.16 Passenger briefing procedures. The contents, means and timing of passenger briefing.

8.3.17 Procedures for aircraft operated whenever required cosmic or solar radiation detection equipment is carried.

8.3.18 Policy on the use of autopilot and autothrottle for aircraft fitted with these systems.

8.4 Low visibility operations (LVO). A description of the operational procedures associated with LVO.

8.5 Extended-range operations with two-engined aeroplanes (ETOPS). A description of the ETOPS operational procedures. (Refer to EASA AMC 20-6)

8.6 Use of the minimum equipment and configuration deviation list(s).

8.7 Non-revenue flights. Procedures and limitations, for example, for the following:

(a) non-commercial operations by AOC holders, a description of the differences to commercial operations,
(b) training flights,
(c) test flights,
(d) delivery flights,
(e) ferry flights,
(f) demonstration flights,
(g) 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 should be provided and used.

8.8.2 The oxygen requirements specified for the following persons:

(a) flight crew;
(b) cabin crew;
(c) passengers.

9 DANGEROUS GOODS AND WEAPONS

9.1 Information, instructions and general guidance on the transport of dangerous goods, in accordance with Chapter 5 subpart G (SPA.DG) including:

(a) operator’s policy on the transport of dangerous goods;
(b) guidance on the requirements for acceptance, labelling, handling, stowage and segregation of dangerous goods;
(c) special notification requirements in the event of an accident or occurrence when dangerous goods are being carried;
(d) procedures for responding to emergency situations involving dangerous goods;
(e) duties of all personnel involved; and
(f) instructions on the carriage of the operator’s personnel on cargo aircraft when dangerous goods are being carried.

9.2 The conditions under which weapons, munitions of war and sporting weapons may be carried.

10 SECURITY

Security instructions, guidance, procedures, training and responsibilities, taking into account Civil Aviation Security Regulations 2008 as amended. Some parts of the security instructions and guidance may be kept confidential.

11 HANDLING, NOTIFYING AND REPORTING ACCIDENTS, INCIDENTS AND OCCURRENCES
Procedures for handling, notifying and reporting accidents, incidents and occurrences. This section should include the following:

(a) definition of accident, incident and occurrence and of the relevant responsibilities of all persons involved;

(b) illustrations of forms to be used for reporting all types of accident, incident and occurrence (or copies of the forms themselves), instructions on how they are to be completed, the addresses to which they should be sent and the time allowed for this to be done;

(c) in the event of an accident, descriptions of which departments, authorities and other organisations have to be notified, how this will be done and in what sequence;

(d) procedures for verbal notification to air traffic service units of incidents involving ACAS resolution advisories (RAs), bird hazards, dangerous goods and hazardous conditions;

(e) procedures for submitting written reports on air traffic incidents, ACAS RAs, bird strikes, dangerous goods incidents or accidents, and unlawful interference;

(f) reporting procedures. These procedures should include internal safety-related reporting procedures to be followed by crew members, designed to ensure that the pilot-in-command/commander is informed immediately of any incident that has endangered, or may have endangered, safety during the flight, and that the pilot-in-command/commander is provided with all relevant information.

(g) Procedures for the preservation of recordings following a reportable event.

12 RULES OF THE AIR

(a) Visual and instrument flight rules

(b) Territorial application of the rules of the air

(c) Communication procedures, including communication-failure procedures

(d) Information and instructions relating to the interception of civil aircraft
(e) The circumstances in which a radio listening watch is to be maintained

(f) Signals

(g) Time system used in operation

(h) ATC clearances, adherence to flight plan and position reports

(i) Visual signals used to warn an unauthorised aircraft flying in or about to enter a restricted, prohibited or danger area

(j) Procedures for flight crew observing an accident or receiving a distress transmission

(k) The ground/air visual codes for use by survivors, and description and use of signal aids

(l) Distress and urgency signals.

13 LEASING / CODE-SHARE

A description of the operational arrangements for leasing and code-share, associated procedures and management responsibilities.

B AIRCRAFT OPERATING MATTERS – TYPE RELATED

Taking account of the differences between types/classes, and variants of types, under the following headings:

0 GENERAL INFORMATION AND UNITS OF MEASUREMENT

0.1 General information (e.g. aircraft dimensions), including a description of the units of measurement used for the operation of the aircraft type concerned and conversion tables.

1 LIMITATIONS

1.1 A description of the certified limitations and the applicable operational limitations should include the following:

(a) certification status (e.g. EASA (supplemental) type certificate, environmental certification, etc.);

(b) passenger seating configuration for each aircraft type including a pictorial presentation;
(c) types of operation that are approved (e.g. VFR/IFR, CAT II/III, RNP, flights in known icing conditions etc.);

(d) crew composition;

(e) mass and centre of gravity;

(f) speed limitations;

(g) flight envelope(s);

(h) wind limits including operations on contaminated runways;

(i) performance limitations for applicable configurations;

(j) (runway) slope;

(k) for aeroplanes, limitations on wet or contaminated runways;

(l) airframe contamination;

(m) system limitations.

2 NORMAL PROCEDURES

The normal procedures and duties assigned to the crew, the appropriate checklists, the system for their use and a statement covering the necessary coordination procedures between flight and cabin/other crew members. The normal procedures and duties should include the following:

(a) pre-flight,

(b) pre-departure,

(c) altimeter setting and checking,

(d) taxi, take-off and climb,

(e) noise abatement,

(f) cruise and descent,

(g) approach, landing preparation and briefing,

(h) VFR approach,
(i)  IFR approach,

(j)  visual approach and circling,

(k)  missed approach,

(l)  normal landing,

(m)  post-landing,

(n)  for aeroplanes, operations on wet and contaminated runways.

3  ABNORMAL AND/OR EMERGENCY PROCEDURES

The abnormal and/or emergency procedures and duties assigned to the crew, the appropriate checklists, the system for their use and a statement covering the necessary coordination procedures between flight and cabin/other crew members. The following abnormal and/or emergency procedures and duties should include the following:

(a)  crew incapacitation,

(b)  fire and smoke drills,

(c)  for aeroplanes, un-pressurised and partially pressurised flight,

(d)  for aeroplanes, exceeding structural limits such as overweight landing,

(e)  lightning strikes,

(f)  distress communications and alerting ATC to emergencies,

(g)  engine/burner failure,

(h)  system failures,

(i)  guidance for diversion in case of serious technical failure,

(j)  ground proximity warning, including for helicopters audio voice alerting device (AVAD) warning,

(k)  ACAS/TCAS warning for aeroplanes/audio voice alerting device (AVAD) warning for helicopters,
(l) windshear,
(m) emergency landing/ditching,
(n) for aeroplanes, departure contingency procedures.

4 PERFORMANCE

4.0 Performance data should be provided in a form that can be used without difficulty.

4.1 Performance data. Performance material that provides the necessary data for compliance with the performance requirements prescribed in AOCR.POL. For aeroplanes, this performance data should be included to allow the determination of the following:

(a) take-off climb limits – mass, altitude, temperature;
(b) take-off field length (for dry, wet and contaminated runway conditions);
(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 (for dry, wet and contaminated runway conditions) including the effects of an in-flight failure of a system or device, if it affects the landing distance;
(i) brake energy limits;
(j) speeds applicable for the various flight stages (also considering dry, wet and contaminated runway conditions).

4.1.1 Supplementary data covering flights in icing conditions. Any certified performance related to an allowable configuration, or configuration deviation, such as anti-skid inoperative.
4.1.2 If performance data, as required for the appropriate performance class, is not available in the AFM, then other data should be included. The OM may contain cross-reference to the data contained in the AFM where such data is not likely to be used often or in an emergency.

4.2 Additional performance data for aeroplanes. Additional performance data, where applicable, including the following:

(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 aircraft with 3 or more engines, one-engine-inoperative ferry flights,
(f) flights conducted under the provisions of the configuration deviation list (CDL).

5 **FLIGHT PLANNING**

5.1 Data and instructions necessary for pre-flight and in-flight planning including, for aeroplanes, factors 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 Chapter 3) and flights to isolated aerodromes should be included.

5.2 The method for calculating fuel needed for the various stages of flight.

5.3 When applicable, for aeroplanes, performance data for ETOPS critical fuel reserve and area of operation, including sufficient data to support the critical fuel reserve and area of operation calculation based on approved aircraft performance data. The following data should be included:

(a) detailed engine(s)-inoperative performance data including fuel flow for standard and non-standard atmospheric conditions and as a function of airspeed and power setting, where appropriate, covering:

(i) drift down (includes net performance), where applicable;
(ii) cruise altitude coverage including 10 000 ft;

(iii) holding;

(iv) altitude capability (includes net performance); and

(v) missed approach;

(b) detailed all-engine-operating performance data, including nominal fuel flow data, for standard and non-standard atmospheric conditions and as a function of airspeed and power setting, where appropriate, covering:

(i) cruise (altitude coverage including 10 000 ft); and

(ii) holding;

(c) details of any other conditions relevant to ETOPS operations which can cause significant deterioration of performance, such as ice accumulation on the unprotected surfaces of the aircraft, ram air turbine (RAT) deployment, thrust-reverser deployment, etc.; and

(d) the altitudes, airspeeds, thrust settings, and fuel flow used in establishing the ETOPS area of operations for each airframe-engine combination should be used in showing the corresponding terrain and obstruction clearances in accordance with Chapter 5.

6 MASS AND BALANCE

Instructions and data for the calculation of the mass and balance including the following:

(a) calculation system (e.g. index system);

(b) information and instructions for completion of mass and balance documentation, including manual and computer generated types;

(c) limiting masses and centre of gravity for the types, variants or individual aircraft used by the operator;

(d) dry operating mass and corresponding centre of gravity or index.

7 LOADING
Procedures and provisions for loading and unloading and securing the load in the aircraft.

8 **CONFIGURATION DEVIATION LIST**

The CDL(s), if provided by the manufacturer, taking account of the aircraft types and variants operated including procedures to be followed when an aircraft is being dispatched under the terms of its CDL.

9 **MINIMUM EQUIPMENT LIST (MEL)**

The MEL for each aircraft type or variant operated and the type(s)/area(s) of operation. The MEL should also include the dispatch conditions associated with operations required for a specific approval (e.g. RNAV, RNP, RVSM, ETOPS). Consideration should be given to using the ATA number system when allocating chapters and numbers.

10 **SURVIVAL AND EMERGENCY EQUIPMENT INCLUDING OXYGEN**

10.1 A list of the survival equipment to be carried for the routes to be flown and the procedures for checking the serviceability of this equipment prior to take-off. Instructions regarding the location, accessibility and use of survival and emergency equipment and its associated checklist(s) should 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 should be considered.

11 **EMERGENCY EVACUATION PROCEDURES**

11.1 Instructions for preparation for emergency evacuation including crew coordination 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 aircraft and the handling of the passengers in the event of a forced landing, ditching or other emergency.

12 **AIRCRAFT SYSTEMS**

A description of the aircraft systems, related controls and indications and operating instructions. Consideration should be given to use the ATA number system when allocating chapters and numbers.
C  ROUTE/ROLE/AREA AND AERODROME/OPERATING SITE INSTRUCTIONS AND INFORMATION

1  Instructions and information relating to communications, navigation and aerodromes/operating sites including minimum flight levels and altitudes for each route to be flown and operating minima for each aerodrome/operating site planned to be used, including the following:

(a)  minimum flight level/altitude;
(b)  operating minima for departure, destination and alternate aerodromes;
(c)  communication facilities and navigation aids;
(d)  runway/final approach and take-off area (FATO) data and aerodrome/operating site facilities;
(e)  approach, missed approach and departure procedures including noise abatement procedures;
(f)  communication-failure procedures;
(g)  search and rescue facilities in the area over which the aircraft is to be flown;
(h)  a description of the aeronautical charts that should be carried on board in relation to the type of flight and the route to be flown, including the method to check their validity;
(i)  availability of aeronautical information and MET services;
(j)  en-route communication/navigation procedures;
(k)  aerodrome/operating site categorisation for flight crew competence qualification;
(l)  special aerodrome/operating site limitations (performance limitations and operating procedures etc.).

D  TRAINING

1  Description of scope: Training syllabi and checking programmes for all operations personnel assigned to operational duties in connection with the preparation and/or conduct of a flight.
2 Content: Training syllabi and checking programmes should include the following:

2.1 for flight crew, all relevant items prescribed in these requirements;

2.2 for cabin crew, all relevant items prescribed in these requirements;

2.3 for technical crew, all relevant items prescribed in these requirements and/or HS-AOCR;

2.4 for operations personnel concerned, including crew members:
   
   (a) all relevant items prescribed in AOCR.SPA.DG; and
   
   (b) all relevant items prescribed in Civil Aviation Security Regulations 2008 as amended; and

2.5 for operations personnel other than crew members (e.g. dispatcher, handling personnel etc.), all other relevant items prescribed in these requirements pertaining to their duties.

3 Procedures:

3.1 Procedures for training and checking.

3.2 Procedures to be applied in the event that personnel do not achieve or maintain the required standards.

3.3 Procedures to ensure that abnormal or emergency situations requiring the application of part or all of the abnormal or emergency procedures, and simulation of instrument meteorological conditions (IMC) by artificial means are not simulated during commercial air transport operations.

AOCR.MLR.105 Minimum equipment list

(a) A minimum equipment list (MEL) shall be established as specified, based on the relevant master minimum equipment list (MMEL) as defined in the data established.

(b) The MEL and any amendment thereto shall be approved by the Authority.

(c) The operator shall amend the MEL after any applicable change to the MMEL within the acceptable timescales.

(d) In addition to the list of items, the MEL shall contain:
(1) a preamble, including guidance and definitions for flight crews and maintenance personnel using the MEL;

(2) the revision status of the MMEL upon which the MEL is based and the revision status of the MEL;

(3) the scope, extent and purpose of the MEL.

(e) The operator shall:

(1) establish rectification intervals for each inoperative instrument, item of equipment or function listed in the MEL. The rectification interval in the MEL shall not be less restrictive than the corresponding rectification interval in the MMEL;

(2) establish an effective rectification programme;

(3) only operate the aircraft after expiry of the rectification interval specified in the MEL when:

   (i) the defect has been rectified; or
   
   (ii) the rectification interval has been extended in accordance with (f).

(f) Subject to approval of the Authority, the operator may use a procedure for the one time extension of category B, C and D rectification intervals, provided that:

(1) the extension of the rectification interval is within the scope of the MMEL for the aircraft type;

(2) the extension of the rectification interval is, as a maximum, of the same duration as the rectification interval specified in the MEL;

(3) the rectification interval extension is not used as a normal means of conducting MEL item rectification and is used only when events beyond the control of the operator have precluded rectification;

(4) a description of specific duties and responsibilities for controlling extensions is established by the operator;
(5) the Authority is notified of any extension of the applicable rectification interval; and

(6) a plan to accomplish the rectification at the earliest opportunity is established.

(g) The operator shall establish the operational and maintenance procedures referenced in the MEL taking into account the operational and maintenance procedures referenced in the MMEL. These procedures shall be part of the operator's manuals or the MEL.

(h) The operator shall amend the operational and maintenance procedures referenced in the MEL after any applicable change to the operational and maintenance procedures referenced in the MMEL.

(i) Unless otherwise specified in the MEL, the operator shall complete:

(1) the operational procedures referenced in the MEL when planning for and/or operating with the listed item inoperative; and

(2) the maintenance procedures referenced in the MEL prior to operating with the listed item inoperative.

(j) Subject to a specific case-by-case approval by the Authority, the operator may operate an aircraft with inoperative instruments, items of equipment or functions outside the constraints of the MEL but within the constraints of the MMEL, provided that:

(1) the concerned instruments, items of equipment or functions are within the scope of the MMEL as defined in the data established;

(2) the approval is not used as a normal means of conducting operations outside the constraints of the approved MEL and is used only when events beyond the control of the operator have precluded the MEL compliance;

(3) a description of specific duties and responsibilities for controlling the operation of the aircraft under such approval is established by the operator; and

(4) a plan to rectify the inoperative instruments, items of equipment or functions or to return operating the aircraft under the MEL constraints at the earliest opportunity is established.
GM1 AOCR.MLR.105(a) Minimum equipment list

GENERAL

(a) The MEL is a document that lists the equipment that may be temporarily inoperative, subject to certain conditions, at the commencement of flight. This document is prepared by the operator for his/their own particular aircraft taking account of their aircraft configuration and all those individual variables that cannot be addressed at MMEL level, such as operating environment, route structure, geographic location, aerodromes where spare parts and maintenance capabilities are available etc., in accordance with a procedure approved by the Authority.

(b) The MMEL, as defined in the mandatory part of the operational suitability data established in accordance with Commission Regulation (EU) No 748/2012, is developed in compliance with CS-MMEL or CS-GENMMEL. These certification specifications contain, among other, guidance intended to standardise the level of relief granted in MMELs, in particular for items that are subject to operational requirements. If a MMEL established as part of the operational suitability data is not available and items subject to operational requirements are listed in the available MMEL without specific relief or dispatch conditions but only with a reference to the operational requirements, the operator may refer to CS-MMEL or CS-GENMMEL guidance material, as applicable, to develop the relevant MEL content for such items.

Note: For FAA certified aircraft or other certification authority, appropriate FAA and appropriate requirements should be referred to.

NON-SAFETY RELATED EQUIPMENT

(a) Most aircraft are designed and certified with a significant amount of equipment redundancy, such that the airworthiness requirements are satisfied by a substantial margin. In addition, aircraft are generally fitted with equipment that is not required for safe operation under all operating conditions, e.g. instrument lighting in day VMC.

(b) All items related to the airworthiness, or required for the safe operation, of the aircraft and not included in the list are automatically required to be operative.

(c) Equipment, such as entertainment systems or galley equipment, may be installed for passenger convenience. If this non-safety related equipment does not affect the airworthiness or operation of the aircraft when inoperative, it does not require a rectification interval, and need
not be listed in the operator’s MEL, if it is not addressed in the MMEL. The exceptions to this are as follows:

(1) Where non-safety related equipment serves a second function, such as movie equipment being used for cabin safety briefings, operators should develop and include operational contingency procedures in the MEL in case of an equipment malfunction.

(2) Where non-safety related equipment is part of another aircraft system, for example the electrical system, procedures should be developed and included in the MEL for deactivating and securing in case of malfunction. In these cases, the item should be listed in the MEL, with compensating provisions and deactivation instructions if applicable. The rectification interval will be dependent on the secondary function of the item and the extent of its effect on other systems.

(d) If the operator chooses to list non-safety related equipment in the MEL, not listed in the MMEL, they should include a rectification interval category. These items may be given a ‘D’ category rectification interval provided any applicable (M) procedure (in the case of electrically supplied items) is applied.

(e) Operators should establish an effective decision making process for failures that are not listed to determine if they are related to airworthiness and required for safe operation. In order for inoperative installed equipment to be considered non-safety related, the following criteria should be considered:

(1) the operation of the aircraft is not adversely affected such that standard operating procedures related to ground personnel, and crew members are impeded;

(2) the condition of the aircraft is not adversely affected such that the safety of passengers and/or personnel is jeopardised;

(3) the condition of the aircraft is configured to minimise the probability of a subsequent failure that may cause injury to passengers / personnel and/or cause damage to the aircraft;

(4) the condition does not include the use of required emergency equipment and does not impact emergency procedures such that personnel could not perform them.

**AMC1 AOCR.MLR.105(c) Minimum equipment list**
AMENDMENTS TO THE MEL FOLLOWING CHANGES TO THE MMEL – APPLICABLE CHANGES AND ACCEPTABLE TIMESCALES

(a) The following are applicable changes to the MMEL that require amendment of the MEL:

(1) a reduction of the rectification interval;

(2) change of an item, only when the change is applicable to the aircraft or type of operations and is more restrictive.

(b) An acceptable timescale for submitting the amended MEL to the Authority is 90 days from the date of applicability specified in the approved change to the MMEL.

(c) Reduced timescales for the implementation of safety related amendments may be required if the Authority consider it necessary.

AMC1 AOCR.MLR.105(d) Minimum equipment list

MEL FORMAT

(a) The MEL format and the presentation of items and dispatch conditions should reflect those of the MMEL.

(b) The ATA 100/2200 Specification numbering system for MEL items is preferred.

(c) Other formats and item numbering systems may be used provided they are clear and unambiguous.

AMC1 AOCR.MLR.105(d)(1) Minimum equipment list

MEL PREAMBLE

The MEL preamble should:

(a) reflect the content of the MMEL preamble as applicable to the MEL scope and extent;

(b) contain terms and definitions used in the MEL;

(c) contain any other relevant specific information for the MEL scope and use that is not originally provided in the MMEL;
(d) provide guidance on how to identify the origin of a failure or malfunction to the extent necessary for appropriate application of the MEL;

(e) contain guidance on the management of multiple unserviceabilities, based on the guidance given in the MMEL; and

(f) contain guidance on placarding of inoperative items to inform crew members of equipment condition, as appropriate. In particular, when such items are accessible to the crew during flight, the control(s) and indicator(s) related to inoperative unit(s) should be clearly placarded.

**AMC1 AOCR.MLR.105 (d) (3) Minimum equipment list**

**SCOPE OF THE MEL**

The MEL should include:

(a) The dispatch conditions associated with flights conducted in accordance with special approvals held by the operator in accordance with Part-SPA.

(b) Specific provision for particular types of operations carried out by the operator in accordance with AOCR.AOC.125 AMC1 AOCR.MLR.105(d)(3) Minimum equipment list.

**AMC2 AOCR.MLR.105 (d) (3) Minimum equipment list**

**EXTENT OF THE MEL**

The operator should include guidance in the MEL on how to deal with any failures that occur between the commencement of the flight and the start of the take-off. If a failure occurs between the commencement of the flight and the start of the take-off, any decision to continue the flight should be subject to pilot judgement and good airmanship. The pilot-in-command/commander may refer to the MEL before any decision to continue the flight is taken.

**GM1 AOCR.MLR.105 (d) (3) M minimum equipment list**

**SCOPE OF THE MEL**

(a) Examples of special approvals in accordance with Part-SPA may be:

   (1) RVSM,

   (2) ETOPS,
(3) LVO.

(b) Examples of operations carried out by the operator in accordance with AOCR.AOC.125 may be:

(1) crew training,
(2) positioning flights,
(3) demonstration flights.

(c) When an aircraft has installed equipment which is not required for the operations conducted, the operator may wish to delay rectification of such items for an indefinite period. Such cases are considered to be out of the scope of the MEL, therefore modification of the aircraft is appropriate and deactivation, inhibition or removal of the item should be accomplished by an appropriate approved modification procedure.

GM2 AOCR.MLR.105 (d) (3) Minimum equipment list

PURPOSE OF THE MEL

The MEL is an alleviating document having the purpose to identify the minimum equipment and conditions to operate safely an aircraft having inoperative equipment. Its purpose is not, however, to encourage the operation of aircraft with inoperative equipment. It is undesirable for aircraft to be dispatched with inoperative equipment and such operations are permitted only as a result of careful analysis of each item to ensure that the acceptable level of safety, as intended in the applicable airworthiness and operational requirements is maintained. The continued operation of an aircraft in this condition should be minimised.

GM1 AOCR.MLR.105 (e) ;( f) Minimum equipment list

RECTIFICATION INTERVAL (RI)

The definitions and categories of rectification intervals are provided in CS-MMEL.

AMC1 AOCR.MLR.105 (f) Minimum equipment list

RECTIFICATION INTERVAL EXTENSION (RIE) - OPERATOR PROCEDURES– FOR THE APPROVAL BY THE AUTHORITY AND NOTIFICATION TO THE AUTHORITY
(a) The operator’s procedures to address the extension of rectification intervals and ongoing surveillance to ensure compliance should provide the Authority with details of the name and position of the nominated personnel responsible for the control of the operator’s rectification interval extension (RIE) procedures and details of the specific duties and responsibilities established to control the use of RIEs.

(b) Personnel authorising RIEs should be adequately trained in technical and/or operational disciplines to accomplish their duties. They should have necessary operational knowledge in terms of operational use of the MEL as alleviating documents by flight crew and maintenance personnel and engineering competence. The authorising personnel should be listed by appointment and name.

(c) The operator should notify the Authority within 1 month of the extension of the applicable rectification interval or within the appropriated timescales specified by the approved procedure for the RIE.

(d) The notification should be made in a form determined by the Authority and should specify the original defect, all such uses, the reason for the RIE and the reasons why rectification was not carried out within the original rectification interval.

**GM1 AOCR.MLR.105 (f) Minimum equipment list**

**RECTIFICATION INTERVAL EXTENSION (RIE)**

Procedures for the extension of rectification intervals should only be applied under certain conditions, such as a shortage of parts from manufacturers or other unforeseen situations (e.g. inability to obtain equipment necessary for proper troubleshooting and repair), in which case the operator may be unable to comply with the specified rectification intervals.

**AMC1 AOCR.MLR.105 (g) Minimum equipment list**

**OPERATIONAL AND MAINTENANCE PROCEDURES**

(a) The operational and maintenance procedures referenced in the MEL should be based on the operational and maintenance procedures referenced in the MMEL. Modified procedures may, however, be developed by the operator when they provide the same level of safety as required by the MMEL.
(b) Providing appropriate operational and maintenance procedures referenced in the MEL, regardless of who developed them, is the responsibility of the operator.

(c) Any item in the MEL requiring an operational or maintenance procedure to ensure an acceptable level of safety should be so identified in the “remarks” or “exceptions” column/part/section of the MEL. This will normally be “(O)” for an operational procedure, or “(M)” for a maintenance procedure. “(O) (M)” means both operational and maintenance procedures are required.

(d) The satisfactory accomplishment of all procedures, regardless of who performs them, is the responsibility of the operator.

**GM1 AOCR.MLR.105 (g) Minimum equipment list**

**OPERATIONAL AND MAINTENANCE PROCEDURES**

(a) Operational and maintenance procedures are an integral part of the compensating conditions needed to maintain an acceptable level of safety, enabling the Authority to approve the MEL. The Authority may request presentation of fully developed (O) and/or (M) procedures in the course of the MEL approval process.

(b) Normally, operational procedures are accomplished by the flight crew; however, other personnel may be qualified and authorised to perform certain functions.

(c) Normally, maintenance procedures are accomplished by the maintenance personnel; however, other personnel may be qualified and authorised to perform certain functions.

(d) Operator’s manuals may include” the OM, the continued airworthiness management organisation manual or other documents.

(e) Unless specifically permitted by a maintenance procedure, an inoperative item may not be removed from the aircraft.

**AMC1 AOCR.MLR.105 (h) Minimum equipment list**

**OPERATIONAL AND MAINTENANCE PROCEDURES - APPLICABLE CHANGES**

(a) Changes to the operational and maintenance procedures referenced in the MMEL are considered applicable and require the amendment of the maintenance and operating procedures referenced in the MEL when the:
(1) the modified procedure is applicable to the operator’s MEL; and

(2) the purpose of this change is to improve compliance with the intent of the associated MMEL dispatch condition.

(b) An acceptable timescale for the amendments of maintenance and operating procedures, as defined in (a) should be 90 days from the date when the amended procedures referenced in the MMEL are made available. Reduced timescales for the implementation of safety related amendments may be required if the competent authority considers it necessary.

AMC1 AOCR.MLR.105 (j) Minimum equipment list

OPERATION OF AN AIRCRAFT WITHIN THE CONSTRAINTS OF THE MMEL - OPERATOR’S PROCEDURES FOR THE APPROVAL BY THE AUTHORITY

(a) The operator’s procedures to address the operation of an aircraft outside the constraints of the MEL but within the constraints of the MMEL and ongoing surveillance to ensure compliance should provide the Authority with details of the name and position of the nominated personnel responsible for the control of the operations under such conditions and details of the specific duties and responsibilities established to control the use of the approval.

(b) Personnel authorising operations under such an approval should be adequately trained in technical and operational disciplines to accomplish their duties. They should have the necessary operational knowledge in terms of operational use of the MEL as alleviating documents by flight crew and maintenance personnel and engineering competence. The authorising personnel should be listed by appointment and name.

GM1 AOCR.MLR.105 (j) Minimum equipment list

OPERATION OF AN AIRCRAFT WITHIN THE CONSTRAINTS OF THE MMEL - OPERATOR’S PROCEDURES FOR THE APPROVAL BY THE AUTHORITY

Procedures for the operation of an aircraft outside the constraints of the MEL but within the constraints of the MMEL should only be applied under certain conditions, such as a shortage of parts from manufacturers or other unforeseen situations (e.g. inability to obtain equipment necessary for proper troubleshooting and repair), in which case the operator may be unable to comply with the constraints specified in the MEL.
AOCR.MLR.110 Journey log

Particulars of the aircraft, its crew and each journey shall be retained for each flight, or series of flights, in the form of a journey log, or equivalent.

**AMC1 AOCR.MLR.110 Journey log**

**GENERAL**

(a) The aircraft journey log, or equivalent, should include the following items, where applicable:

(1) aircraft nationality and registration,
(2) date,
(3) name(s) of crew member(s),
(4) duty assignments of crew member(s),
(5) place of departure,
(6) place of arrival,
(7) time of departure,
(8) time of arrival,
(9) hours of flight,
(10) nature of flight (scheduled or non-scheduled),
(11) incidents, observations, if any,
(12) signature of person in charge.

(b) The information, or parts thereof, may be recorded in a form other than on printed paper. Accessibility, usability and reliability should be assured.

(c) ‘Journey log, or equivalent’, means that the required information may be recorded in documentation other than a log book, such as the operational flight plan or the aircraft technical log.

(d) ‘Series of flights’, means consecutive flights, which begin and end:
(1) within a 24 hour period;

(2) at the same aerodrome or operating site or remain within a local area specified in the operations manual; and

(3) with the same pilot-in-command/commander of the aircraft.

**GM1 AOCR.MLR.110 Journey log**

**SERIES OF FLIGHTS**
The term “series of flights” is used to facilitate a single set of documentation.

**AOCR.MLR.115 Record-keeping**

(a) The records of the activities referred to in AOCR.GEN.200 shall be stored for at least five years.

   (1) for CAT operators, records of the activities referred to in AOCR.GEN.200;

   (2) for declared operators, a copy of the operator’s declaration, details of approvals held and operations manual.

   (3) for SPO authorisation holders, in addition to (a) (2), records related to the risk assessment conducted in accordance with SPO.OP.230 and related standard operating procedures.

(b) The following information used for the preparation and execution of a flight, and associated reports, shall be stored for three months:

   (1) the operational flight plan, if applicable;

   (2) route-specific notice(s) to airmen (NOTAM) and aeronautical information services (AIS) briefing documentation, if edited by the operator;

   (3) mass and balance documentation;

   (4) notification of special loads, including written information to the commander/pilot-in-command about dangerous goods;

   (5) the journey log, or equivalent; and

   (6) flight report(s) for recording details of any occurrence, or any event that the commander/pilot-in-command deems necessary to report or record;
Personnel records shall be stored for the periods indicated below:

<table>
<thead>
<tr>
<th>Record Type</th>
<th>Storage Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flight crew licence and cabin crew attestation</td>
<td>As long as the crew member is exercising the privileges of the licence or attestation for the aircraft operator</td>
</tr>
<tr>
<td>Crew member training, checking and qualifications</td>
<td>3 years</td>
</tr>
<tr>
<td>Records on crew member recent experience</td>
<td>15 months</td>
</tr>
<tr>
<td>Crew member route and aerodrome/task and area competence, as appropriate</td>
<td>3 years</td>
</tr>
<tr>
<td>Dangerous goods training, as appropriate</td>
<td>3 years</td>
</tr>
<tr>
<td>Training/qualification records of other personnel for whom a training programme is required</td>
<td>Last 2 training records</td>
</tr>
</tbody>
</table>

The operator shall:

1. maintain records of all training, checking and qualifications of each crew member, as prescribed in these requirements; and
2. make such records available, on request, to the crew member concerned.

The operator shall preserve the information used for the preparation and execution of a flight and personnel training records, even if the operator ceases to be the operator of that aircraft or the employer of that crew member, provided this is within the timescales prescribed in (c).

If a crew member becomes a crew member for another operator, the operator shall make the crew member’s records available to the new operator, provided this is within the timescales prescribed in (c).

**AMC1 AOCR.MLR.115 Record-keeping**

**TRAINING RECORDS**

A summary of training should be maintained by the operator to show every crew member’s completion of each stage of training and checking.
E. FLIGHT CREW

AOCR.FC.005 Scope

This part establishes requirements to be met by the operator conducting commercial air transport operations related to flight crew training, experience and qualification.

AOCR.FC.100 Composition of flight crew

(a) The composition of the flight crew and the number of flight crew members at designated crew stations shall be not less than the minimum specified in the aircraft flight manual or operating limitations prescribed for the aircraft.

(b) The flight crew shall include additional flight crew members when required by the type of operation and shall not be reduced below the number specified in the operations manual.

(c) All flight crew members shall hold a licence and ratings issued by the Authority and appropriate to the duties assigned to them.

(d) The flight crew member may be relieved in flight of his/her duties at the controls by another suitably qualified flight crew member.

(e) When engaging the services of flight crew members who are working on a freelance or part-time basis, the operator shall verify that all applicable requirements of these requirements and the relevant elements of Part-FCL, including the requirements on recent experience, are complied with, taking into account all services rendered by the flight crew member to other operator(s) to determine in particular:

1. the total number of aircraft types or variants operated; and
2. the applicable flight and duty time limitations and rest requirements.

AMC1 AOCR.FC.100(c) Composition of flight crew

OPERATIONAL MULTI-PILOT LIMITATION (OML)

The operator should ensure that pilots with an OML on their medical certificate only operate aircraft in multi-pilot operations when the other pilot is fully qualified on the relevant type of aircraft, is not subject to an OML.
AOCR.FC.105 Designation as pilot-in-command/commander

(a) One pilot amongst the flight crew, qualified as pilot-in-command in accordance with MFCL shall be designated by the operator as pilot-in-command/commander.

(b) The operator shall only designate a flight crew member to act as pilot-in-command/commander if he/she has:

(1) the minimum level of experience specified in the operations manual;

(2) adequate knowledge of the route or area to be flown and of the aerodromes, including alternate aerodromes, facilities and procedures to be used;

(3) in the case of multi-crew operations, completed an operator’s command course if upgrading from co-pilot to pilot-in-command/commander.

(c) The pilot-in-command/commander or the pilot, to whom the conduct of the flight may be delegated, shall have had initial familiarisation training of the route or area to be flown and of the aerodromes, facilities and procedures to be used. This route/area and aerodrome knowledge shall be maintained by operating at least once on the route or area or to the aerodrome within a 12-month period.

(d) In the case of performance class B aeroplanes involved in commercial air transport operations under VFR by day; (c) shall not apply.

AMC1 AOCR.FC.105 (b) (2) ;( c) Designation as pilot-in-command/commander

ROUTE/AREA AND AERODROME KNOWLEDGE FOR COMMERCIAL AIR TRANSPORT OPERATIONS

For commercial air transport (CAT) operations, the experience of the route or area to be flown and of the aerodrome facilities and procedures to be used should include the following:

(a) Area and route knowledge

(1) Area and route training should include knowledge of:

(i) terrain and minimum safe altitudes;

(ii) seasonal meteorological conditions;
(iii) meteorological, communication and air traffic facilities, services and procedures;

(iv) search and rescue procedures where available; and

(v) navigational facilities associated with the area or route along which the flight is to take place.

(2) Depending on the complexity of the area or route, as assessed by the operator, the following methods of familiarisation should be used:

(i) for the less complex areas or routes, familiarisation by self-briefing with route documentation, or by means of programmed instruction; and

(ii) in addition, for the more complex areas or routes, in-flight familiarisation as a pilot in command/commander or co-pilot under supervision, observer, or familiarisation in a flight simulation training device (FSTD) using a database appropriate to the route concerned.

(b) Aerodrome knowledge

(1) Aerodrome training should include knowledge of obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures, applicable operating minima and ground movement considerations.

(2) The operations manual should describe the method of categorisation of aerodromes and, in the case of CAT operations, provide a list of those aerodrome categorised as B or C.

(3) All aerodromes to which an operator operates should be categorised in one of these three categories:

(i) category A - an aerodrome that meets 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 ft above aerodrome level; and

(D) night operations capability.

(ii) category B - an aerodrome that does not meet the category A requirements or which requires extra considerations such as:

(A) non-standard approach aids and/or approach patterns;

(B) unusual local weather conditions;

(C) unusual characteristics or performance limitations; or

(D) any other relevant considerations including obstructions, physical layout, lighting etc.

(iii) category C - an aerodrome that requires additional considerations to a category B aerodrome;

(iv) offshore installations may be categorised as category B or C aerodromes, taking into account the limitations determined in accordance with AMC2 AOCR.OP.MPA.105 Use of aerodromes and operating sites.

(c) Prior to operating to a:

(1) category B aerodrome, the pilot-in-command/commander should be briefed, or self-briefed by means of programmed instruction, on the category B aerodrome(s) concerned. The completion of the briefing should be recorded. This recording may be accomplished after completion or confirmed by the pilot-in-command/commander before departure on a flight involving category B aerodrome(s) as destination or alternate aerodromes.

(2) category C aerodrome, the pilot-in-command/commander should be briefed and visit the aerodrome as an observer and/or undertake instruction in a suitable FSTD. The completion of the briefing, visit and/or instruction should be recorded.

**GM1 AOCR.FC.105 (b) (2) Route and aerodrome knowledge**

**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.

**AMC1 AOCR.FC.105(c) Designation as pilot-in-command/commander**

**ROUTE/AREA AND AERODROME REQUENCY**

(a) The 12-month period should be counted from the last day of the month:

(1) when the familiarisation training was undertaken; or

(2) of the latest operation on the route or area to be flown and of the aerodromes, facilities and procedures to be used.

(b) When the operation is undertaken within the last 3 calendar months of that period, the new 12-month period should be counted from the original expiry date.

**AMC2 AOCR.FC.105(c) Designation as pilot-in-command/commander**
ROUTE/AREA AND AERODROME RECENCY - PERFORMANCE CLASS B–
AEROPLANES OPERATED UNDER VFR BY NIGHT OR IFR IN CAT
OPERATIONS

In the case of CAT operations with performance class B aeroplanes operating under visual flight rules (VFR) by night or instrument flight rules (IFR), the knowledge should be maintained as follows:

(a) except for operations to the most demanding aerodromes, by completion of at least 10 flight sectors within the area of operation during the preceding 12 months in addition to any required self-briefing;

(b) operations to the most demanding aerodromes may be performed only if:

(1) the pilot-in-command/commander has been qualified at the aerodrome within the preceding 36 months by a visit as an operating flight crew member or as an observer;

(2) the approach is performed in visual meteorological conditions (VMC) from the applicable minimum sector altitude; and

(3) an adequate self-briefing has been made prior to the flight.

GM1 AOCR.FC.105 (d) Designation as pilot-in-command/commander

PERFORMANCE CLASS B AEROPLANES OPERATED UNDER VFR BY DAY IN CAT OPERATIONS

For CAT operations under VFR by day with performance class B aeroplanes, the operator should take account of any requirement that might be stipulated in specific cases by the State of the aerodrome.

AOCR.FC.110 Flight engineer

When a separate flight engineer station is incorporated in the design of an aeroplane, the flight crew shall include one crew member who is suitably qualified in accordance with applicable national rules.

AOCR.FC.115 Crew resource management (CRM) training

(a) Before operating, the flight crew member shall have received CRM training, appropriate to his/her role, as specified in the operations manual.
(b) Elements of CRM training shall be included in the aircraft type or class training and recurrent training as well as in the command course.

**AOCR.FC.120 Operator conversion training**

(a) In the case of aeroplane or helicopter operations, the flight crew member shall complete the operator conversion training course before commencing unsupervised line flying:

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

(2) when joining an operator.

(b) The operator conversion training course shall include training on the equipment installed on the aircraft as relevant to flight crew member’s roles.

**AOCR.FC.125 Differences training and familiarisation training**

(a) Flight crew members shall complete differences or familiarisation training when required by MFCL and when changing equipment or procedures requiring additional knowledge on types or variants currently operated.

(b) The operations manual shall specify when such differences or familiarisation is required.

**AMC1 AOCR.FC.125 Differences training and familiarisation training**

(a) Differences training requiring additional knowledge and training on the aircraft or an appropriate training device. It should be carried out:

(1) when introducing a significant change of equipment and/or procedures on types or variants currently operated; and

(2) in the case of aeroplanes, when operating another variant of an aeroplane of the same type or another type of the same class currently operated; or

(3) in the case of helicopters, when operating a variant of a helicopter currently operated.

(b) Familiarisation training requires only the acquisition of additional knowledge. It should be carried out when:
(1) operating another helicopter or aeroplane of the same type; or

(2) when introducing a significant change of equipment and/or procedures on types or variants currently operated.

**AOCR.FC.130 Recurrent training and checking**

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

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

**AOCR.FC.135 Pilot qualification to operate in either pilot’s seat**

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

**AOCR.FC.140 Operation on more than one type or variant**

(a) Flight crew members operating more than one type or variant of aircraft shall comply with the requirements prescribed in these requirements for each type or variant, unless credits related to the training, checking, and recent experience requirements are defined in the data established.

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

**AOCR.FC.145 Provision of training**

(a) All the training required in these requirements shall be conducted:

(1) in accordance with the training programmes and syllabi established by the operator in the operations manual;

(2) by appropriately qualified personnel. In the case of flight and flight simulation training and checking, the personnel providing the training and conducting the checks shall be qualified in accordance with Part-FCL.
(b) When establishing the training programmes and syllabi, the operator shall include the mandatory elements for the relevant type as defined in the data established in accordance with MFCL.

(c) Training and checking programmes, including syllabi and use of individual flight simulation training devices (FSTDs), shall be approved by the Authority.

(d) The FSTD shall replicate the aircraft used by the operator, as far as practicable. Differences between the FSTD and the aircraft shall be described and addressed through a briefing or training, as appropriate.

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

AMC1 AOCR.FC.145 (b) Provision of training

NON-MANDATORY (RECOMMENDATION) ELEMENTS

When developing the training programmes and syllabi, the operator should consider the non-mandatory (recommendation) elements for the relevant type that are provided in the data established in accordance with Regulations.

AMC1 AOCR.FC.145 (d) Provision of training

FULL FLIGHT SIMULATORS (FFS)

The operator should classify any differences between the aircraft and FFS in accordance with the Air Transport Association (ATA) chapters as follows: Compliance Levels

(a) **Level A differences:**

1. no influence on flight characteristics;
2. no influence on procedures (normal and/or abnormal);
3. differences in presentation; and
4. differences in operation.

**Method:** self-instruction via the operations manual or flight crew information.
(b) **Level B differences:**

1. no influence on flight characteristics;
2. influence on procedures (normal and/or abnormal); and
3. possible differences in presentation and operation.

*Method:* flight crew information, computer-based training, system device training or special instruction by instructor.

(c) **Level C differences:**

1. influence on flight characteristics;
2. influence on procedures (normal and/or abnormal); and
3. eventually differences in presentation and operation.

*Method:* special instruction by instructor, a selected partial training on another FSTD or aircraft or a waiver because of previous experience, special instruction or training programme.

(d) **Level D differences:**

1. influence on flight characteristics; and/or
2. influence on procedures (normal and/or abnormal); and/or
3. differences in presentation and/or operation; and
4. FSTD is level D qualified and is used for zero flight-time training (ZFTT).

*Method:* a specified partial training on another FSTD or aircraft or a waiver because of previous experience, special instruction or training programme.

**AOCR.FC.200 Composition of flight crew**

(a) There shall not be more than one inexperienced flight crew member in any flight crew.
(b) The commander may delegate the conduct of the flight to another pilot suitably qualified in accordance with Part-FCL provided that the requirements of AOCR.FC.105 (b) (1), (b) (2) and (c) are complied with.

(c) Specific requirements for aeroplane operations under instrument flight rules (IFR) or at night.

(1) The minimum flight crew shall be two pilots for all turbo-propeller aeroplanes with a maximum operational passenger seating configuration (MOPSC) of more than nine and all turbojet aeroplanes.

(2) Aeroplanes other than those covered by (c)(1) shall be operated with a minimum crew of two pilots, unless the requirements of AOCR.FC.202 are complied with, in which case they may be operated by a single pilot.

(d) Specific requirements for helicopter operations.

(1) For all operations of helicopters with an MOPSC of more than 19 and for operations under IFR of helicopters with an MOPSC of more than 9:

   (i) the minimum flight crew shall be two pilots; and

   (ii) the commander shall be the holder of an airline transport pilot licence (helicopter) (ATPL (H)) with an instrument rating issued in accordance with Part-FCL.

(2) Operations not covered by (d) (1) may be operated by a single pilot under IFR or at night provided that the requirements of AOCR.FC.202 are complied with.

**AMC1 AOCR.FC.200 (a) Composition of flight crew**

**CREWING OF INEXPERIENCED FLIGHT CREW MEMBERS**

The operator should establish procedures in the operations manual taking into account the following elements:

**Aeroplanes**

(a) The 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/she has achieved on the type either:
(1) 100 flight hours and flown 10 sectors within a consolidation period of 120 consecutive days; or

(2) 150 flight hours and flown 20 sectors (no time limit).

(b) A lesser number of flight hours or sectors, subject to any other conditions that the Authority may impose, may be acceptable to the Authority when one of the following applies:

(1) a new operator is commencing operations;

(2) an operator introduces a new aeroplane type;

(3) flight crew members have previously completed a type conversion course with the same operator;

(4) credits are defined in the data established in accordance with Regulations; or

(5) the aeroplane has a maximum take-off mass of less than 10 tonnes or a maximum operational passenger seating configuration (MOPSC) of less than 20.

Helicopters

(c) The operator should consider that, when two flight crew members are required, a flight crew member, following completion of a type rating or command course, and the associated line flying under supervision, is inexperienced until either:

(1) he/she has achieved 50 flight hours on the type and/or in the role within a period of 60 days; or

(2) he/she has achieved 100 flight hours on the type and/or in the role (no time limit).

(d) A lesser number of flight hours, on the type and/or in the role, and subject to any other conditions which the Authority may impose, may be acceptable to the Authority when one of the following applies:

(1) a new operator is commencing operations;

(2) an operator introduces a new helicopter type;
(3) flight crew members have previously completed a type conversion course with the same operator (reconversion); or

(4) credits are defined in the data established in accordance with Regulations.

**AOCR.FC.A.201 In-flight relief of flight crew members**

(a) The commander may delegate the conduct of the flight to:

(1) another qualified commander; or

(2) for operations only above flight level (FL) 200, a pilot who complies with the following minimum qualifications:

   (i) ATPL;

   (ii) conversion training and checking, including type rating training, in accordance with AOCR.FC.220;

   (iii) all recurrent training and checking in accordance with AOCR.FC.230 and AOCR.FC.240;

   (iv) route/area and aerodrome competence in accordance with AOCR.FC.105.

(b) The co-pilot may be relieved by:

(1) another suitably qualified pilot;

(2) for operations only above FL 200, a cruise relief co-pilot that complies with the following minimum qualifications:

   (i) valid commercial pilot licence (CPL) with an instrument rating;

   (ii) conversion training and checking, including type rating training, in accordance with AOCR.FC.220 except the requirement for take-off and landing training;

   (iii) recurrent training and checking in accordance with AOCR.FC.230 except, the requirement for take-off and landing training.

(c) A flight engineer may be relieved in flight by a crew member suitably qualified in accordance with applicable national rules.
AOCR.FC.202 Single-pilot operations under IFR or at night

In order to be able to fly under IFR or at night with a minimum flight crew of one pilot, as foreseen in AOCR.FC.200(c)(2) and (d)(2), the following shall be complied with:

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

(1) engine management and emergency handling;
(2) use of normal, abnormal and emergency checklist;
(3) air traffic control (ATC) communication;
(4) departure and approach procedures;
(5) autopilot management, if applicable;
(6) use of simplified in-flight documentation;
(7) single-pilot crew resource management.

(b) The recurrent checks required by AOCR.FC.230 shall be performed in the single-pilot role on the relevant type or class of aircraft in an environment representative of the operation.

(c) For aeroplane operations under IFR the pilot shall have:

(1) a minimum of 50 hours flight time under IFR on the relevant type or class of aeroplane, of which 10 hours are as commander; and

(2) completed during the preceding 90 days on the relevant type or class of aeroplane:

(i) five IFR flights, including three instrument approaches, in a single-pilot role; or

(ii) an IFR instrument approach check.

(d) For aeroplane operations at night the pilot shall have:
(1) a minimum of 15 hours flight time at night which may be included in the 50 hours flight time under IFR in (c)(1); and

(2) completed during the preceding 90 days on the relevant type or class of aeroplane:

   (i) three take-offs and landings at night in the single pilot role; or

   (ii) a night take-off and landing check.

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

(1) 25 hours total IFI Flight experience in the relevant operating environment; and

(2) 25 hours flight experience as a single pilot on the specific type of helicopter, approved for single-pilot IFR, of which 10 hours may be flown under supervision, including five sectors of IFR line flying under supervision using the single-pilot procedures;

(3) completed during the preceding 90 days:

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

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

**AOCR.FC.205 Command course**

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

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

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

(3) command responsibilities training;

(4) line training as commander under supervision, for a minimum of:
(i) 10 flight sectors, in the case of aeroplanes; and

(ii) 10 hours, including at least 10 flight sectors, in the case of helicopters;

(5) completion of a line check as commander and demonstration of adequate knowledge of the route or area to be flown and of the aerodromes, including alternate aerodromes, facilities and procedures to be used; and

(6) crew resource management training.

**AOCR.FC.215 Initial operator’s crew resource management (CRM) training**

(a) The flight crew member shall have completed an initial CRM training course before commencing unsupervised line flying.

(b) Initial CRM training shall be conducted by at least one suitably qualified CRM trainer who may be assisted by experts in order to address specific areas.

(c) If the flight crew member has not previously received theoretical training in human factors to the ATPL level, he/she shall complete, before or combined with the initial CRM training, a theoretical course provided by the operator and based on the human performance and limitations syllabus for the ATPL as established in Part-FCL.

**AMC1 FC.115 & 215 Crew resource management (CRM) training**

**CRM TRAINING – CAT OPERATIONS**

(a) General

(1) CRM training should reflect the culture of the operator as well as type of operation 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 FSTDs that reproduce, in an acceptable way, a realistic operational environment and permit interaction. This includes, but is not
limited to, appropriate line-oriented flight training (LOFT) scenarios conducted in FSTDs.

(3) It is recommended that, whenever possible, initial CRM training be conducted in a group session away from the pressures of the usual working environment so that the opportunity is provided for flight crew members to interact and communicate in an environment conducive to learning.

(b) Initial CRM Training

(1) Initial 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 1 day for single-pilot operations and 2 days for all other types of operations. It should cover all the elements indicated in (f).

(2) The CRM trainer should:

(i) possess group facilitation skills;
(ii) have and maintain adequate knowledge of the operation and the aircraft type, preferably through current CAT experience as a flight crew member;
(iii) have successfully passed the human performance and limitations (HPL) examination whilst recently obtaining the airline transport pilot licence (ATPL); or followed a theoretical HPL course covering the whole syllabus of the HPL examination;
(iv) have completed initial CRM training;
(v) have received additional education in the fields of group management, group dynamics and personal awareness; and
(vi) be supervised by suitably qualified CRM training personnel when conducting his/her first initial CRM training session.

(3) The operator should ensure that initial CRM training addresses the nature of the operations of the operator concerned, as well as the associated procedures and the culture of the operator. This will include areas of operations that produce particular difficulties or involve adverse climatic conditions and any unusual hazards.
(4) If the operator does not have sufficient means to establish initial CRM training, use may be made of a course provided by another operator, or a third party or training organisation. In this event the operator should ensure that the content of the course meets his/her operational requirements. When crew members from several companies follow the same course, CRM core elements should be specific to the nature of operations of the companies and the trainees concerned.

(5) The flight crew member’s CRM skills should not be assessed during initial CRM training.

(c) Operator conversion course – CRM training

(1) If the flight crew member undergoes a conversion course with a change of aircraft type, elements of CRM should be integrated into all appropriate phases of the operator’s conversion course, in accordance with (f).

(2) If the flight crew member undergoes a conversion course with a change of operator, elements of CRM should be integrated into all appropriate phases of the operator’s conversion course, in accordance with (f).

(3) The flight crew member should not be assessed when completing elements of CRM training that are included in the operator conversion course.

(d) Command course – CRM training

(1) The operator should ensure that elements of CRM are integrated into the command course in accordance with (f).

(2) The flight crew member should not be assessed when completing elements of CRM training that are included in the command course, although feedback should be given.

(e) Recurrent CRM training

(1) The operator should ensure that:

(i) elements of CRM are integrated into all appropriate phases of recurrent training every year, in accordance with (f), and that modular CRM training covers the same areas over a maximum period of 3 years; and
(ii) relevant modular CRM training is conducted by CRM trainers qualified according to (b) (2).

(2) The flight crew member should not be assessed when completing elements of CRM training that are included in the recurrent training.

(f) Implementation of CRM

(1) Table 1 indicates which elements of CRM should be included in each type of training.

**Table 1: Elements of CRM to be included in training**

<table>
<thead>
<tr>
<th>Core Elements</th>
<th>Initial CRM Training</th>
<th>Operator conversion course when changing type*</th>
<th>Operator conversion course when changing operator</th>
<th>Command course</th>
<th>Recurrent training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human error and reliability, error chain, error prevention and detection</td>
<td>In-depth</td>
<td>In-depth</td>
<td>Overview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operator safety culture, standard operating procedures (SOPs), organisational factors</td>
<td>Not required</td>
<td>In-depth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress, stress management, fatigue &amp; vigilance</td>
<td>In-depth</td>
<td>Not required</td>
<td>In-depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information acquisition and processing situation awareness, workload management</td>
<td>Overview</td>
<td></td>
<td>Overview</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision making</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication and coordination inside and outside the flight crew compartment</td>
<td>Overview</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership and team behaviour synergy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Automation, philosophy of the use of automation (if relevant to the type)</td>
<td>As required</td>
<td>In-depth</td>
<td>As required</td>
<td>As required</td>
<td></td>
</tr>
<tr>
<td>Specific type-related differences</td>
<td></td>
<td>Not required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case studies</td>
<td>In-depth</td>
<td>In-depth</td>
<td>In-depth</td>
<td>In-depth</td>
<td></td>
</tr>
</tbody>
</table>
* Credit may be given when converting between similar aircraft types such as airbus family as agreed with the Authority.

(g) Coordination between flight crew and cabin/technical crew training

(1) Operators should, as far as practicable, provide combined training for flight crew and cabin/technical crew including briefing and debriefing.

(2) There should be an effective liaison between flight crew and cabin/technical crew training departments. Provision should be made for transfer of relevant knowledge and skills between flight and cabin/technical crew instructors.

(h) Assessment of CRM skills

(1) Assessment of CRM skills is the process of observing, recording, interpreting and debriefing crews and crew member’s performance and knowledge using an acceptable methodology in the context of overall performance. It includes the concept of self-critique, and feedback which can be given continuously during training or in summary following a check. In order to enhance the effectiveness of the programme this methodology should, where possible, be agreed with flight crew representatives.

(2) NOTECHS (non-technical skills evaluation) or other acceptable methods of assessment should be used. The selection criteria and training requirements of the assessors and their relevant qualifications, knowledge and skills should be established.

(3) Assessment of CRM skills should:

(i) provide feedback to the crew and the individual and serve to identify retraining where needed; and

(ii) be used to improve the CRM training system.

(4) Prior to the introduction of CRM skills assessment, a detailed description of the CRM methodology including terminology used should be published in the operations manual.

(5) Methodology of CRM skills assessment

(i) The operator should establish the CRM training programme including an agreed terminology. This should be evaluated with regard to methods, length of training, depth of subjects and effectiveness.
(ii) A training and standardisation programme for training personnel should then be established.

(iii) The assessment should be based on the following principles:

(A) only observable, repetitive behaviours are assessed;

(B) the assessment should positively reflect any CRM skills that result in enhanced safety;

(C) assessments should include behaviour that contributes to a technical failure, such technical failure being errors leading to an event that requires debriefing by the person conducting the line check; and

(D) the crew and, where needed, the individual are verbally debriefed.

(6) De-identified summaries of all CRM assessments by the operator should be used to provide feedback and such feedback should be used to update and improve the operator’s CRM training.

(7) Operators should establish procedures, including retraining, to be applied in the event that personnel do not achieve or maintain the required standards.

(8) If the operator proficiency check is combined with the type rating revalidation/renewal check, the assessment of CRM skills should satisfy the multi-crew cooperation requirements of the type rating revalidation/renewal. This assessment should not affect the validity of the type rating.

(i) Levels of training

(1) Overview. When overview training is required it should normally be instructional in style. Such training should refresh knowledge gained in earlier training.

(2) In-depth. When in-depth training is required it should normally be interactive in style and should include, as appropriate, case studies, group discussions, role play and consolidation of knowledge and skills. Core elements should be tailored to the specific needs of the training phase being undertaken.
(j) Use of automation

(1) The operator conversion course should include training in the use and knowledge of automation and in the recognition of systems and human limitations associated with the use of automation. The operator should therefore ensure that the flight crew member receives training on:

(i) the application of the operations policy concerning the use of automation as stated in the operations manual; and

(ii) system and human limitations associated with the use of automation.

(2) The objective of this training should be to provide appropriate knowledge, skills and behavioural patterns for managing and operating automated systems. Special attention should be given to how automation increases the need for crews to have a common understanding of the way in which the system performs, and any features of automation that make this understanding difficult.

AMC1.1 AOCR.FC.115 & 215 Crew resource management (CRM) training

CRM TRAINER

The acceptable means of compliance are as set out in AMC1 AOCR.FC.115&.215, except for (b) (2) of that AMC, for which the following qualifications and experience are also acceptable for a CRM trainer:

(a) a flight crew member holding a recent qualification as a CRM trainer may continue to be a CRM trainer even after the cessation of active flying duties;

(b) an experienced non-flight crew CRM trainer having a knowledge of HPL; and

(c) a former flight crew member having knowledge of HPL may become a CRM trainer if he/she maintains adequate knowledge of the operation and aircraft type and meets the provisions of AMC1 AOCR.FC.115&.215, (b)(2)(i), (iv), (v) and (vi).
GM1.FC.115 & 215 Crew resource management (CRM) training

GENERAL

(a) Crew resource management (CRM) is the effective utilisation of all available resources (e.g. crew members, aircraft 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.

AOCR.FC.220 Operator conversion training and checking

(a) CRM training shall be integrated into the operator conversion training course.

(b) Once an operator conversion course has been commenced, the flight crew member shall not be assigned to flying duties on another type or class of aircraft until the course is completed or terminated. Crew members operating only performance class B aeroplanes may be assigned to flights on other types of performance class B aeroplanes during conversion courses to the extent necessary to maintain the operation.

(c) The amount of training required by the flight crew member for the operator’s conversion course shall be determined in accordance with the standards of qualification and experience specified in the operations manual, taking into account his/her previous training and experience.

(d) The flight crew member shall complete:

(1) the operator proficiency check and the emergency and safety equipment training and checking before commencing line flying under supervision (LIFUS); and

(2) the line check upon completion of line flying under supervision. For performance class B aeroplanes, LIFUS may be performed on any aeroplane within the applicable class.

(e) In the case of aeroplanes, pilots that have been issued a type rating based on a zero flight-time training (ZFTT) course shall:

(1) commence line flying under supervision not later than 21 days after the completion of the skill test or after appropriate training
provided by the operator. The content of such training shall be described in the operations manual;

(2) complete six take-offs and landings in a FSTD not later than 21 days after the completion of the skill test under the supervision of a type rating instructor for aeroplanes (TRI(A)) occupying the other pilot seat. The number of take-offs and landings may be reduced when credits are defined in the data established and agreed with the Authority. If these take-offs and landings have not been performed within 21 days, the operator shall provide refresher training. The content of such training shall be described in the operations manual;

(3) conduct the first four take-offs and landings of the LIFUS in the aeroplane under the supervision of a TRI (A) occupying the other pilot seat. The number of take-offs and landings may be reduced when credits are defined and agreed with the Authority.

AMC1 AOCR.FC.220 Operator conversion training and checking

OPERATOR CONVERSION TRAINING SYLLABUS

(a) General

(1) The operator conversion training should include, in the following order:

(i) ground training and checking, including aircraft systems, and normal, abnormal and emergency procedures;

(ii) emergency and safety equipment training and checking, (completed before any flight training in an aircraft commences);

(iii) flight training and checking (aircraft and/or FSTD); and

(iv) line flying under supervision and line check.

(2) When the flight crew member has not previously completed an operator’s conversion course, he/she should undergo general first-aid training and, if applicable, ditching procedures training using the equipment in water.

(3) Where the emergency drills require action by the non-handling pilot, the check should additionally cover knowledge of these drills.
(4) The operator’s conversion may be combined with a new type/class rating training as required by MCAR-FCL.

(5) The operator should ensure that the personnel integrating elements of CRM into conversion training are suitably qualified.

(b) Ground training

(1) Ground training should comprise a properly organised programme of ground instruction supervised by training staff with adequate facilities, including any necessary audio, mechanical and visual aids. Self-study using appropriate electronic learning aids, computer-based training (CBT) etc. may be used with adequate supervision of the standards achieved. However, if the aircraft concerned is relatively simple, unsupervised private study may be adequate if the operator provides suitable manuals and/or study notes.

(2) The course of ground instruction should incorporate formal tests on such matters as aircraft systems, performance and flight planning, where applicable.

(c) Emergency and safety equipment training and checking

(1) Emergency and safety equipment training should take place in conjunction with cabin/technical crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight crew compartment and the cabin.

(2) 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 aircraft type of operation and crew complement including those situations where no cabin crew is required to be carried (initial and subsequent).

(ii) Aero-medical 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) Actual firefighting, using equipment representative of that carried in the aircraft on an actual or simulated fire except that, with Halon extinguishers, an alternative extinguisher may be used.

(v) The operational procedures of security, rescue and emergency services.

(vi) 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.

(vii) A comprehensive drill to cover all ditching procedures where flotation equipment is carried. This should include practice of the actual donning and inflation of a life-jacket, together with a demonstration or audio-visual presentation 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 certified training with another operator or the use of similar equipment will be accepted in lieu of further wet-drill training.

(viii) 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 aircraft (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.

(d) Flight training
(1) Flight training should be conducted to familiarise the flight crew member thoroughly with all aspects of limitations and normal, abnormal and emergency procedures associated with the aircraft and should be carried out by suitably qualified class and type rating instructors and/or examiners. For specific operations such as steep approaches, ETOPS, or operations based on QFE, additional training should be carried out, based on any additional elements of training defined for the aircraft type in the data, where they exist.

(2) In planning flight training on aircraft with a flight crew of two or more, particular emphasis should be placed on the practice of LOFT with emphasis on CRM, and the use of crew coordination procedures, including coping with incapacitation.

(3) Normally, the same training and practice in the flying of the aircraft should be given to co-pilots as well as commanders. The “flight handling” sections of the syllabus for commanders and co-pilots alike should include all the requirements of the operator proficiency check required by AOCR.FC.230.

(4) Unless the type rating training programme has been carried out in an FSTD usable for ZFTT, the training should include at least three take-offs and landings in the aircraft.

(e) Line flying under supervision (LIFUS)

(1) Following completion of flight training and checking as part of the operator’s conversion course, each flight crew member should operate a minimum number of sectors and/or flight hours under the supervision of a flight crew member nominated by the operator.

(2) The minimum flight 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 aircraft; and

   (iii) the type and area of operation.

(3) For performance class B aeroplanes, the amount of LIFUS required is dependent on the complexity of the operations to be performed.
(f) Passenger handling for operations where no cabin crew is required
Other than general training on dealing with people, emphasis should be placed on the following:

(1) advice on the recognition and management of passengers who appear or are intoxicated with alcohol, under the influence of drugs or aggressive;

(2) methods used to motivate passengers and the crowd control necessary to expedite an aircraft evacuation; and

(3) the importance of correct seat allocation with reference to aircraft mass and balance. Particular emphasis should also be given on the seating of special categories of passengers.

(g) Discipline and responsibilities, for operations where no cabin crew is required
Emphasis should be placed on discipline and an individual’s responsibilities in relation to:

(1) his/her ongoing competence and fitness to operate as a crew member with special regard to flight and duty time limitation (FTL) requirements; and

(2) security procedures.

(h) Passenger briefing/safety demonstrations, for operations where no cabin crew is required
Training should be given in the preparation of passengers for normal and emergency situations.

**AMC2 AOCR.FC.220 Operator conversion training and checking**

**OPERATOR CONVERSION TRAINING SYLLABUS – FLIGHT ENGINEERS**

(a) Operator conversion training for flight engineers should approximate to that of pilots.

(b) If the flight crew includes a pilot with the duties of a flight engineer, he/she should, after training and the initial check in these duties, operate a minimum number of flight sectors under the supervision of a nominated additional flight crew member. The minimum figures should be specified in the operations manual and should be selected after due note has been taken of the complexity of the aircraft and the experience of the flight crew member.
GM1 AOCR.FC.220 (b) Operator conversion training and checking

COMPLETION OF AN OPERATOR"S CONVERSION COURSE

(a) The operator conversion course is deemed to have started when the flight training has begun. The theoretical element of the course may be undertaken ahead of the practical element.

(b) Under certain circumstances the course may have started and reached a stage where, for unforeseen reasons, it is not possible to complete it without a delay. In these circumstances the operator may allow the pilot to revert to the original type.

(c) Before the resumption of the operator conversion course, the operator should evaluate how much of the course needs to be repeated before continuing with the remainder of the course.

GM1 AOCR.FC.220 (d) Operator conversion training and checking

LINE FLYING UNDER SUPERVISION

(a) Line flying under supervision provides the opportunity for a flight crew member to carry into practice the procedures and techniques he/she has been made familiar with during the ground and flight training of an operator conversion course. This is accomplished under the supervision of a flight crew member specifically nominated and trained for the task. At the end of line flying under supervision the respective crew member should be able to perform a safe and efficient flight conducted within the tasks of his/her crew member station.

(b) A variety of reasonable combinations may exist with respect to:

(1) a flight crew member’s previous experience;

(2) the complexity of the aircraft concerned; and

(3) the type of route/role/area operations.

(c) Aeroplanes.

The following minimum figures for details to be flown under supervision are guidelines for operators to use when establishing their individual requirements:

(1) turbo-jet aircraft
(i) co-pilot undertaking first operator conversion course:

(A) total accumulated 100 hours or minimum 40 flight sectors;

(ii) co-pilot upgrading to commander:

(A) minimum 20 flight sectors when converting to a new type;

(B) minimum 10 flight sectors when already qualified on the aeroplane type.

AOCR.FC.230 Recurrent training and checking

(a) Each flight crew member shall complete recurrent training and checking relevant to the type or variant of aircraft on which they operate.

(b) Operator proficiency check

(1) Each flight crew member shall complete operator proficiency checks as part of the normal crew complement to demonstrate competence in carrying out normal, abnormal and emergency procedures.

(2) When the flight crew member will be required to operate under IFR, the operator proficiency check shall be conducted without external visual reference, as appropriate.

(3) The validity period of the operator proficiency check shall be six calendar months. For operations under VFR by day of performance class B aeroplanes conducted during seasons not longer than eight consecutive months, one operator proficiency check shall be sufficient. The proficiency check shall be undertaken before commencing commercial air transport operations.

(4) The flight crew member involved in operations by day and over routes navigated by reference to visual landmarks with an other-than-complex motor-powered helicopter may complete the operator proficiency check in only one of the relevant types held. The operator proficiency check shall be performed each time on the type least recently used for the proficiency check. The relevant helicopter types that may be grouped for the purpose of
the operator proficiency check shall be contained in the operations manual.

(5) Notwithstanding AOCR.FC.145 (a) (2), for operations of other-than-complex motor-powered helicopters by day and over routes navigated by reference to visual landmarks and performance class B aeroplanes, the check may be conducted by a suitably qualified commander nominated by the operator, trained in CRM concepts and the assessment of CRM skills. The operator shall inform the Authority about the persons nominated.

(c) **Line check**

(1) Each flight crew member shall complete a line check on the aircraft to demonstrate competence in carrying out normal line operations described in the operations manual. The validity period of the line check shall be 12 calendar months.

(2) Notwithstanding AOCR.FC.145 (a) (2), line checks may be conducted by a suitably qualified commander nominated by the operator, trained in CRM concepts and the assessment of CRM skills.

(d) **Emergency and safety equipment training and checking**

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

(e) **CRM training**

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

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

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

(g) The validity periods mentioned in (b) (3), (c) and (d) shall be counted from the end of the month when the check was taken.
When the training or checks required above are undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date.

**AMC1 AOCR.FC.230 Recurrent training and checking**

**RECURRENT TRAINING SYLLABUS**

(a) **Recurrent training**

Recurrent training should comprise the following:

(1) **Ground training**

(i) The ground training programme should include:

(A) aircraft systems;

(B) operational procedures and requirements including ground de-icing/anti-icing and pilot incapacitation; and

(C) accident/incident and occurrence review.

(ii) Knowledge of the ground training should be verified by a questionnaire or other suitable methods.

(iii) When the ground training is conducted within 3 calendar months prior to the expiry of the 12 calendar months period, the next ground and refresher training should be completed within 12 calendar months of the original expiry date of the previous training.

(2) **Emergency and safety equipment training**

(i) Emergency and safety equipment training may be combined with emergency and safety equipment checking and should be conducted in an aircraft or a suitable alternative training device.

(ii) Every year the emergency and safety equipment training programme should include the following:

(A) actual donning of a life-jacket, where fitted;
(B) actual donning of protective breathing equipment, where fitted;

(C) actual handling of fire extinguishers of the type used;

(D) instruction on the location and use of all emergency and safety equipment carried on the aircraft;

(E) instruction on the location and use of all types of exits;

(F) security procedures.

(iii) Every 3 years the programme of training should 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 aircraft on an actual or simulated fire except that, with Halon extinguishers, an alternative extinguisher 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 applicable;

(F) demonstration in the use of the life-rafts where fitted. In the case of helicopters involved in extended over water operations, demonstration and use of the life-rafts.

Helicopter water survival training

Where life-rafts are fitted for helicopter extended overwater operations (such as sea pilot transfer, offshore operations, regular, or scheduled, coast-to-coast overwater operations), a comprehensive wet drill to cover all ditching procedures should be practised by aircraft crew. This wet drill should
include, as appropriate, practice of the actual donning and inflation of a life-jacket, together with a demonstration or audio-visual presentation of the inflation of life-rafts. Crews should board the same (or similar) life-rafts from the water whilst wearing a life-jacket. Training should include the use of all survival equipment carried on board life-rafts and any additional survival equipment carried separately on board the aircraft;

- consideration should be given to the provision of further specialist training such as underwater escape training. Where operations are predominately conducted offshore, operators should conduct 3-yearly helicopter underwater escape training at an appropriate facility;

- wet practice drill should always be given in initial training unless the crew member concerned has received similar training provided by another operator;

(G) particularly in the case where no cabin crew is required, first-aid, appropriate to the aircraft type, the kind of operation and crew complement.

(iv) The successful resolution of aircraft emergencies requires interaction between flight crew and cabin/technical crew and emphasis should be placed on the importance of effective coordination and two-way communication between all crew members in various emergency situations.

(v) Emergency and safety equipment training should include joint practice in aircraft 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/technical crew training should include joint discussion of emergency scenarios.

(vi) Emergency and safety equipment training should, as far as practicable, take place in conjunction with cabin/technical crew undergoing similar training with emphasis on coordinated procedures and two-way communication between the flight crew compartment and the cabin.

(3) CRM
(i) Elements of CRM should be integrated into all appropriate phases of recurrent training.

(ii) A specific modular CRM training programme should 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) operator safety culture, standard operating procedures (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 coordination inside and outside the flight crew compartment;

(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 studies;

(K) additional areas which warrant extra attention, as identified by the safety management system.

(iii) Operators should establish procedures to update their CRM recurrent training programme. Revision of the programme should be conducted over a period not exceeding 3 years.

The revision of the programme should take into account the de-identified results of the CRM assessments of crews, and information identified by the safety management system.

(4) Aircraft/FSTD training
(i) General

(A) The aircraft/FSTD training programme should be established in a way that all major failures of aircraft systems and associated procedures will have been covered in the preceding 3 year period.

(B) When engine-out manoeuvres are carried out in an aircraft, the engine failure should be simulated.

(C) Aircraft/FSTD training may be combined with the operator proficiency check.

(D) When the aircraft/FSTD training is conducted within 3 calendar months prior to the expiry of the 12 calendar months period, the next aircraft/FSTD training should be completed within 12 calendar months of the original expiry date of the previous training.

(ii) Helicopters

(A) Where a suitable FSTD is available it should be used for the aircraft/FSTD training programme. If the operator is able to demonstrate, on the basis of a compliance and risk assessment, that using an aircraft for this training provides equivalent standards of training with safety levels similar to those achieved using an FSTD, the aircraft may be used for this training to the extent necessary.

(B) The recurrent training should include the following additional items, which should be completed in an FSTD:

- settling with power and vortex ring;
- loss of tail rotor effectiveness.

(5) For operations with other-than-complex motor-powered aeroplanes, all training and checking should 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.
(b) **Recurrent checking**

Recurrent checking should comprise the following:

(1) **Operator proficiency checks**

   (i) **Aeroplanes**

   Where applicable, operator proficiency checks should include the following manoeuvres as pilot flying:

   (A) rejected take-off when an FSTD is available to represent that specific aeroplane, otherwise touch drills only;

   (B) take-off with engine failure between V1 and V2 (take-off safety speed) or, if carried out in an aeroplane, at a safe speed above V2;

   (C) precision instrument approach to minima with, in the case of multi-engine aeroplanes, one-engine-inoperative;

   (D) non-precision approach to minima;

   (E) missed approach on instruments from minima with, in the case of multi-engined aeroplanes, one-engine-inoperative;

   (F) landing with one-engine-inoperative. For single-engine aeroplanes a practice forced landing is required.

(ii) **Helicopters**

   (A) Where applicable, operator proficiency checks should include the following abnormal/emergency procedures:

   - engine fire;

   - fuselage fire;

   - emergency operation of under carriage;

   - fuel dumping;
- engine failure and relight;
- hydraulic failure;
- electrical failure;
- engine failure during take-off before decision point;
- engine failure during take-off after decision point;
- engine failure during landing before decision point;
- engine failure during landing after decision point;
- flight and engine control system malfunctions;
- recovery from unusual attitudes;
- landing with one or more engine(s) inoperative;

Instrument meteorological conditions (IMC) autorotation techniques;

- autorotation to a designated area;
- pilot incapacitation;
- directional control failures and malfunctions.

(B) For pilots required to engage in IFR operations, proficiency checks include the following additional abnormal/emergency procedures:

- precision instrument approach to minima;
- go-around on instruments from minima with, in the case of multi-engined helicopters, a simulated failure of one engine;
- non-precision approach to minima;
- in the case of multi-engined helicopters, a simulated failure of one engine to be included in either the precision or non-precision approach to minima;
- landing with a simulated failure of one or more engines;

- where appropriate to the helicopter type, approach with flight control system/flight director system malfunctions, flight instrument and navigation equipment failures.

(C) Before a flight crew member without a valid instrument rating is allowed to operate in VMC at night, he/she should be required to undergo a proficiency check at night. Thereafter, each second proficiency check should be conducted at night.

(iii) Once every 12 months the checks prescribed in (b) (1) (ii) (A) may be combined with the proficiency check for revalidation or renewal of the aircraft type rating.

(iv) Operator proficiency checks should be conducted by a type rating examiner (TRE) or a synthetic flight examiner (SFE), as applicable.

(2) Emergency and safety equipment checks. The items to be checked should be those for which training has been carried out in accordance with (a) (2).

(3) Line checks

(i) Line checks should 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. 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 commander, or any pilot who may be required to relieve the commander, should also demonstrate his/her ability to “manage” the operation and take appropriate command decisions.

(ii) The flight crew should be assessed on their CRM skills in accordance with a methodology described 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 assessment alone should not be used as a reason for a failure of the line check.

(iv) When pilots are assigned duties as pilot flying and pilot monitoring they should be checked in both functions.

(v) Line checks should be conducted by a commander nominated by the operator. The operator should inform the Authority about the persons nominated. The person conducting the line check, who is described in (d) (5) (ii), should occupy an observer’s seat where installed. His/her CRM assessments should solely be based on observations made during the initial briefing, cabin briefing, flight crew compartment briefing and those phases where he/she occupies the observer’s seat.

(A) For aeroplanes, 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 should not occupy either pilot’s seat during take-off, departure, initial cruise, descent, approach and landing.

(vi) Where a pilot is required to operate as pilot flying and pilot monitoring, he/she should be checked on one flight sector as pilot flying and on another flight sector as pilot monitoring. However, where the operator’s procedures require integrated flight preparation, integrated cockpit initialisation and that each pilot performs both flying and monitoring duties on the same sector, then the line check may be performed on a single flight sector.

(4) When the operator proficiency check, line check or emergency and safety equipment check are undertaken within the final 3 calendar months of validity of a previous check, the period of validity of the subsequent check should be counted from the expiry date of the previous check.

(5) In the case of single-pilot operations with helicopters, the recurrent checks referred to in (b) (1), (2) and (3) should be performed in the single-pilot role on a particular helicopter type in an environment representative of the operation.
(c) **Flight crew incapacitation training, except single-pilot operations**

(1) Procedures should be established to train flight crew to recognise and handle flight crew 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, audio-visual presentation or other similar means.

(2) If an FSTD is available for the type of aircraft operated, practical training on flight crew incapacitation should be carried out at intervals not exceeding 3 years.

(d) **Personnel providing training and checking**

Training and checking should be provided by the following personnel:

(1) ground and refresher training by suitably qualified personnel;

(2) flight training by a flight instructor (FI), type rating instructor (TRI) or class rating instructor (CRI) or, in the case of the FSTD content, a synthetic flight instructor (SFI), providing that the FI, TRI, CRI or SFI satisfies the operator’s experience and knowledge requirements sufficient to instruct on the items specified in paragraphs (a)(1)(i)(A) and (B);

(3) emergency and safety equipment training by suitably qualified personnel;

(4) CRM:

(i) integration of CRM elements into all the phases of the recurrent training by all the personnel conducting recurrent training. The operator should ensure that all personnel conducting recurrent training are suitably qualified to integrate elements of CRM into this training;

(ii) modular CRM training by at least one CRM trainer, who may be assisted by experts in order to address specific areas.

(5) recurrent checking 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 FSTD, a TRE, CRE or a synthetic flight examiner (SFE),
trained in CRM concepts and the assessment of CRM skills.

(ii) emergency and safety equipment checking by suitably
qualified personnel.

(e) Use of FSTD

(1) Training and checking provide an opportunity to practice
abnormal/emergency procedures that rarely arise in normal
operations and should be part of a structured programme of
recurrent training. This should be carried out in an FSTD
whenever possible.

(2) The line check should be performed in the aircraft. All other
training and checking should be performed in an FSTD, or, if it is
not reasonably practicable to gain access to such devices, in an
aircraft of the same type 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 aircraft type operated by the flight crew member.

(3) Because of the unacceptable risk when simulating emergencies
such as engine failure, icing problems, certain types of engine(s)
(e.g. during continued take-off or go-around, total hydraulic
failure), or because of environmental considerations associated
with some emergencies (e.g. fuel dumping) these emergencies
should preferably be covered in an FSTD. If no FSTD is available
these emergencies may be covered in the aircraft using a safe
airborne simulation, bearing in mind the effect of any subsequent
failure, and the exercise must be preceded by a comprehensive
briefing.

AMC2 AOCR.FC.230 Recurrent training and checking

FLIGHT ENGINEERS

(a) The recurrent training and checking for flight engineers should meet the
requirements for pilots and any additional specific duties, omitting those
items that do not apply to flight engineers.

(b) Recurrent training and checking for flight engineers should, whenever
possible, take place concurrently with a pilot undergoing recurrent
training and checking.
(c) The line check should be conducted by a commander or by a flight engineer nominated by the operator, in accordance with national rules, if applicable.

AMC1 AOCR.FC.220&230 Operator conversion training and checking & recurrent training and checking

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM OPERATIONAL PASSENGER SEATING CONFIGURATION (MOPSC) OF MORE THAN 19.

(a) Upset prevention training should:

(1) consist of ground training and flight training in an FSTD or an aeroplane;

(2) include 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 12 calendar months, such that all the elements are covered over a period not exceeding 3 years.

Table 1: Elements and respective components of upset prevention training

<table>
<thead>
<tr>
<th>Elements and components</th>
<th>Ground training</th>
<th>FSTD/Aeroplane training</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Aerodynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 General aerodynamic characteristics</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>2 Aeroplane certification and limitations</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>3 Aerodynamics (high and low altitudes)</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>4 Aeroplane performance (high and low altitudes)</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>5 Angle of attack (AOA) and stall awareness</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>6 Stick shaker or other stall-warning device activation (as applicable)</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>7 Stick pusher (as applicable)</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>8 Mach effects (if applicable to the aeroplane type)</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>9 Aeroplane stability</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>10 Control surface fundamentals</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>11 Use of trims</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>
## DEPARTMENT OF CIVIL AVIATION

### AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Icing and contamination effects</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Propeller slipstream (as applicable)</td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td><strong>Causes of and contributing factors to upsets</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Environmental</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pilot-induced</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Mechanical (aeroplane systems)</td>
<td></td>
</tr>
<tr>
<td><strong>C</strong></td>
<td><strong>Safety review of accidents and incidents relating to aeroplane upsets</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Safety review of accidents and incidents relating to aeroplane upsets</td>
<td></td>
</tr>
<tr>
<td><strong>D</strong></td>
<td><strong>g-load awareness and management</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Positive/negative/increasing/decreasing g-loads</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Lateral g awareness (sideslip)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>g-load management</td>
<td></td>
</tr>
<tr>
<td><strong>E</strong></td>
<td><strong>Energy management</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Kinetic energy vs potential energy vs chemical energy (power)</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td><strong>Flight path management</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Relationship between pitch, power and performance</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Performance and effects of differing power plants (if applicable)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Manual and automation inputs for guidance and control</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Type-specific characteristics</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Management of go-arounds from various stages during the approach</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Automation management</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Proper use of rudder</td>
<td></td>
</tr>
<tr>
<td><strong>G</strong></td>
<td><strong>Recognition</strong></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Type-specific examples of physiological, visual and instrument clues during developing and developed upsets</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Pitch/power/roll/yaw</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Effective scanning (effective monitoring)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Type-specific stall protection systems and cues</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Criteria for identifying stalls and upsets</td>
<td></td>
</tr>
</tbody>
</table>
### 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 | • | • |

### I Stall protection system failures including icing alerting systems

**Manual handling skills**
(no autopilot, no autothrust/autothrottle 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 3 years.
Table 2: Exercises for upset recovery training

<table>
<thead>
<tr>
<th>Exercises</th>
<th>Ground training</th>
<th>FF training</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Recovery from developed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Timely and appropriate</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>2. Recovery from stall events, in the following</td>
<td></td>
<td></td>
</tr>
<tr>
<td>— take-off configuration,</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>— clean configuration low altitude,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>— clean configuration near maximum operating altitude, and</td>
<td>— landing configuration during the approach phase.</td>
<td></td>
</tr>
<tr>
<td>3. Recovery from nose high at various bank</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>4. Recovery from nose low at various bank</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>5. Consolidated summary of aeroplane recovery</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

(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).

AMC2 AOCR.FC.220&230 Operator conversion training and checking & recurrent training and checking

UPSET PREVENTION AND RECOVERY TRAINING (UPRT) FOR COMPLEX MOTOR-POWERED AEROPLANES WITH A MAXIMUM OPERATIONAL PASSENGER SEATING CONFIGURATION (MOPSC) OF 19 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 AMC1 AOCR.FC.220&230 for the conversion training course; and

(3) include upset prevention elements in Table 1 of AMC1 AOCR.FC.220&230 for the recurrent training programme at least every 12 calendar months, such that all the elements are covered over a period not exceeding 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 AMC1 AOCR.FC.220&230 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).

**GM1 AOCR.FC.230 Recurrent training and checking**

**LINE CHECK AND PROFICIENCY TRAINING AND CHECKING**

(a) Line checks, route and aerodrome knowledge and recent experience requirements are intended to ensure the crew member’s ability to operate efficiently under normal conditions, whereas other checks and emergency and safety equipment training are primarily intended to prepare the crew member for abnormal/emergency procedures.

(b) The line check is 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/her training policy and methods. Line checks are a test of a flight crew member’s ability to perform a complete line operation, including pre-flight and post-flight procedures and use of the equipment provided, and an opportunity for an overall assessment of his/her ability to perform the duties required as specified in the operations manual. The line check is not intended to determine knowledge on any particular route.

(c) Proficiency training and checking

When an FSTD is used, the opportunity should be taken, where possible, to use LOFT.
GM1 AOCR.FC.220&230 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 a developing or developed 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.

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’).

Further guidance is available from revision 2 of the aeroplane upset recovery training aid (AURTA), the UK CAA Paper 2013/02 (‘Monitoring Matters’), and

GM2 AOCR.FC.220&230 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:

— Un-planned go-arounds expose the crew to the surprise and startle effect;
— Go-arounds with various aeroplane configurations and different weights; and
— 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.

**GM3 AOCR.FC.220&230 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 appreciates 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 template in Table 1 below.

Refer to revision 2 of the AURTA for a detailed explanation and rationale on
the stall event recovery template as recommended by the OEMs.

Table 1: Recommended Stall Event Recovery Template

<table>
<thead>
<tr>
<th>Stall Event Recovery Template</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pilot Flying</strong> - 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><strong>Pilot Flying (PF)</strong></td>
</tr>
<tr>
<td>1. <strong>AUTOPilot – DISCONNECT</strong></td>
</tr>
<tr>
<td>(A large out-of-trim condition could be encountered when the autopilot is disconnected.)</td>
</tr>
<tr>
<td>2. <strong>AUTOTHrUST/AUTOTHROTTLE – OFF</strong></td>
</tr>
<tr>
<td>3. a) <strong>NOSE DOWN PITCH CONTROL</strong> apply until stall warning is eliminated</td>
</tr>
<tr>
<td>b) <strong>NOSE DOWN PITCH TRIM</strong> (as needed)</td>
</tr>
<tr>
<td>(reduce the angle of attack (AOA) whilst accepting the resulting altitude loss.)</td>
</tr>
<tr>
<td>4. <strong>BANK – WINGS LEVEL</strong></td>
</tr>
<tr>
<td>5. <strong>THRUST – ADJUST</strong> (as needed)</td>
</tr>
<tr>
<td>(thrust reduction for aeroplanes with underwing mounted engines may be needed)</td>
</tr>
<tr>
<td>6. <strong>SPEEDBRAKES/SPOILERS - RETRACT</strong></td>
</tr>
</tbody>
</table>

**MONITOR** airspeed and attitude throughout the recovery and **ANNOUNCE** any continued divergence.
7. When airspeed is sufficiently increasing - **RECOVER** to level flight  
(Avoid the secondary stall due premature recovery or excessive g-loading.)

**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 type-specific recovery procedures are available prior to using the templates.

Refer to revision 2 of the AURTA 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**

<table>
<thead>
<tr>
<th>Nose HIGH Recovery Strategy</th>
<th>PF</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Either pilot</strong> - Recognise and confirm the developing situation by announcing: ‘Nos High’</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. AUTOPILOT – DISCONNECT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A large out of trim condition could be encountered when the AP is disconnected.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2. AUTOTHREAT/AUTOTHERTLE – OFF</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. APPLY</strong> as much nose-down control input as required to obtain a nose-down pitch rate</td>
<td></td>
<td>MONITOR airspeed and attitude throughout the recovery and <strong>ANNOUNCE</strong> any continued divergence</td>
</tr>
<tr>
<td><strong>4. THRUST – ADJUST</strong> (if required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(thrust reduction for aeroplanes with underwing mounted engines may be needed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>5. ROLL – ADJUST</strong> (if required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Avoid exceeding 60 degrees bank.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>6. When airspeed is sufficiently increasing - RECOVER</strong> to level flight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Avoid the secondary stall due premature recovery or excessive g-loading.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Recommended Nose Low Recovery Strategy Template

<table>
<thead>
<tr>
<th>Nose LOW Recovery Strategy Template</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Either pilot</strong> - Recognise and confirm the developing situation by announcing: ‘Nose Low’</td>
</tr>
<tr>
<td>(If the autopilot or 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>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>PF</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>AUTOPILOT – DISCONNECT</strong></td>
<td>(A large out of trim condition could be encountered when the AP is disconnected.)</td>
<td></td>
</tr>
<tr>
<td>2. <strong>AUTOTHROTCH/AUTOTHRUST – OFF</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. <strong>RECOVERY</strong> from stall if required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. <strong>ROLL</strong> in the shortest direction to wings level.</td>
<td></td>
<td><strong>MONITOR</strong> airspeed and attitude throughout the recovery and <strong>ANNOUNCE</strong> any continued divergence</td>
</tr>
<tr>
<td></td>
<td>(It may be necessary to reduce the g-loading by applying forward control pressure to improve roll effectiveness)</td>
<td></td>
</tr>
<tr>
<td>5. <strong>THRUST</strong> and <strong>DRAG – ADJUST</strong> (if required)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. <strong>RECOVER</strong> to level flight.</td>
<td></td>
<td>(Avoid the secondary stall due premature recovery or excessive g-loading.)</td>
</tr>
</tbody>
</table>

**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.
GM4 AOCR.FC.220&230 Operator conversion training and checking & recurrent training and checking

FFS QUALIFIED FOR THE UPSET RECOVERY TRAINING TASK

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.

A level C or D FFS is qualified for the upset recovery training task, such as the approach-to-stall exercises. Full aerodynamic stall or other exercises outside the validated training envelope (VTE) should not be conducted.

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 CS-FSTD(A) Appendix 8 to AMCI FSTD(A).300 General Technical Requirements for FSTD Qualification Levels, and associated FSTD validation tests.

FSTD operators may achieve such demonstration of equivalency through the conduct of a special evaluation by the competent 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 competent authority in accordance with AOCR.FC.145(c).

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.

General

- Refer to Subpart C Aeroplane Flight Simulation Training Devices AMC1 FSTD (A).300(c) (1) (i) and (2) (ii) for the scope of the qualification criteria;

- A six-degrees-of-freedom motion system should be provided; and

- The response to control inputs should not be greater than 150 ms more than that experienced on the aeroplane (see Appendix 1 to CS-FSTD (A).300 General r.1).
### Table 1: Minimum FSTD standards, validation tests, and functions and subjective tests

<table>
<thead>
<tr>
<th>FSTD Standards</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appendix 1 to CS-FSTD(A).300 Flight Simulation Training Device Standards</strong> (Ref. CS-FSTD(A) pages 9 - 22)</td>
<td></td>
</tr>
<tr>
<td>1. General - q.1, r.1, s.1, t.1, w.1</td>
<td></td>
</tr>
<tr>
<td>2. Motion System - b.1(3)</td>
<td></td>
</tr>
<tr>
<td>3. Visual System - b.2</td>
<td></td>
</tr>
<tr>
<td><strong>FSTD Validation Tests</strong></td>
<td></td>
</tr>
<tr>
<td><strong>AMC1 FSTD(A).300 Qualification Basis – Table of FSTD Validation Tests</strong> (Ref. CS-FSTD(A) pages 46 - 75)</td>
<td></td>
</tr>
<tr>
<td>1. Performance - Climb - c.(4)</td>
<td></td>
</tr>
<tr>
<td>2. Handling Qualities - Dynamic Control Checks - b.(1), b.(2), b.(3), b.(4), b.(5), b.(6)</td>
<td></td>
</tr>
<tr>
<td>3. Motion System - e.</td>
<td></td>
</tr>
<tr>
<td>4. Visual System - a.(1) or a.(2), b.(1)(a)</td>
<td></td>
</tr>
<tr>
<td><strong>Functions and Subjective Tests</strong></td>
<td></td>
</tr>
<tr>
<td><strong>AMC1 FSTD(A).300 Qualification Basis – Functions and Subjective Tests</strong> (CS-FSTD(A) page 115)</td>
<td></td>
</tr>
<tr>
<td>p. Special Effects - Effects of Airframe and Engine Icing (2) (a) (See Appendix 1 to CS FSTD (A).300 1.t.1.)</td>
<td></td>
</tr>
</tbody>
</table>

### GM5 AOCE.FC.220&230 Operator conversion training and checking & recurrent training and checking

**PERSONNEL PROVIDING FSTD UPSET PREVENTION AND RECOVERY TRAINING (UPRT)**

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. 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.

Standardisation and training should ensure that personnel providing FSTD UPRT:

(1) are able to demonstrate the correct upset recovery techniques for the specific aeroplane type;

(2) understand the importance of applying type-specific Original Equipment Manufacturers (OEMs) procedures for recovery manoeuvres;

(3) are able to distinguish between the applicable SOPs and the OEMs recommendations (if available);

(4) understand the capabilities and limitations of the FSTD used for UPRT;

(5) are aware of the potential of negative transfer of training that may exist when training outside the capabilities of the FSTD;

(6) understand and are able to use the IOS of the FSTD in the context of effective UPRT delivery;

(7) understand and are able to use the FSTD instructor tools available for providing accurate feedback on flight crew performance;

(8) understand the importance of adhering to the FSTD UPRT scenarios that have been validated by the training programme developer; and

(9) understand the missing critical human factor aspects due to the limitations of the FSTD and convey this to the flight crew receiving the training.

AOCR.FC.235 Pilot qualification to operate in either pilot’s seat

(a) Commanders whose duties require them to operate in either pilot seat and carry out the duties of a co-pilot, or commanders required to conduct training or checking duties, shall complete additional training and checking as specified in the operations manual. The check may be conducted together with the operator proficiency check prescribed in AOCR.FC.230 (b).

(b) The additional training and checking shall 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.

(c) In the case of helicopters, commanders shall also complete their proficiency checks from left- and right-hand seats, on alternate proficiency checks, provided that when the type rating proficiency check is combined with the operator proficiency check the commander completes his/her training or checking from the normally occupied seat.

(d) When engine-out manoeuvres are carried out in an aircraft, the engine failure shall be simulated.

(e) When operating in the co-pilot’s seat, the checks required by AOCR.FC.230 for operating in the commander’s seat shall, in addition, be valid and current.

(f) The pilot relieving the commander shall have demonstrated, concurrent with the operator proficiency checks prescribed in AOCR.FC.230(b), practice of drills and procedures that would not, normally, be his/her responsibility. Where the differences between left- and right-hand seats are not significant, practice may be conducted in either seat.

(g) The pilot other than the commander occupying the commander’s seat shall demonstrate practice of drills and procedures, concurrent with the operator proficiency checks prescribed in AOCR.FC.230(b), which are the commander’s responsibility acting as pilot monitoring. Where the differences between left- and right-hand seats are not significant, practice may be conducted in either seat.

**GM1 AOCR.FC.235 (f) ;( g) Pilot qualification to operate in either pilot’s seat**

**DIFFERENCES BETWEEN LEFT AND RIGHT-HAND SEATS**

*The differences between left- and right-hand seats may not be significant in cases where, for example, the autopilot is used.*

**AOCR.FC.240 Operation on more than one type or variant**

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

(b) When a flight crew member operates both helicopters and aeroplanes, that flight crew member shall be limited to operations on only one type of aeroplane and one type of helicopter.

(c) Point (a) shall not apply to operations of performance class B aeroplane if they are limited to single-pilot classes of reciprocating engine aeroplanes under VFR by day. Point (b) shall not apply to operations of performance class B aeroplane if they are limited to single-pilot classes of reciprocating engine aeroplanes.

AMC1 AOCR.FC.240 Operation on more than one type or variant

GENERAL

(a) Aeroplanes

(1) When a flight crew member operates more than one aeroplane class, type or variant listed in Regulation (EU) No 1178/2011 and associated procedures for class-single pilot and/or type-single pilot, but not within a single licence endorsement, the operator should ensure that the flight crew member does not operate more than:

(i) three reciprocating engine aeroplane types or variants;

(ii) three turbo-propeller aeroplane types or variants;

(iii) one turbo-propeller aeroplane type or variant and one reciprocating engine aeroplane type or variant; or

(iv) one turbo-propeller aeroplane type or variant and any aeroplane within a particular class.
(2) When a flight crew member operates more than one aeroplane type or variant within one or more licence endorsement as defined in MCAR-FCL and associated procedures, the operator should ensure that:

(i) the minimum flight crew complement specified in the operations manual is the same for each type or variant to be operated;

(ii) the flight crew member does not operate more than two aeroplane types or variants for which a separate licence endorsement is required, unless credits related to the training, checking, and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants; and

(iii) only aeroplanes within one licence endorsement are flown in any one flight duty period, unless the operator has established procedures to ensure adequate time for preparation.

(3) When a flight crew member operates more than one aeroplane type or variant listed in MCAR-FCL and associated procedures for type-single pilot and type-multi pilot, but not within a single licence endorsement, the operator should comply with points (a) (2) and (4).

(4) When a flight crew member operates more than one aeroplane type or variant listed in Regulation (EU) No 1178/2011 and associated procedures for type multi-pilot, but not within a single licence endorsement, or combinations of aeroplane types or variants listed in MCAR-FCL and associated procedures for class single-pilot and type multi-pilot, the operator should comply with the following:

(i) point (a) (2);

(ii) before exercising the privileges of more than one licence endorsement:

(A) flight crew members should have completed two consecutive operator proficiency checks and should have:

- 500 hours in the relevant crew position in CAT operations with the same operator; or
- for IFR and VFR night operations with performance class B aeroplanes, 100 hours or flight sectors in the relevant crew position in CAT operations with the same operator, if at least one licence endorsement is related to a class. A check flight should be completed before the pilot is released for duties as commander;

(B) in the case of a pilot having experience with an operator and exercising the privileges of more than one licence endorsement, and then being promoted to command with the same operator on one of those types, the required minimum experience as commander is 6 months and 300 hours, and the pilot should have completed two consecutive operator proficiency checks before again being eligible to exercise more than one licence endorsement;

(iii) before commencing training for and operation of another type or variant, flight crew members should have completed 3 months and 150 hours flying on the base aeroplane, which should include at least one proficiency check, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants;

(iv) after completion of the initial line check on the new type, 50 hours flying or 20 sectors should be achieved solely on aeroplanes of the new type rating, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants;

(v) recent experience requirements established in MCAR-FCL for each type operated;

(vi) the period within which line flying experience is required on each type should be specified in the operations manual;
(vii) when credits are defined in data established in accordance with MCAR-PART-21 for the relevant type or variant, this should be reflected in the training required in AOCR.FC.230 and:

(A) AOCR.FC.230 (b) requires two operator proficiency checks every year. When credits are defined in data established in accordance with MCAR-PART-21 for operator proficiency checks to alternate between the types, each operator proficiency check should revalidate the operator proficiency check for the other type(s). The operator proficiency check may be combined with the proficiency checks for revalidation or renewal of the aeroplane type rating or the instrument rating in accordance with MCAR-FCL

(B) AOCR.FC.230 (c) requires one line check every year. When credits are defined in data established in accordance for MCAR-PART-21 for line checks to alternate between types or variants, each line check should revalidate the line check for the other type or variant.

(C) Annual emergency and safety equipment training and checking should cover all requirements for each type.

(b) Helicopters

(1) If a flight crew member operates more than one type or variant the following provisions should be met:

(i) The recency requirements and the requirements for recurrent training and checking should be met and confirmed prior to CAT operations on any type, and the minimum number of flights on each type within a 3-month period specified in the operations manual.

(ii) AOCR.FC.230 requirements with regard to recurrent training.

(iii) When credits related to the training, checking and recent experience requirements are defined in data established in
accordance with MCAR-PART-21 for the relevant types or variants, the requirements of AOCR.FC.230 with regard to proficiency checks may be met by a 6 monthly check on any one type or variant operated. However, a proficiency check on each type or variant operated should be completed every 12 months.

(iv) For helicopters with a maximum certified take-off mass (MCTOM) of more than 5,700 kg, or with a maximum operational passenger seating configuration (MOPSC) of more than 19:

(A) the flight crew member should not fly more than two helicopter types, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants;

(B) a minimum of 3 months and 150 hours experience on the type or variant should be achieved before the flight crew member should commence the conversion course onto the new type or variant, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants;

(C) 28 days and/or 50 hours flying should then be achieved exclusively on the new type or variant, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants; and

(D) a flight crew member should not be rostered to fly more than one type or significantly different variant of a type during a single duty period.

(v) In the case of all other helicopters, the flight crew member should not operate more than three helicopter types or significantly different variants, unless credits related to the training, checking and recent experience requirements are defined in data established in accordance with MCAR-PART-21 for the relevant types or variants.
(c) Combination of helicopter and aeroplane

(1) The flight crew member may fly one helicopter type or variant and one aeroplane type irrespective of their MCTOM or MOPSC.

(2) If the helicopter type is covered by paragraph (b) (1) (iv) then (b) (1) (iv) (B), (C) and (D) should also apply in this case.

AMC2 AOCR.FC.240 Operation on more than one type or variant

GENERAL

(a) Terminology

The terms used in the context of the operation of more than one type or variant have the following meaning:

(1) Base aircraft means an aircraft used as a reference to compare differences with another aircraft.

(2) Variant means an aircraft or a group of aircraft within the same pilot type rating that has differences to the base aircraft requiring difference training or familiarisation training.

(3) Credit means the recognition of training, checking or recent experience based on commonalities between aircraft. For substantiation of the credits ODR tables or other appropriate documentation for comparison of the relevant aircraft characteristics may be provided.

(4) Operator difference requirements (ODRs) mean a formal description of differences between types or variants flown by a particular operator.

(b) Philosophy

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. The first consideration is whether or not aircraft types or variants are sufficiently similar to allow the safe operation of both. The second consideration is whether or not the types or variants are sufficiently similar for the training, checking and recent experience. Unless credits have been established by the operational suitability data in accordance with Civil Aviation Regulations, all training, checking and recent experience requirements should be completed independently for each type or variant.
(c) Methodology – Use of Operator Difference Requirement (ODR) Tables

(1) Before assigning flight crew members to operate more than one type or variant of aircraft, the operator should conduct a detailed evaluation of the differences or similarities of the aircraft concerned in order to establish appropriate procedures or operational restrictions. This evaluation should be based on the data established in accordance with Civil Aviation Regulations for the relevant types or variants, and should be adapted to the operator’s specific aircraft configurations. This evaluation should take into account of the following:

(i) the level of technology;

(ii) operational procedures; and

(iii) handling characteristics.

The methodology described below should be used 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

Before requiring flight crew members to operate more than one type or variant, operators should first nominate one aircraft as the base aircraft from which to show differences with the second aircraft type or variant, the ‘difference aircraft’, in terms of technology (systems), procedures, pilot handling and aircraft 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 also the basis for the associated differences/familiarisation or reduced type rating training for the flight crew.

(3) The ODR tables should be presented as follows:
### GENERAL OPERATOR DIFFERENCES REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>DIFFERENCE AIRCRAFT:</th>
<th>Compliance Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE AIRCRAFT:</td>
<td>TRAINING</td>
</tr>
<tr>
<td></td>
<td>CHKG/CURR</td>
</tr>
<tr>
<td>General Differences</td>
<td></td>
</tr>
<tr>
<td>GENERAL Range</td>
<td></td>
</tr>
<tr>
<td>ETOPS Certified</td>
<td></td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td></td>
</tr>
</tbody>
</table>

### SYSTEM OPERATOR DIFFERENCES REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>DIFFERENCE AIRCRAFT:</th>
<th>Compliance Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE AIRCRAFT:</td>
<td>TRAINING</td>
</tr>
<tr>
<td></td>
<td>CHKG/CURR</td>
</tr>
<tr>
<td>System Differences</td>
<td></td>
</tr>
<tr>
<td>21 – AIR CONDITIONING</td>
<td></td>
</tr>
<tr>
<td>CONTROLS AND</td>
<td></td>
</tr>
<tr>
<td>INDICATORS:</td>
<td></td>
</tr>
<tr>
<td>Panel layout</td>
<td></td>
</tr>
<tr>
<td>21 – AIR CONDITIONING</td>
<td></td>
</tr>
<tr>
<td>PACKS:</td>
<td></td>
</tr>
<tr>
<td>Switch type</td>
<td></td>
</tr>
<tr>
<td>Automatically</td>
<td></td>
</tr>
<tr>
<td>controlled</td>
<td></td>
</tr>
<tr>
<td>Reset switch for</td>
<td></td>
</tr>
<tr>
<td>both packs</td>
<td></td>
</tr>
</tbody>
</table>

### MANOEUVRE OPERATOR DIFFERENCES REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>DIFFERENCE AIRCRAFT:</th>
<th>Compliance Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE AIRCRAFT:</td>
<td>TRAINING</td>
</tr>
<tr>
<td></td>
<td>CHKG/CURR</td>
</tr>
<tr>
<td>Manoeuvre Differences</td>
<td></td>
</tr>
<tr>
<td>Exterior Preflight</td>
<td></td>
</tr>
</tbody>
</table>

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Issue 2 – Rev 0 Dated 04 March 2015
Page 232 of 737
(4) Compilation of ODR Tables

(i) ODR 1: General

The general characteristics of the candidate aircraft are compared with the base aircraft with regard to:

(A) general dimensions and aircraft design (number and type of rotors, wing span or category);

(B) flight deck general design;

(C) cabin layout;

(D) engines (number, type and position);

(E) limitations (flight envelope).

(ii) ODR 2: Systems

Consideration is given to differences in design between the candidate aircraft and the base aircraft. For this comparison the Air Transport Association (ATA) 100 index is used. This index establishes a system and subsystem classification and then an analysis performed for each index item with respect to the main architectural, functional and operations elements, including controls and indications on the systems control panel.

(iii) ODR 3: Manoeuvres

Operational differences encompass normal, abnormal and emergency situations and include any change in aircraft 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:

<table>
<thead>
<tr>
<th>Preflight</th>
<th>Differences due to systems, ECL</th>
<th>No</th>
<th>Yes</th>
<th>CBT</th>
<th>FTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Takeoff</td>
<td>FBW handling vs Conventional; AFDS TAKEOFF: Autothrottle engagement FMA indications</td>
<td>No</td>
<td>Yes</td>
<td>CBT</td>
<td>FFS</td>
</tr>
</tbody>
</table>
(A) flight deck dimensions (size, cut-off angle and pilot eye height);

(B) differences in controls (design, shape, location and function);

(C) additional or altered function (flight controls) in normal or abnormal conditions;

(D) handling qualities (including inertia) in normal and in abnormal configurations;

(E) aircraft performance in specific manoeuvres;

(F) aircraft status following failure;

(G) management (e.g. ECAM, EICAS, navaid selection, automatic checklists).

(iv) 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.

(v) Difference Levels – crew training, checking and currency

(A) 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.

(B) Differences items identified in the ODR tables as impacting flight characteristics, or procedures, should be analysed in the corresponding ATA section of the ODR manoeuvres. Normal, abnormal and emergency situations should be addressed accordingly.

(d) Difference Levels

(1) Difference levels — General

Difference levels are used to identify the extent of difference between a base and a candidate aircraft with reference to the elements described in the ODR tables. These levels are proportionate to the differences between a base and a candidate
aircraft. A range of five difference levels in order of increasing requirements, identified as A through E, are each specified for training, checking, and currency. Difference levels apply when a difference with the potential to affect flight safety exists between a base and a candidate aircraft. Differences may also affect the knowledge, skills, or abilities required from a pilot. If no differences exist, or if differences exist but do not affect flight safety, or if differences exist but do not affect knowledge, skills, or abilities, then difference levels are neither assigned nor applicable to pilot qualification. When difference levels apply, each level is based on a scale of differences related to design features, systems, or manoeuvres. In assessing the effects of differences, both flight characteristics and procedures are considered since flight characteristics address handling qualities and performance, while procedures include normal, non-normal and emergency items. Levels for training, checking, and currency are assigned independently, but are linked depending on the differences between a base and candidate aircraft. Training at level E usually identifies that the candidate aircraft is a different type to the base aircraft.

(2) Difference levels are summarised in the table below regarding training, checking, and currency.

<table>
<thead>
<tr>
<th>DIFFERENCE LEVEL</th>
<th>TRAINING</th>
<th>CHECKING</th>
<th>CURRENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Self-instruction</td>
<td>Not applicable or integrated with next proficiency check</td>
<td>Not applicable</td>
</tr>
<tr>
<td>B</td>
<td>Aided instruction</td>
<td>Task or system check</td>
<td>Self-review</td>
</tr>
<tr>
<td>C</td>
<td>System devices</td>
<td>Partial proficiency check using qualified device</td>
<td>Designated system</td>
</tr>
<tr>
<td>D</td>
<td>Manoeuvre Training Devices1 or aircraft to accomplish specific manoeuvres</td>
<td>Partial proficiency check using qualified device¹</td>
<td>Designated manoeuvre(s)</td>
</tr>
<tr>
<td>E</td>
<td>FSTDs² or aircraft</td>
<td>Proficiency check using FSTDs² or aircraft</td>
<td>As per regulation, using FSTDs² or aircraft</td>
</tr>
</tbody>
</table>
Footnote (1):
- Aeroplane: FTD Level 2, or FFS, or aeroplane
- Helicopter: FTD Level 2 and 3, or FFS, or helicopter

Footnote (2):
- Aeroplane: FFS Level C or D, or aeroplane
- Helicopter: FSTD’S having dual qualification: FFS Level B and FTD Level 3, or FFS Level C or D, or helicopter Training Levels A and B require familiarisation training, levels C and D require differences training. Training Level E means that differences are such that type rating training is required.

(3) Difference level — Training

The training differences levels specified represent the minimum requirements. Devices associated with a higher difference level may be used to satisfy a training differences requirement.

(i) Level A training

Level A differences training is applicable to aircraft with differences that can adequately be addressed through self-instruction. Level A training represents a knowledge requirement such that once appropriate information is provided; understanding and compliance can be assumed to be demonstrated.

Training needs not covered by level A training may require level B training, or higher, depending on the outcome of the evaluations described in the aircraft evaluation process (CS FCD.420).

(ii) Level B training

Level B differences training is applicable to aircraft with system or procedure differences that can adequately be addressed through aided instruction.

At level B aided instruction it is appropriate to ensure pilot understanding, emphasise issues, provide a standardised method of presentation of material, or to aid retention of material following training.

(iii) Level C training

Level C differences training can only be accomplished through the use of devices capable of systems training.
Level C differences training is applicable to variants having ‘part task’ differences that affect skills or abilities as well as knowledge. Training objectives focus on mastering individual systems, procedures, or tasks, as opposed to performing highly integrated flight operations and manoeuvres in ‘real time’. Level C may also require self-instruction or aided instruction of a pilot, but cannot be adequately addressed by a knowledge requirement alone. Training devices are required to supplement instruction to ensure attainment or retention of pilot skills and abilities to accomplish the more complex tasks, usually related to operation of particular aircraft systems.

The minimum acceptable training media for level C is interactive computer-based training, cockpit systems simulators, cockpit procedure trainers, part task trainers [such as Inertial Navigation System (INS), Flight Management System (FMS), or Traffic Collision Avoidance System (TCAS) trainers], or similar devices.

(iv) **Level D training**

Level D differences training can only be accomplished with devices capable of performing flight manoeuvres and addressing full task differences affecting knowledge, skills, or abilities.

Devices capable of flight manoeuvres address full task performance in a dynamic ‘real time’ environment and enable integration of knowledge, skills and abilities in a simulated flight environment, involving combinations of operationally oriented tasks and realistic task loading for each relevant phase of flight. At level D, knowledge and skills to complete necessary normal, non-normal and emergency procedures are fully addressed for each variant.

Level D differences training requires mastery of interrelated skills that cannot be adequately addressed by separate acquisition of a series of knowledge areas or skills that are interrelated. However, the differences are not so significant, that a full type rating training course is required. If demonstration of interrelationships between the systems was important, the use of a series of separate devices for systems training would not suffice. Training for level D differences requires a training device that has accurate, high fidelity integration of systems and controls and realistic instrument indications. Level D training may also require manoeuvre visual cues, motion cues, dynamics, control loading or specific environmental conditions. Weather phenomena such as low visibility operations or wind shear may or may not be incorporated. Where simplified or generic characteristics of an aircraft
type are used in devices to satisfy level D difference training, significant negative training cannot occur as a result of the simplification.

Appropriate devices as described in CS FCD.420 (a), satisfying level D differences training range from those where relevant elements of aircraft flight manoeuvring, performance, and handling qualities are incorporated. The use of a Manoeuvre Training Device or aircraft is limited for the conduct of specific manoeuvres or handling differences, or for specific equipment or procedures.

(v) Level E training

Level E differences training is applicable to candidate aircraft having such a significant ‘full task’ differences that a full type rating training course or a type rating training course with credit for previous experience on similar aircraft types is required to meet the training objectives.

The training requires a ‘high fidelity’ environment to attain or maintain knowledge, skills, or abilities that can only be satisfied by the use of FSTDs or the aircraft itself as mentioned in CS FCD.415 (a). Level E training, if done in an aircraft, should be modified for safety reasons where manoeuvres can result in a high degree of risk.

When level E differences training is assigned, suitable credit or constraints may be applied for knowledge, skills or abilities related to other pertinent aircraft types and specifies the relevant subjects, procedures or manoeuvres.

(4) Difference level — Checking

Differences checking addresses any pertinent pilot testing or checking. Initial and recurrent checking levels are the same unless otherwise specified.

It may be possible to satisfactorily accomplish recurrent checking objectives in devices not meeting initial checking requirements. In such instances the applicant may propose for revalidation checks the use of certain devices not meeting the initial check requirements.

(i) Level A checking

Level A differences checking indicates that no check related to differences is required at the time of differences training. However, a pilot is responsible for knowledge of each variant flown.
(ii) Level B checking

Level B differences checking indicates that a ‘task’ or ‘systems’ check is required following initial and recurring training.

(iii) Level C checking

Level C differences checking requires a partial check using a suitable qualified device. A partial check is conducted relative to particular manoeuvres or systems.

(iv) Level D checking

Level D differences checking indicates that a partial proficiency check is required following both initial and recurrent training. In conducting the partial proficiency check, manoeuvres common to each variant may be credited and need not be repeated. The partial proficiency check covers the specified particular manoeuvres, systems, or devices. Level D checking is performed using scenarios representing a ‘real time’ flight environment and uses qualified devices permitted for level D training or higher.

(v) Level E checking

Level E differences checking requires that a full proficiency check be conducted in FSTDs or in an aircraft as mentioned in CS FCD.415(a), following both initial and recurrent training. If appropriate, alternating Level E checking between relevant aircraft is possible and credit may be defined for procedures or manoeuvres based on commonality.

Assignment of level E checking requirements alone, or in conjunction with level E currency, does not necessarily result in assignment of a separate type rating.

(5) Difference level — Currency

Differences currency addresses any currency and re-currency levels. Initial and recurrent currency levels are the same unless otherwise specified.

(i) Level A currency

Level A currency is common to each aircraft and does not require separate tracking. Maintenance of currency in any aircraft suffices for any other variant within the same type rating.
(ii) Level B currency

Level B currency is ‘knowledge-related’ currency, typically achieved through self-review by individual pilots.

(iii) Level C currency

(A) Level C currency is applicable to one or more designated systems or procedures, and relates to both skill and knowledge requirements. When level C currency applies, any pertinent lower level currency is also to be addressed.

(B) Re-establishing level C currency

When currency is lost, it may be re-established by completing required items using a device equal to or higher than that specified for level C training and checking.

(iv) Level D currency

(A) Level D currency is related to designated manoeuvres and addresses knowledge and skills required for performing aircraft control tasks in real time with integrated use of associated systems and procedures. Level D currency may also address certain differences in flight characteristics including performance of any required manoeuvres and related normal, non-normal and emergency procedures. When level D is necessary, any pertinent lower level currency is also to be addressed.

(B) Re-establishing level D currency

When currency is lost, currency may be re-established by completing pertinent manoeuvres using a device equal to or higher than that specified for level D differences training and checking.

(v) Level E currency

(A) Level E currency requires that recent experience requirements of Part-FCL and operational requirements be complied with in each aircraft separately. Level E currency may also specify other system, procedure, or manoeuvre currency item(s) necessary for safe operations, and requires procedures or manoeuvres to be accomplished in FSTDs or
in an aircraft as mentioned in CS FCD.415(a). Provisions are applied in a way which addresses the required system or manoeuvre experience.

When level E is assigned between aircraft of common characteristics, credit may be permitted. Assignment of level E currency requirements does not automatically lead to a determination on same or separate type rating. Level E currency is tracked by a means that is acceptable to the competent authority.

When CTLC is permitted, any credit or constraints applicable to using FSTDs, as mentioned in CS FCD.415(a), are also to be determined.

(B) Re-establishing level E currency

When currency is lost, currency may be re-established by completing pertinent manoeuvres using a device specified for level E differences training and checking.

(6) Competency regarding non-normal and emergency procedures — Currency

Competency for non-normal and emergency manoeuvres or procedures is generally addressed by checking requirements. Particular non-normal and emergency manoeuvres or procedures may not be considered mandatory for checking or training. In this situation it may be necessary to periodically practice or demonstrate those manoeuvres or procedures specifying currency requirements for those manoeuvres or procedures.

AOCR.FC.A.245 Alternative training and qualification programme

(a) The aeroplane operator having appropriate experience may substitute one or more of the following training and checking requirements for flight crew by an alternative training and qualification programme (ATQP), approved by the Authority:

(1) SPA.LVO.120 on flight crew training and qualifications;

(2) conversion training and checking;

(3) differences training and familiarisation training;

(4) Command course;
(5) recurrent training and checking; and

(6) operation on more than one type or variant.

(b) The ATQP shall contain training and checking that establishes and maintains at least an equivalent level of proficiency achieved by complying with the provisions of AOCR.FC.220 and AOCR.FC.230. The level of flight crew training and qualification proficiency shall be demonstrated prior to being granted the ATQP approval by the Authority.

(c) The operator applying for an ATQP approval shall provide the Authority with an implementation plan, including a description of the level of flight crew training and qualification proficiency to be achieved.

(d) In addition to the checks required by AOCR.FC.230 and Part-FCL, each flight crew member shall complete a line oriented evaluation (LOE) conducted in an FSTD. The validity period of an LOE shall be 12 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the LOE is undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date.

(e) After two years of operating with an approved ATQP, the operator may, with the approval of the Authority, extend the validity periods of the checks in AOCR.FC.230 as follows:

(1) Operator proficiency check to 12 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the check is undertaken within the last three months of the validity period, the new validity period shall be counted from the original expiry date.

(2) Line check to 24 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the check is undertaken within the last six months of the validity period, the new validity period shall be counted from the original expiry date.

(3) Emergency and safety equipment checking to 24 calendar months. The validity period shall be counted from the end of the month when the check was taken. When the check is undertaken within the last six months of the validity period, the new validity period shall be counted from the original expiry date.
COMPONENTS AND IMPLEMENTATION

(a) Alternative training and qualification programme (ATQP) components

The ATQP should comprise the following:

(1) Documentation that details the scope and requirements of the programme, including the following:

(i) 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 standards prescribed in AOCR.FC and Part E of SPA.LVO.

(ii) The operator’s training needs and established operational and training objectives.

(iii) A description of the process for designing 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.

(iv) A description of how the programme will:

(A) enhance safety;

(B) improve training and qualification standards of flight crew;

(C) establish attainable training objectives;

(D) integrate CRM in all aspects of training;

(E) develop a support and feedback process to form a self-correcting training system;

(F) institute a system of progressive evaluations of all training to enable consistent and uniform monitoring of the training undertaken by flight crew;
(G) enable the operator to be able to respond to new aeroplane technologies and changes in the operational environment;

(H) foster the use of innovative training methods and technology for flight crew instruction and the evaluation of training systems; and

(I) make efficient use of training resources, specifically to match the use of training media to the training needs.

(2) A task analysis to determine the:

(i) knowledge;

(ii) required skills;

(iii) associated skill-based training; and

(iv) validated behavioural markers, where appropriate.

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/class. Data from other types/classes 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. In addition, the analysis should identify the appropriate behavioural markers that should be exhibited.

The task analysis should be suitably validated in accordance with (b) (3). The task analysis, in conjunction with the data gathering programme(s) permits the operator to establish a programme of targeted training together with the associated training objectives.

(3) Curricula. The curriculum structure and content should be determined by task analysis, and should include proficiency objectives including when and how these objectives should be met.

(i) The training programme should have the following structure:
(A) Curriculum, specifying 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

(1) Specific target or set of targets that have to be reached and fulfilled before the training course can be continued.

(2) Each specified target should have an associated objective that is identifiable both by the flight crew and the trainers.

(3) 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.

(B) Daily lesson plan

(a) Each lesson/course/training or qualification event should have the same basic structure. The topics related to the lesson should be listed and the lesson targets should be unambiguous.

(b) Each lesson/course or training event whether classroom, CBT or simulator should specify the required topics with the relevant targets to be achieved.

(4) A specific training programme for:

(i) each aeroplane type/class within the ATQP;

(ii) instructors (class rating instructor rating/synthetic flight instructor authorisation/type rating instructor rating — CRI/SFI/TRI), and other personnel undertaking flight crew instruction; and
(iii) examiners (class rating examiner/synthetic flight examiner/type rating examiner — CRE/SFE/TRE).

This should include a method for the standardisation of instructors and examiners.

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) line oriented evaluation (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 instructors part in the ATQP quality control; and

(I) line oriented quality evaluation (LOQE).

(5) A feedback loop for the purpose of curriculum validation and refinement, and to ascertain that the programme meets its proficiency objectives.

(i) 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, the advanced flight data monitoring (FDM)
programme and LOE/LOQE programmes. In addition, the evaluation process should describe whether the overall targets/objectives of training are being achieved and should prescribe any corrective action that needs to be undertaken.

(ii) The programmers 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.

(6) A method for the assessment of flight crew during conversion and recurrent training and checking. The assessment process should include event-based assessment as part of the LOE. The assessment method should comply with AOCR.FC.230.

(i) 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.

(ii) An LOE event should comprise 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 practise 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. 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.).

(iii) 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 is shown in the table below:

<table>
<thead>
<tr>
<th>EVENT</th>
<th>MARKER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness of Aeroplane Systems:</td>
<td>1. Monitors and reports changes in automation status</td>
</tr>
<tr>
<td></td>
<td>2. Applies closed loop principle in all relevant situations</td>
</tr>
<tr>
<td></td>
<td>3. Uses all channels for updates</td>
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<tr>
<td></td>
<td>4. Is aware of remaining technical resources</td>
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</tbody>
</table>

(iv) The topics / targets integrated into the curriculum should be measurable and progression on any training/course is only allowed if the targets are fulfilled.

(7) A data monitoring/analysis programme consisting of the following:

(i) A flight data monitoring (FDM) programme as described in AMC1 AOCP.AOC.130. 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 as determined by the Authority.

(ii) 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 safety management 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 as determined by the Authority. The purpose of an FDM or advanced FDM programme for ATQP is to enable the operator to:
(A) provide data to support the programmers implementation and justify any changes to the ATQP;

(B) establish operational and training objectives based upon an analysis of the operational environment; and

(C) monitor the effectiveness of flight crew training and qualification.

(iii) Data gathering: the data analysis should be made available to the person responsible for ATQP within the organisation. The data gathered should:

(A) include all fleets that are planned to be operated under the ATQP;

(B) include all crews trained and qualified under the ATQP;

(C) be established during the implementation phase of ATQP; and

(D) continue throughout the life of the ATQP.

(iv) Data handling: the operator should establish a procedure to ensure the confidentiality of individual flight crew members, as described by AMC1 AOCR.AOC.130.

(v) The operator that has a flight data monitoring programme prior to the proposed introduction of ATQP may use relevant data from other fleets not part of the proposed ATQP.

(b) Implementation. The operator should develop an evaluation and implementation process including the following stages:

(1) A safety case that demonstrates equivalency of:

(i) the revised training and qualification standards compared to the standards of AOCR.FC and/or AOCR.SPA.LVO prior to the introduction of ATQP; and

(ii) any new training methods implemented as part of ATQP. 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. The safety case should:

- demonstrate the required level of safety;

- ensure the required safety is maintained throughout the lifetime of the programme; and

- minimise risk during all phases of the programme's implementation and operation.

The elements of a safety case include:

- planning: integrated and planned with the operation (ATQP) that is to be justified;

- criteria;

- safety-related documentation including a safety checklist;

- programme of implementation to include controls and validity checks; and

- oversight, including review and audits.

Criteria for the establishment of a safety case. The safety case should:

- be able to demonstrate that the required or equivalent level of safety is maintained throughout all phases of the programme;

- be valid to the application and the proposed operation;

- be adequately safe and ensure the required regulatory safety standards or approved equivalent safety standards are achieved;

- be applicable over the entire lifetime of the programme;

- demonstrate completeness and credibility of the programme;

- be fully documented;
- ensure integrity of the operation and the maintenance of the operations and training infrastructure;

- ensure robustness to system change;

- address the impact of technological advance, obsolescence and change; and

- address the impact of regulatory change.

(2) A task analysis as required by (a) (2) to establish the operator’s programme of targeted training and the associated training objectives.

(3) A period of operation whilst data is collected and analysed to validate the safety case and task analysis. During this period the operator should continue to operate in accordance with AOCR.FC and/or AOCR.SPA.LVO, as applicable. The length of this period should be determined by the Authority.

**GM1 AOCR.FC.A.245 Alternative training and qualification programme**

**TERMINOLOGY**

(a) “Line oriented evaluation (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.

(b) “Line oriented quality evaluation (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” 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.
(d) “Event-based assessment” 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.

(e) Safety case means a documented body of evidence that provides a demonstrable and valid justification that the ATQP is adequately safe for the given type of operation.

**AMC1 AOCR.FC.A.245 (a) Alternative training and qualification programme**

**OPERATOR EXPERIENCE**

The appropriate experience should be at least 2 years” continuous operation.

**AMC1 AOCR.FC.A.245 (d) (e) (2) Alternative training and qualification programme**

**COMBINATION OF CHECKS**

(a) The line orientated evaluation (LOE) may be undertaken with other ATQP training.

(b) The line check may be combined with a line oriented quality evaluation (LOQE).

**AOCR.FC.A.250 Commanders holding a CPL (A)**

(a) The holder of a CPL (A) (aeroplane) shall only act as commander in commercial air transport on a single-pilot aeroplane if:

1. when carrying passengers under VFR outside a radius of 50 NM (90 km) from an aerodrome of departure, he/she has a minimum of 500 hours of flight time on aeroplanes or holds a valid instrument rating; or
2. when operating on a multi-engine type under IFR, he/she has a minimum of 700 hours of flight time on aeroplanes, including 400 hours as pilot-in-command. These hours shall include 100 hours under IFR and 40 hours in multi-engine operations. The 400 hours as pilot-in-command may be substituted by hours operating as co-pilot within an established multi-pilot crew system prescribed in the operations manual, on the basis of two hours of flight time as co-pilot for one hour of flight time as pilot-in command.
(b) For operations under VFR by day of performance class B aeroplanes (a) (1) shall not apply.

**AOCR.FC.H.250 Commanders holding a CPL (H)**

(a) The holder of a CPL (H) (helicopter) shall only act as commander in commercial air transport on a single-pilot helicopter if:

(1) when operating under IFR, he/she has a minimum of 700 hours total flight time on helicopters, including 300 hours as pilot-in-command. These hours shall include 100 hours under IFR. The 300 hours as pilot-in-command may be substituted by hours operating as co-pilot within an established multi-pilot crew system prescribed in the operations manual on the basis of two hours of flight time as co-pilot for one hour flight time as pilot-in-command;

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

(i) a valid instrument rating; or

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

AOCR.CC.005 Scope

This Subpart establishes the requirements to be met by the operator when operating an aircraft with cabin crew.

General requirements

AOCR.CC.100 Number and composition of cabin crew

(a) The number and composition of cabin crew shall be determined, taking into account operational factors or circumstances of the particular flight to be operated. At least one cabin crew member shall be assigned for the operation of aircraft with an MOPSC of more than 19 when carrying one or more passenger(s).

(b) For the purpose of complying with (a), the minimum number of cabin crew shall be the greater of the following:

(1) the number of cabin crew members established during the aircraft certification process in accordance with the applicable certification specifications, for the aircraft cabin configuration used by the operator; or

(2) if the number under (1) has not been established, the number of cabin crew established during the aircraft certification process for the maximum certified passenger seating configuration reduced by 1 for every whole multiple of 50 passenger seats of the aircraft cabin configuration used by the operator falling below the maximum certified seating capacity; or

(3) one cabin crew member for every 50, or fraction of 50, passenger seats installed on the same deck of the aircraft to be operated.

(c) For operations where more than one cabin crew member is assigned, the operator shall nominate one cabin crew member to be responsible to the pilot-in-command/commander.

AMC1 AOCR.CC.100 Number and composition of cabin crew

DETERMINATION OF THE NUMBER AND COMPOSITION OF CABIN CREW
(a) When determining the minimum number of cabin crew required to operate aircraft engaged in commercial air transport operations, factors to be taken into account should include:

(1) the number of doors/exits;

(2) the type(s) of doors/exits and the associated assisting evacuation means;

(3) the location of doors/exits in relation to cabin crew stations and the cabin layout;

(4) the location of cabin crew stations taking into account direct view requirements and cabin crew duties in an emergency evacuation including:

   (i) opening floor level doors/exits and initiating stair or slide deployment;

   (ii) assisting passengers to pass through doors/exits; and

   (iii) directing passengers away from inoperative doors/exits, crowd control and passenger flow management;

(5) actions required to be performed by cabin crew in ditching, including the deployment of slide-rafts and the launching of life rafts;

(6) additional actions required to be performed by cabin crew members when responsible for a pair of doors/exits; and

(7) the type and duration of the flight to be operated.

(b) When scheduling cabin crew for a flight, the operator should establish procedures that take account of the experience of each cabin crew member. The procedures should specify that the required cabin crew includes some cabin crew members who have at least 3 months experience as an operating cabin crew member.

**GM1 AOCR.CC.100 Number and composition of cabin crew**

**MINIMUM NUMBER OF CABIN CREW**

(a) When determining the minimum required cabin crew for its specific aircraft cabin configuration, the operator should:
(1) request information regarding the minimum number of cabin crew established by the aircraft type certificate (TC) holder or other design organisation responsible for showing compliance with the evacuation requirements of the applicable certification specifications; and

(2) take into account the factors specified in AMC1 AOCCR.100 as applicable.

(b) The number of cabin crew referred to in AOCCR.100 (b) (1) means either:

(1) the number of cabin crew who actively participated in the aircraft cabin during the relevant emergency evacuation demonstration, or who were assumed to have taken part in the relevant analysis, carried out by the aircraft TC holder when demonstrating the maximum passenger seating capacity (MPSC) of the aircraft type at the time of initial type certification; or

(2) a lower number of cabin crew who actively participated in a subsequent emergency evacuation demonstration, or who were assumed to have taken part in the relevant analysis, and for which approval has been obtained for a cabin configuration other than the MPSC, either by the TC holder or by another design organisation. The operator should obtain a clear indication of that number which is specified in the related documentation. If a lower number is not specified, the number of cabin crew established at the time of initial type certification applies.

AOCCR.110 Conditions for assignment to duties

(a) Cabin crew members shall only be assigned to duties on an aircraft if they:

(1) are at least 18 years of age;

(2) have been assessed, as physically and mentally fit to perform their duties (see MMED requirements and discharge their responsibilities safely; and

(3) have successfully completed all applicable training and checking required by this Part and are competent to perform the assigned duties in accordance with the procedures specified in the operations manual.
Before assigning to duties cabin crew members who are working on a freelance or part-time basis, the operator shall verify that all applicable requirements of this Subpart are complied with, taking into account all services rendered by the cabin crew member to any other operator(s), to determine in particular:

(1) the total number of aircraft types and variants operated; and

(2) the applicable flight and duty time limitations and rest requirements.

Operating cabin crew members, as well as their role with regard to the safety of passengers and flight, shall be clearly identified to the passengers.

**AOCR.CC.115 Conduct of training courses and associated checking**

A detailed programme and syllabus shall be established by the operator for each training course in accordance with the applicable requirements of this Part, to cover the duties and responsibilities to be discharged by the cabin crew members.

Each training course shall include theoretical and practical instruction together with individual or collective practice, as relevant to each training subject, in order that the cabin crew member achieves and maintains the adequate level of proficiency in accordance with this Part.

Each training course shall be:

(1) conducted in a structured and realistic manner; and

(2) performed by personnel appropriately qualified for the subject to be covered.

During or following completion of all training required by this Part, each cabin crew member shall undergo a check covering all training elements of the relevant training programme, except for crew resource management (CRM) training. Checks shall be performed by personnel appropriately qualified to verify that the cabin crew member has achieved and/or maintains the required level of proficiency.

CRM training courses and CRM modules where applicable shall be conducted by a cabin crew CRM instructor. When CRM elements are integrated in other training, a cabin crew CRM instructor shall manage the definition and implementation of the syllabus.
GM1 AOCR.CC.115 Conduct of training courses and associated checking

EQUIPMENT AND PROCEDURES

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-out 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.

AMC1 AOCR.CC.115(c) Conduct of training courses and associated checking

TRAINING METHODS AND TRAINING DEVICES

(a) The operator should establish training methods that take into account the following:

(1) training should include the use of cabin training devices, audio-visual presentations, computer-based training and other types of training, as most appropriate to the training element; and

(2) a reasonable balance between the different training methods should be ensured so that the cabin crew member achieves the
level of proficiency necessary for a safe performance of all related cabin crew duties and responsibilities.

(b) When assessing the representative training devices to be used, the operator should:

(1) take into account that a representative training device may be used to train cabin crew as an alternative to the use of the actual aircraft or required equipment;

(2) ensure that those items relevant to the training and checking intended to be given accurately represent the aircraft or equipment in the following particulars:

(i) layout of the cabin in relation to doors/exits, galley areas and safety and emergency equipment stowage as relevant;

(ii) type and location of passenger seats and cabin crew stations;

(iii) doors/exits in all modes of operation, particularly in relation to the method of operation, mass and balance and operating forces, including failure of power-assist systems where fitted; and

(iv) 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); and

(3) assess the following factors when determining whether a door/exit can be considered to be a variant of another type:

(i) door/exit arming/disarming;

(ii) direction of movement of the operating handle;

(iii) direction of door/exit opening;

(iv) power-assist mechanisms; and

(v) assisting evacuation means such as slides and ropes.
AMC1 AOCR.CC.115 (d) Conduct of training courses and associated checking

CHECKING

(a) Checking required for each training course should be accomplished by the method appropriate to the training element to be checked. These methods include:

(1) practical demonstration;
(2) computer-based assessment;
(3) in-flight checks;
(4) oral or written tests.

(b) Training elements that require individual practical participation may be combined with practical checks.

AMC1 AOCR.CC.115 (e) Conduct of training courses and associated checking

CREW RESOURCE MANAGEMENT–TRAINING PROGRAMMES AND CRM INSTRUCTORS

(a) Implementation of CRM training

Table 1 below indicates which CRM training elements should be covered in each type of training.

Table 1 – Cabin crew CRM training CRM

<table>
<thead>
<tr>
<th>TRAINING ELEMENTS to be covered</th>
<th>Operator’s CRM Training</th>
<th>Operator Aircraft Type Conversion Training</th>
<th>Annual Recurrent Training</th>
<th>Senior Cabin Crew (SCC) Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Principles</td>
<td>Not required</td>
<td>Not required (as covered under initial training required by)</td>
<td>Not required</td>
<td>Overview</td>
</tr>
<tr>
<td>Human factors in aviation</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>General instructions on CRM principles and objectives</td>
<td></td>
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<tr>
<td>Human performance and limitations</td>
<td>Part-CC)</td>
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<tr>
<td>Relevant to the individual cabin crew member</td>
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<tr>
<td>Personality awareness, human error and reliability, attitudes and behaviours, self-assessment</td>
<td>Not required (as covered under initial training required by Part-CC)</td>
<td>Not required</td>
<td>Overview (3 year cycle)</td>
<td>Not required</td>
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<tr>
<td>Stress and stress management</td>
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<td></td>
<td></td>
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<tr>
<td>Fatigue and vigilance</td>
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<tr>
<td>Assertiveness, situation awareness, information acquisition and processing</td>
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<td></td>
<td></td>
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<tr>
<td>Relevant to the entire aircraft crew</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error prevention and detection</td>
<td>In-depth</td>
<td>Relevant to the type(s)</td>
<td>Overview (3 year cycle)</td>
<td>Reinforcement (relevant to the SCC duties)</td>
</tr>
<tr>
<td>Shared situation awareness, information acquisition and processing</td>
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<td></td>
<td></td>
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<tr>
<td>Workload management</td>
<td></td>
<td></td>
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<tr>
<td>Effective communication and coordination between all crew members including the flight crew as well as inexperienced cabin crew members, cultural differences</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Leadership, cooperation, synergy, decision-making, delegation</td>
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<tr>
<td>Individual and team responsibilities, decision making, and actions</td>
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<tr>
<td>Identification and management of the passenger human factors: crowd control, passenger stress, conflict management, medical factors</td>
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<tr>
<td>Specifics related to aircraft types (narrow/wide bodied, single/multi deck), flight crew and cabin crew composition and number of passengers</td>
<td>Not required</td>
<td>In-depth</td>
<td></td>
<td></td>
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</tbody>
</table>

**Relevant to the operator and the organisation**

<table>
<thead>
<tr>
<th>Company safety culture, SOPs, organisational factors, factors linked to the type of operations</th>
<th>Relevant to the type(s)</th>
<th>Overview (3 year cycle)</th>
<th>Reinforcement (relevant to the SCC duties)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective communication and coordination with other operational personnel and ground services</td>
<td>In-depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participation in cabin safety incident and accident reporting</td>
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**Case studies**

- Required

**CRM training programmes**

1. There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made to allow, whenever practicable, flight and cabin crew instructors to observe and comment on each other's training. Consideration should be
given to creating films of flight crew compartment scenarios for playback to all cabin crew during recurrent training, and to providing the opportunity for cabin crew members, particularly senior cabin crew members; to participate in flight crew line oriented flying training (LOFT) exercises.

(2) The programme of each CRM training course, its content and the level to be achieved should comply with the relevant elements specified in table 1 below as applicable to the appropriate training course to be completed.

(3) CRM training for senior cabin crew members

(i) CRM training for senior 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 a senior cabin crew member.

(ii) The senior cabin crew member should demonstrate the ability to manage the operation and take appropriate leadership/management decisions.

(c) CRM instructor qualifications

(1) All personnel conducting training should be appropriately qualified to integrate elements of CRM into all appropriate training programmes.

(2) A training and standardisation programme for CRM instructors should be established.

(3) The cabin crew CRM instructor should:

(i) have suitable experience of commercial air transport operations as a cabin crew member;

(ii) have received instruction on human factors performance limitations (HPL);

(iii) have completed an introductory CRM course as required by Part-CC and all cabin crew CRM training required by Part-ORO;

(iv) have received instruction in training skills in order to conduct CRM courses; and
be supervised by an appropriately qualified CRM instructor when conducting their first CRM training course.

(4) An experienced non-cabin crew CRM instructor may continue to be a cabin crew CRM instructor, provided that the provisions specified in (3)(ii) to (3)(v) are satisfied and that the instructor demonstrates a satisfactory knowledge of the nature of the operation, the relevant specific aircraft types and the cabin crew working environment.

(5) Instructors integrating elements of CRM into aircraft type training, recurrent training, or senior cabin crew training should have acquired relevant knowledge of human factors and have completed appropriate CRM training.

GM1 AOCR.CC.115 (e) Conduct of training courses and associated checking

CREW RESOURCE MANAGEMENT (CRM)

(a) CRM - General

(1) CRM should be the effective utilisation of all available resources (e.g. crew members, aircraft systems, and supporting facilities) to achieve safe and efficient operation.

(2) The objective of CRM should be to enhance the communication and management skills of the crew member, as well as the importance of effective coordination and two-way communication between all crew members.

(3) Operator’s CRM training should reflect the culture of the operator, the scale and scope of the operation together with associated operating procedures and areas of operation that produce particular difficulties.

(4) Accordingly, where required during CRM training, if relevant aircraft type-specific case studies are not available, then other case studies relevant to the scale and scope of the operation should be considered.

(b) General principles for CRM training for cabin crew

(1) Cabin crew CRM training should focus on issues related to cabin crew duties and, therefore, should be different from flight crew
CRM training. However, the coordination of the tasks and functions of flight crew and cabin crew should be addressed.

(2) Whenever practicable, combined training should be provided to flight crew and cabin crew, particularly senior cabin crew members. This should include feedback.

(3) Where appropriate, CRM principles should be integrated into relevant parts of cabin crew training.

(4) CRM training should include group discussions and the review of accidents and incidents (case studies).

(5) Whenever it is practicable to do so, relevant parts of CRM training should form part of the training conducted in cabin training devices or in the aircraft.

(6) CRM training courses should be conducted in a structured and realistic manner.

(7) There should be an assessment of CRM skills. Feedback from instructors or members of the group on individual performance should be given during training to the individuals concerned.

**AOCR.CC.120 Initial training course**

(a) Each new entrant who does not already hold a valid cabin crew attestation issued in accordance with these requirements:

(1) shall be provided with an initial training course as specified in AOCR.CC.TRA.220;

(2) shall successfully undergo the associated examination before undertaking other training required by this Part.

(b) Elements of the initial training programme may be combined with the first aircraft type specific training and operator conversion training, provided that the requirements of AOCR.CC.TRA.220 are met and any such element(s) are recorded as elements of the initial training course in the training records of the cabin crew members concerned.
AMC1 AOCR.CC.120 (a) (1) Initial training course

NEW ENTRANTS IN OPERATIONS OTHER THAN COMMERCIAL AIR TRANSPORT OPERATIONS

(a) When a new entrant to an operator conducting operations other than commercial air transport is a cabin crew member, not holding a valid cabin crew attestation, who has already acquired experience as cabin crew in operations other than commercial air transport, credit may be granted to the elements of the initial training programme he/she has previously completed if such training elements are documented in his/her training records.

(b) In such a case, the operator should ensure that:

(1) the full training programme, as specified in Appendix 1 to Part-CC, has been covered, and

(2) the new entrant successfully undergoes the examination required by AOCR.CC.120 (a) (2).

AOCR.CC.125 Aircraft type specific training and operator conversion training

(a) Each cabin crew member shall have completed appropriate aircraft type specific training and operator conversion training, as well as the associated checks, before being:

(1) first assigned by the operator to operate as a cabin crew member; or

(2) assigned by that operator to operate on another aircraft type.

(b) When establishing the aircraft type specific and the operator conversion training programmes and syllabi, the operator shall include, where available, the mandatory elements for the relevant type.

(c) The aircraft type specific training programme shall:

(1) involve training and practice on a representative training device or on the actual aircraft; and

(2) cover at least the following aircraft type specific training elements:
(i) aircraft description as relevant to cabin crew duties;

(ii) all safety equipment and systems installed relevant to
cabin crew duties;

(iii) operation and actual opening, by each cabin crew
member, of each type or variant of normal and emergency
doors and exits in the normal and emergency modes;

(iv) demonstration of the operation of the other exits including
flight crew compartment windows;

(v) fire and smoke protection equipment where installed;

(vi) evacuation slide training, where fitted;

(vii) operation of the seat, restraint system and oxygen system
equipment relevant to pilot incapacitation.

(d) The operator conversion training programme for each aircraft type to
be operated shall:

(1) involve training and practice on a representative training device
or on the actual aircraft;

(2) include training in the operator’s standard operating procedures
for cabin crew members to be first assigned to duties by the
operator;

(3) cover at least the following operator specific training elements as
relevant to the aircraft type to be operated:

(i) description of the cabin configuration;

(ii) location, removal and use of all portable safety and
emergency equipment carried on-board;

(iii) all normal and emergency procedures;

(iv) passenger handling and crowd control;

(v) fire and smoke training including the use of all related
fire-fighting and protective equipment representative of
that carried on-board;

(vi) evacuation procedures;
(vii) pilot incapacitation procedures;

(viii) applicable security requirements and procedures;

(ix) crew resource management.

**AMC1 AOCR.CC.125(c) Aircraft type specific training and operator conversion training**

**TRAINING PROGRAMME – AIRCRAFT TYPE SPECIFIC TRAINING**

The following aircraft type specific training elements should be covered as relevant to the aircraft type:

(a) Aircraft description

(1) type of aircraft, principal dimensions, narrow or wide bodied, single or double deck;

(2) speed, altitude, range;

(3) passenger seating capacity;

(4) flight crew number and minimum number of required cabin crew;

(5) cabin doors/exits location and sill height;

(6) cargo and unpressurised areas as relevant;

(7) aircraft systems relevant to cabin crew duties;

(8) flight crew compartment - general presentation-, pilot seats and their mechanism, emergency exits, storage;

(9) required cabin crew stations;

(10) flight crew compartment security - general: door components and use;

(11) access to avionics bay where relevant;

(12) lavatories - general: doors, sys–ems, calls and signs; and

(13) least risk bomb location.
(b) Safety and emergency equipment and aircraft systems installed. Each cabin crew member should receive realistic training on, and demonstration of, the location and use of all aircraft type specific safety and emergency equipment and aircraft systems installed, with emphasis on the following:

(1) slides, and where non-self-supporting slides are carried, the use of any associated assisting evacuation means;

(2) life-rafts and slide-rafts, including the equipment attached to, and/or carried in, the raft;

(3) drop-out oxygen system; and

(4) communication equipment.

(c) Operation of doors and exits

This training should be conducted in a representative training device or in the actual aircraft and should include failure of power assist systems where fitted and the action and forces required to operate and deploy evacuation slides. Training should also include operation and actual opening of the flight crew compartment security door when installed.

(d) Fire and smoke protection equipment

Each cabin crew member should be trained in using fire and/or smoke protection equipment where fitted.

(e) Evacuation slide training

(1) Each cabin crew member should descend an evacuation slide from a height representative of the aircraft main deck sill height.

(2) The slide should be fitted to a representative training device or to the actual aircraft.

(3) A further descent should be made when the cabin crew member qualifies on an aircraft type in which the main deck exit sill height differs significantly from any aircraft type previously operated.

(f) Operation of equipment related to pilot incapacitation.

The training should cover any type specific elements or conditions relevant to cabin crew actions to be taken in case of pilot incapacitation.
Each cabin crew member should be trained to operate all equipment that must be used in case of pilot incapacitation.

**AMC1 AOCR.CC.125 (d) Aircraft type specific training and operator conversion training**

**TRAINING PROGRAMME – OPERATOR CONVERSION TRAINING**

The following training elements should be covered as relevant to the aircraft type and the related operator’s specifics:

(a) **Description of the cabin configuration**

The description should cover all elements specific to the operator’s cabin configuration and any differences with those previously covered in accordance with AMC1 AOCR.CC.125(c), including:

1. required and additional cabin crew stations - location (including direct view), restraint systems, control panels;
2. passenger seats – general presentation and associated operator’s specific features and equipment;
3. designated stowage areas;
4. lavatories - operator’s specific-features, equipment and systems additional to the aircraft type specific elements;
5. galley - location, appliance–, water and waste system, including shut-off, sinks, drains, stowage, control panels, calls and signs; and where applicable
6. crew rest areas - location, systems, controls, safety and emergency equipment;
7. cabin dividers, curtains, partitions;
8. lift location, use, controls;
9. stowage for the containment of waste; and
10. passenger hand rail system or alternative means.

(b) **Safety and emergency equipment**
Each cabin crew member should receive realistic training on and demonstration of the location and use of all safety and emergency equipment carried including:

(1) life-jackets, infant life-jackets and flotation devices;
(2) first-aid and drop-out oxygen, including supplementary systems;
(3) fire extinguishers and protective breathing equipment (PBE);
(4) crash axe or crowbar;
(5) emergency lights including torches;
(6) communication equipment, including megaphones;
(7) slide-rafts and life-rafts” survival packs and their contents;
(8) pyrotechnics (actual or representative devices);
(9) first-aid kits, emergency medical kits and their contents; and
(10) other portable safety and emergency equipment, where applicable.

(c) Normal and emergency procedures

Each cabin crew member should be trained on the operator’s normal and emergency procedures as applicable, with emphasis on the following:

(1) passenger briefing, safety demonstration and cabin surveillance;
(2) severe air turbulence;
(3) non-pressurisation, slow sudden decompression, including the donning of portable oxygen equipment by each cabin crew member; and
(4) other in-flight emergencies.

(d) Passenger handling and crowd control

Training should be provided 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 aircraft cabin configuration, and should cover the following:

(1) communications between flight crew and cabin crew and use of all communications equipment, including the difficulties of coordination in a smoke-filled environment;

(2) verbal commands;

(3) the physical contact that may be needed to encourage people out of a door/exit and onto a slide;

(4) redirection of passengers away from unusable doors/exits;

(5) marshalling of passengers away from the aircraft;

(6) evacuation of special categories of passengers with emphasis on passengers with disabilities or reduced mobility; and

(7) authority and leadership.

(e) Fire and smoke training

(1) Each cabin crew member should receive realistic and practical training in the use of all fire-fighting equipment including protective clothing representative of that carried in the aircraft.

(2) Each cabin crew member should:

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

(ii) exercise the donning and use of PBE in an enclosed simulated smoke-filled environment with particular emphasis on identifying the actual source of fire and smoke.

(f) Evacuation procedures

Training should include all the operator’s procedures that are applicable to planned or unplanned evacuations on land and water. It should also include, where relevant, the additional actions required from cabin crew members responsible for a pair of doors/exits and the recognition of when doors/exits are unusable or when evacuation equipment is unserviceable.
(g) Pilot incapacitation procedures

Unless the minimum flight crew is more than two, each cabin crew member should be trained in the procedure for pilot incapacitation. Training in the use of flight crew checklists, where required by the operator’s standard operating procedures (SOPs), should be conducted by a practical demonstration.

(h) Crew resource management

(1) Each cabin crew member should complete the operator’s CRM training covering the applicable training elements to the level specified in the relevant column of Table 1 of AMC1 AOCR.CC.115 (e).

(2) When a cabin crew member undertakes the operator’s conversion training on an aircraft type, the applicable training elements specified in Table 1 of AMC1 AOCR.CC.115 (e) should be covered to the level specified in column “Operator’s aircraft type conversion training”.

(3) The operator’s CRM training and CRM training covered during operator aircraft type conversion training should be conducted by at least one cabin crew CRM instructor.

**AMC1 AOCR.CC.125 & AOCR.CC.130 Aircraft type specific training and operator conversion training & Differences training**

**TRAINING PROGRAMMES**

The programmes and syllabi of aircraft type specific training, operator conversion training and differences training should take into account the cabin crew member’s previous training as documented in his/her training records.

**AMC1 AOCR.CC.125 (b) & AOCR.CC.130(c) Aircraft type specific training and operator conversion training & Differences training**

**NON-MANDATORY (RECOMMENDATIONS) ELEMENTS**

When developing the training programmes and syllabi for aircraft-type specific training and for differences training, the operator should consider the non-mandatory (recommendations) elements for the relevant type that are provided in the data established in accordance with Regulations.
AOCR.CC.130 Differences training

(a) In addition to the training required in AOCR.CC.125, the cabin crew member shall complete appropriate training and checking covering any differences before being assigned on:

(1) a variant of an aircraft type currently operated; or

(2) a currently operated aircraft type or variant with different:

(i) safety equipment;

(ii) safety and emergency equipment location; or

(iii) normal and emergency procedures.

(b) The differences training programme shall:

(1) be determined as necessary on the basis of a comparison with the training programme completed by the cabin crew member, in accordance with AOCR.CC.125(c) and (d), for the relevant aircraft type; and

(2) involve training and practice in a representative training device or the actual aircraft as relevant to the difference training element to be covered.

(c) When establishing a differences training programme and syllabus for a variant of an aircraft type currently operated, the operator shall include, where available, the mandatory elements for the relevant aircraft type and its variants.

AOCR.CC.135 Familiarisation

After completion of aircraft type specific training and operator conversion training on an aircraft type, each cabin crew member shall complete appropriate supervised familiarisation on the familiarisation being assigned to operate as a member of the minimum number of cabin crew required in accordance with AOCR.CC.100.

AMC1 AOCR.CC.135 Familiarisation

FAMILIARISATION FLIGHTS AND AIRCRAFT FAMILIARISATION VISITS
For commercial air transport operations, familiarisation of cabin crew to a new aircraft type or variant should be completed in accordance with the following, as relevant:

1. **New entrant cabin crew**

   Each new entrant cabin crew member having no previous comparable operating experience should participate in:

   (i) a familiarisation visit as described in (c) to the aircraft to be operated; and

   (ii) familiarisation flight as described in (b).

2. **Cabin crew operating on a subsequent aircraft type**

   A cabin crew member assigned to operate on a subsequent aircraft type with the same operator should participate either in a:

   (i) familiarisation flight as described in (b); or

   (ii) familiarisation visit as described in (c) to the aircraft type to be operated.

**Familiarisation flights**

1. During familiarisation flights, the cabin crew member should be assigned in addition to the minimum number of cabin crew required in accordance with AOCR.CC.100 and if applicable AOCR.CC.200.

2. **Familiarisation flights should be:**

   (i) conducted under the supervision of the senior cabin crew member;

   (ii) structured and conducted with the cabin crew member participating in pre-flight, in-flight and post-flight safety duties;

   (iii) operated with the cabin crew member wearing the operator's cabin crew uniform; and

   (iv) recorded in the training record of the cabin crew member.

**Aircraft familiarisation visits** should enable the cabin crew member to become familiar with the aircraft environment and its equipment.
Accordingly, aircraft visits should be conducted by appropriately qualified persons. The aircraft visit should provide an overview of the aircraft’s exterior, interior and aircraft systems with emphasis on the following:

(i) interphone and public address systems;
(ii) evacuation alarm systems;
(iii) emergency lighting;
(iv) smoke detection systems;
(v) safety and emergency equipment;
(vi) flight crew compartment;
(vii) cabin crew stations;
(viii) lavatories;
(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; and
(xiii) doors/ exits location and environment.

(2) An aircraft familiarisation visit may be combined with the aircraft type specific training or operator conversion training required by AOCR.CC.125.

**AOCR.CC.140 Recurrent training**

(a) Each cabin crew member shall complete annually recurrent training and checking.

(b) Recurrent training shall cover the actions assigned to each member of the cabin crew in normal and emergency procedures and drills relevant to each aircraft type and/or variant to be operated.

(c) Aircraft type specific training elements:
(1) Recurrent training shall include annually touch-drills by each cabin crew member for simulating the operation of each type or variant of normal and emergency doors and exits for passenger evacuation.

(2) Recurrent training shall also include at intervals not exceeding three years:
   (i) operation and actual opening by each cabin crew member, in a representative training device or in the actual aircraft, of each type or variant of normal and emergency exits in the normal and emergency modes;

   (ii) actual operation by each cabin crew member, in a representative training device or in the actual aircraft, of the flight crew compartment security door, in both normal and emergency modes, and of the seat and restraint system, and a practical demonstration of the oxygen system equipment relevant to pilot incapacitation;

   (iii) demonstration of the operation of all other exits including the flight crew compartment windows; and

   (iv) demonstration of the use of the life-raft, or slide raft, where fitted.

(d) Operator specific training elements:

(1) Recurrent training shall include annually:

   (i) by each cabin crew member:

      (A) location and handling of all safety and emergency equipment installed or carried on board; and

      (B) the donning of life-jackets, portable oxygen and protective breathing equipment (PBE);

   (ii) stowage of articles in the passenger compartment;

   (iii) procedures related to aircraft surface contamination;

   (iv) emergency procedures;

   (v) evacuation procedures;
(vi) incident and accident review;

(vii) crew resource management;

(viii) aero-medical aspects and first aid including related equipment;

(ix) security procedures.

(2) Recurrent training shall also include at intervals not exceeding three years:

(i) use of pyrotechnics (actual or representative devices);

(ii) practical demonstration of the use of flight crew checklists;

(iii) realistic and practical training in the use of all fire-fighting equipment, including protective clothing, representative of that carried in the aircraft;

(iv) by each cabin crew member:

   (A) extinguishing a fire characteristic of an aircraft interior fire;

   (B) donning and use of PBE in an enclosed simulated smoke-filled environment.

(e) Validity periods:

(1) The annual recurrent training validity period shall be 12 calendar months counted from the end of the month when the check was taken.

(2) If the recurrent training and checking required in (a) are undertaken within the last three calendar months of the validity period, the new validity period shall be counted from the original expiry date.

(3) For the additional triennial training elements specified in (c)(2) and (d)(2), the validity period shall be 36 calendar months counted from the end of the month when the checks were taken.
AMC1 AOCR.CC.140 Recurrent training

TRAINING PROGRAMMES

(a) Elements of the annual recurrent training programme

(1) Training on the location and handling of safety and emergency equipment should include all relevant oxygen systems, and any equipment such as defibrillators if carried on board.

(2) Training on emergency procedures should cover pilot incapacitation procedures and crowd control techniques.

(3) CRM training should satisfy the following:
   (i) the applicable training elements specified in Table 1 of AMC1 AOCR.CC.115 (e) should be covered within a 3 year cycle to the level required by Column "Annual Recurrent Training";
   (ii) the definition and implementation of the programme should be managed by a cabin crew CRM instructor; and
   (iii) when CRM training is provided by stand-alone modules, it should be conducted by at least one cabin crew CRM instructor.

(b) Additional triennial elements of recurrent training programme

(1) Training on the operation of normal and emergency doors/exits should cover failure of power assist systems where fitted. This should include the actions and forces required to operate and deploy evacuation slides, and additional training when relevant for cabin crew members responsible for a pair of doors/exits.

(2) Training in the use of all fire-fighting equipment, including protective clothing, representative of that carried in the aircraft should include individual practice by each cabin crew member to extinguish a fire characteristic of an aircraft interior fire except that, in the case of halon extinguishers, an alternative extinguishing agent may be used. Training should place particular emphasis on identifying the actual source of fire or smoke.
AOCR.CC.145 Refresher training

(a) When a cabin crew member, during the preceding six months within the validity period of the last relevant recurrent training and checking:

(1) has not performed any flying duties, he/she shall, before being reassigned to such duties, complete refresher training and checking for each aircraft type to be operated; or

(2) has not performed flying duties on one particular aircraft type, he/she shall, before being reassigned to duties, complete on that aircraft type:

(i) refresher training and checking; or

(ii) two familiarisation flights in accordance with AOCR.CC.135.

(b) The refresher training programme for each aircraft type shall at least cover:

(1) emergency procedures;

(2) evacuation procedures;

(3) operation and actual opening, by each cabin crew member, of each type or variant of normal and emergency exits and of the flight crew compartment security door in the normal and emergency modes;

(4) demonstration of the operation of all other exits including the flight crew compartment windows;

(5) location and handling of all relevant safety and emergency equipment installed or carried on-board.

(c) The operator may elect to 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 AOCR.CC.125.
AMC1 AOCR.CC.145 Refresher training

TRAINING PROGRAMME

(a) Training on emergency procedures should include pilot incapacitation procedures and crowd control techniques as applicable to the aircraft type; and

(b) Operation of doors and exits by each cabin crew member should include failure of power assist systems where fitted as well as the action and forces required to operate and deploy evacuation slides.

GM1 AOCR.CC.145 Refresher training

FREQUENCY OF REFRESHER TRAINING
For aircraft with complex equipment or procedures, the operator should consider the need for refresher training to be completed by cabin crew members who have been absent from flying duties for less than 6 months.

AOCR.CC.200 Senior cabin crew member

(a) When more than one cabin crew member is required, the composition of the cabin crew shall include a senior cabin crew member nominated by the operator.

(b) The operator shall nominate cabin crew members to the position of senior cabin crew member only if they:

(1) have at least one year of experience as operating cabin crew member; and

(2) have successfully completed a senior cabin crew training course and the associated check.

(c) The senior cabin crew training course shall cover all duties and responsibilities of senior cabin crew members and shall include at least the following elements:

(1) pre-flight briefing;

(2) cooperation with the crew;

(3) review of operator requirements and legal requirements;

(4) accident and incident reporting;
(5) human factors and crew resource management (CRM); and
(6) flight and duty time limitations and rest requirements.

(d) The senior cabin crew member shall be responsible to the commander for the conduct and coordination of normal and emergency procedures specified in the operations manual, including for discontinuing non-safety-related duties for safety or security purposes.

(e) The operator shall establish procedures to select the most appropriately qualified cabin crew member to act as senior cabin crew member if the nominated senior cabin crew member becomes unable to operate. Changes to these procedures shall be notified to the Authority.

**AMC1 AOGR.CC.200(c) Senior cabin crew member**

**TRAINING PROGRAMME**

The senior cabin crew member training course should at least cover the following elements:

(a) Pre-flight briefing:

(1) operating as a crew;
(2) allocation of cabin crew stations and responsibilities; and
(3) consideration of the particular flight, aircraft type, equipment, area and type of operation including extended range operations with two-engine aeroplanes (ETOPS) and special categories of passengers with emphasis on passengers with disabilities or reduced mobility, infants and stretcher cases.

(b) Cooperation within the crew:

(1) discipline, responsibilities and chain of command;
(2) importance of coordination and communication; and
(3) pilot incapacitation.

(c) Review of operator requirements and legal requirements:

(1) passenger briefing, safety briefing cards;
(2) securing of galleys;
(3) stowage of cabin baggage;
(4) electronic equipment;
(5) procedures when fueling with passengers on board;
(6) turbulence; and
(7) documentation.

(d) Accident and incident reporting.

(e) Human factors and CRM:

The operator should ensure that all applicable elements specified in Table 1 of AMC1 AOCR.CC.115 (e) are integrated into the training and covered to the level required by Column “Senior Cabin Crew Course”.

(f) Flight and duty time limitations and rest requirements (FTL).

**AMC1 AOCR.CC.200 (d) Senior cabin crew member**

**RESPONSIBILITY TO THE COMMANDER**

When the level of turbulence so requires, and in the absence of any instructions from the flight crew, the senior cabin crew member should 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 relevant areas.

**AMC1 ORO.CC.200 (e) Senior cabin crew member**

**UNABLE TO OPERATE**

(a) Replacement of senior cabin crew member at a base of the operator

A senior cabin crew member who did not report for or cannot commence the assigned flight or series of flights originating from a base of the operator should be replaced without undue delay. The flight should not depart unless another senior cabin crew member has been assigned.

(b) Replacement of incapacitated or unavailable senior cabin crew member
A senior 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 senior cabin crew member qualified on the concerned aircraft type/variant. If there is no other senior cabin crew member, the most appropriately qualified cabin crew member should be assigned to act as senior cabin crew member in order to reach a base of the operator.

If during the series of flights the aircraft transits via a base of the operator, the assigned cabin crew member acting as senior cabin crew member should be replaced by another senior cabin crew member.

**AMC2 ORO.CC.200 (e) Senior cabin crew member**

MOST APPROPRIATELY QUALIFIED CABIN CREW MEMBER

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 a senior cabin crew member. The selected cabin crew member should have operational experience on the concerned aircraft type/variant.

**GM1 ORO.CC.200 (e) Senior cabin crew member**

REPLACEMENT OF INCAPACITATED OR UNAVAILABLE SENIOR CABIN CREW MEMBER BY ANOTHER SENIOR CABIN CREW MEMBER

To ensure that another senior cabin crew member is assigned without undue delay, the operator should take appropriate measures. These include, but are not limited to, the following:

(a) to ensure that a flight or series of flights do not depart from an aerodrome where a senior cabin crew member is available or can be made available, the operator may:

(1) appoint a senior 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

(2) assign a senior cabin crew member who is on standby to operate the flight or to position to the destination where the nominated senior cabin crew member has become incapacitated or unavailable to operate;
(b) the operator should utilise another senior cabin crew member if she/he is among the operating crew on the same flight;

(c) in case of unavailable senior cabin crew member, the operator should use the available time and resources to replace him/her at the stopover (layover) point with another senior cabin crew member;

(d) the operator should consider including the identification of the most appropriately qualified cabin crew member in pre-flight briefings.

GM2 ORO.CC.200 (e) Senior cabin crew member

FLIGHT OR SERIES OF FLIGHTS

Flight or series of flights refers to a period that commences when a cabin crew member is required to report for duty, which includes a sector or a series of sectors, and finishes when the aircraft finally comes to rest and the engines are shut down, at the end of the last sector on which the cabin crew member acts as an operating crew member.

AOCR.CC.205 Reduction of the number of cabin crew during ground operations and in unforeseen circumstances

(a) Whenever any passengers are on board an aircraft, the minimum number of cabin crew required in accordance with AOCR.CC.100 shall be present in the passenger compartment.

(b) Subject to the conditions specified in (c), this number may be reduced:

(1) during normal ground operations not involving refueling/defueling when the aircraft is at its parking station; or

(2) in unforeseen circumstances if the number of passengers carried on the flight is reduced. In this case a report shall be submitted to the Authority after completion of the flight.

(c) Conditions:

(1) procedures ensuring that an equivalent level of safety is achieved with the reduced number of cabin crew, in particular for evacuation of passengers, are established in the operations manual;

(2) the reduced cabin crew includes a senior cabin crew member as specified in AOCR.CC.200;
(3) at least one cabin crew member is required for every 50, or fraction of 50, passengers present on the same deck of the aircraft;

(4) in the case of normal ground operations with aircraft requiring more than one cabin crew member, the number determined in accordance with (c)(3) shall be increased to include one cabin crew member per pair of floor level emergency exits.

**GM1 ORO.CC.205 (b) (2) Reduction of the number of cabin crew during ground operations and in unforeseen circumstances**

**UNFORESEEN CIRCUMSTANCES**

Unforeseen circumstances in this context refer to incapacitation and unavailability of a senior cabin crew member or a cabin crew member as follows:

(a) ‘Incapacitation’ means a sudden degradation of medical fitness that occurs during flight duty period either in-flight or during a flight transit of the same flight duty period away from operator’s base and that precludes the senior cabin crew member or cabin crew member from performing his/her duties. Incapacitation prior to dispatch of the aircraft from a base of the operator does not substantiate a reduction of the cabin crew complement below the minimum required.

(b) ‘Unavailability’ means circumstances at a stopover (layover) destination that preclude the senior cabin crew member or cabin crew member from reporting for the flight duty period, such as traffic jams that prevent the senior cabin crew member or cabin crew member from presenting himself/herself at the crew pick-up point in time, difficulties with local authorities, health problems, death, etc. Unavailability does not refer to insufficient number or absence of cabin crew members on standby, or absence from work due to pregnancy, maternity/paternity leave, parental leave, medical leave, sick leave, or any other absence from work.

**AMC1 AOCR.CC.205(c) (1) Reduction of the number of cabin crew during ground operations and in unforeseen circumstances**

**PROCEDURES WITH REDUCED NUMBER OF CABIN CREW**

(a) During ground operations, if reducing the applicable minimum required number of cabin crew, the operator should ensure that the procedures required by AOCR.CC.205 (c) (1) specify that:
(1) electrical power is available on the aircraft;

(2) a means of initiating an evacuation is available to the senior cabin crew member or at least one member of the flight crew is in the flight crew compartment;

(3) cabin crew stations and associated duties are specified in the operations manual; and

(4) cabin crew remains aware of the position of servicing and loading vehicles at and near the exits.

Additionally, in the case of passengers embarkation:

(5) the senior cabin crew member should have performed the pre-boarding safety briefing to the cabin crew; and

(6) the pre-boarding cabin checks should have been completed.

(b) If, in unforeseen circumstances, the number of cabin crew members is reduced below the applicable minimum required number, for example in the event of incapacitation or unavailability of cabin crew, the procedures established for this purpose in the operations manual should take into consideration at least the following:

(1) reduction of passenger numbers;

(2) reseating of passengers with due regard to doors/exits and other applicable limitations; and

(3) relocation of cabin crew taking into account the factors specified in AMC1 AOCR.CC.100 and any change of procedures.

AOCR.CC.210 Additional conditions for assignment to duties

Cabin crew members shall only be assigned to duties, and operate, on a particular aircraft type or variant if they:

(a) hold a valid attestation issued in accordance with these requirements;

(b) are qualified on the type or variant in accordance with these requirements;

(c) comply with the other applicable requirements of these requirements

(d) wear the operator’s cabin crew uniform.
GM1 AOCR.CC.210 (d) Additional conditions for assignment to duties

OPERATOR’S CABIN CREW UNIFORM

The uniform to be worn by operating cabin crew should be such as not to impede the performance of their duties as required for the safety of passengers and flight during operations, and should allow passengers to identify the operating cabin crew including in an emergency situation.

AOCR.CC.215 Training and checking programs and related documentation

(a) Training and checking programmes including syllabi required by this chapter shall be approved by the Authority and specified in the operations manual.

(b) After a cabin crew member has successfully completed a training course and the associated check, the operator shall:

(1) update the cabin crew member’s training records in accordance with AOCR.MLR.115; and

(2) provide him/her with a list showing updated validity periods as relevant to the aircraft type(s) and variant(s) on which the cabin crew member is qualified to operate.

GM1 AOCR.CC.215 (b) (2) Training and checking programmes and related documentation

LIST OF AIRCRAFT TYPE/VARIANT QUALIFICATION(S)

When providing the updated validity list of aircraft type/variant qualifications to cabin crew members having successfully completed a training course and the associated checking, the operator may use the following format. If using another format, at least the elements in (a) to (d) and in columns (1) and (2) should be indicated to show validity of qualification(s).
CABIN CREW AIRCRAFT TYPE/VARIANT QUALIFICATION(S)

(a) Reference number of the cabin crew attestation:

(b) Cabin crew attestation holder’s full name:
The above-mentioned person may act as an operating cabin crew member during flight operations only if his/her aircraft type and/or variant qualification(s) listed below, and dated DD/MM/YYYY, comply with the applicable validity period(s) specified in Part-AOCR.

(c) Issuing organisation:
(name, postal address, AOC and/or approval reference number and stamp or logo)

(d) Date of issue: (DD/MM/YYYY)

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**AOCR.CC.250 Operation on more than one aircraft type or variant**

(a) A cabin crew member shall not be assigned to operate on more than three aircraft types, except that, with the approval of the Authority, the cabin crew member may be assigned to operate on four aircraft types if for at least two of the types:

(1) safety and emergency equipment and type-specific normal and emergency procedures are similar; and

(2) non-type-specific normal and emergency procedures are identical.

(b) For the purpose of (a) and for cabin crew training and qualifications, the operator shall determine:
each aircraft as a type or a variant taking into account, where available, the relevant data established; and

(2) variants of an aircraft type to be different types if they are not similar in the following aspects:

(i) emergency exit operation;

(ii) location and type of portable safety and emergency equipment;

(iii) type-specific emergency procedures.

AMC1 AOCR.CC.250 (b) Operation on more than one aircraft type or variant

DETERMINATION OF AIRCRAFT TYPES AND VARIANTS

(a) When determining similarity of location and type of portable safety and emergency equipment, the following factors should be assessed:

(1) all portable safety and emergency equipment is stowed in the same, or in exceptional circumstances, in substantially the same location;

(2) all portable safety and emergency equipment requires the same method of operation;

(3) portable safety and emergency equipment includes:

(i) fire-fighting equipment;

(ii) protective breathing equipment (PBE);

(iii) oxygen equipment;

(iv) crew life-jackets;

(v) torches;

(vi) megaphones;

(vii) first-aid equipment;

(viii) survival and signaling equipment;
(ix) other safety and emergency equipment, where applicable.

(b) The type-specific emergency procedures to be considered should include at least the following:

(1) land and water evacuation;
(2) in-flight fire;
(3) non-pressurisation, slow and sudden decompression; and
(4) pilot incapacitation.

(c) When determining similarity of doors/exits in the absence of data for the relevant aircraft type(s) or variant(s), the following factors should be assessed, except for self-help exits, such as type III and type IV exits, that need not be included in the assessment:

(1) door/exit arming and disarming;
(2) direction of movement of the operating handle;
(3) direction of door/exit opening;
(4) power assist mechanisms; and
(5) assisted evacuation means.

GM1 AOCR.CC.250 Operation on more than one aircraft type or variant

SAFETY BRIEFING FOR CABIN CREW

When changing aircraft type or variant during a series of flight sectors, the cabin crew safety briefing should include a representative sample of type-specific normal and emergency procedures and safety and emergency equipment applicable to the actual aircraft to be operated for the immediately subsequent flight sector.

AOCR.CC.255 Single cabin crew member operations

(a) The operator shall select, recruit, train and check the proficiency of cabin crew members to be assigned to single cabin crew member operations according to criteria appropriate to this type of operation.
(b) Cabin crew members who have no previous operating experience as single cabin crew member shall only be assigned to such type of operation after they have:

(1) completed training as required in (c) in addition to other applicable training and checking required by this chapter;

(2) successfully passed the checks verifying their proficiency in discharging their duties and responsibilities in accordance with the procedures specified in the operations manual; and

(3) undertaken familiarisation flying 20 hours and 15 sectors on the relevant aircraft type under the supervision of an appropriately experienced cabin crew member.

(c) The following additional training elements shall be covered with particular emphasis to reflect single cabin crew operations:

(1) responsibility to the commander for the conduct of normal and emergency procedures;

(2) importance of coordination and communication with the flight crew, in particular when managing unruly or disruptive passengers;

(3) review of operator requirements and legal requirements;

(4) documentation;

(5) accident and incident reporting; and

(6) flight and duty time limitations and rest requirements.

AOCR.CC.GEN.030 Documents and record-keeping

(a) Each holder of a cabin crew attestation shall keep, and provide upon request, the training and checking records relevant to his/her aircraft type or variant qualification(s), unless the operator employing his/her services keeps such records and can make them readily available upon request by an authority or by the holder.

(b) When exercising the associated privileges, holders shall carry their cabin crew attestation and the list of their aircraft type or variant qualification(s) provided by the operator(s) employing their services.
Specific Requirements for the Cabin Crew Certificate

AOCR.CC.CCA.100 Issue of the cabin crew Certificate

(a) Cabin crew certificates shall only be issued to applicants who have passed the examination following completion of the initial training course in accordance with this Part.

(b) Cabin crew certificates shall be issued:

(1) by the Authority; or

(2) by an organisation approved to do so by the Authority.

AOCR.CC.CCA.105 Validity of the cabin crew certificates

The cabin crew certificates shall be issued with unlimited duration and shall remain valid unless:

(a) it is suspended or revoked by the Authority; or

(b) its holder has not exercised the associated privileges during the preceding 60 months on at least one aircraft type.

AOCR.CC.CCA.110 Suspension and revocation of the cabin crew certificate

(a) If holders do not comply with these requirements, their cabin crew certificate may be suspended or revoked by the Authority.

(b) In case of suspension or revocation of their cabin crew certificate by the Authority, holders shall:

(1) be informed in writing of this decision, and of their right of appeal in accordance with national law;

(2) not exercise the privileges granted by their cabin crew certificate;

(3) inform, without undue delay, the operator(s) employing their services; and

(4) return their certificate in accordance with the applicable procedure established by the Authority.
Training Requirements for Cabin Crew Certificate Applicants and Holder

AOCR.CC.TRA.215 Provision of training

Training required in this Part shall be:

(a) provided by training organisations or commercial air transport operators approved to do so by the Authority;

(b) performed by personnel appropriately qualified for the training elements to be covered; and

(c) conducted according to a training programme and syllabus documented in the organization’s approval.

AOCR.CC.TRA.220 Initial training course and examination

(a) Applicants for a cabin crew certificate shall complete an initial training course to familiarise themselves with the aviation environment and to acquire sufficient general knowledge and basic proficiency required to perform the duties and discharge the responsibilities related to the safety of passengers and flight during normal, abnormal and emergency operations.

(b) The programme of the initial training course shall cover at least the elements specified in Appendix 1 to this Part. It shall include theoretical and practical training.

(c) Applicants for a cabin crew certificate shall undergo an examination covering all elements of the training programme specified in (b), except CRM training, to demonstrate that they have attained the level of knowledge and proficiency required in (a).

Initial Training Course and Examination

TRAINING PROGRAMME

The training programme of the initial training course shall include at least the following:

1 General theoretical knowledge of aviation and aviation regulations covering all elements relevant to the duties and responsibilities required from cabin crew:
1.1 general knowledge of relevant aviation terminology, theory of flight, passenger distribution, areas of operation, meteorology and effects of surface contamination;

1.2 aviation regulations relevant to cabin crew and the role of the Authority;

1.3 duties and responsibilities of cabin crew during operations and the need to respond promptly and effectively to emergency situations;

1.4 continuing competence and fitness to operate as a cabin crew member, including as regards flight and duty time limitations and rest requirements;

1.5 the importance of ensuring that relevant documents and manuals are kept up-to-date, with amendments provided by the operator as applicable;

1.6 the importance of cabin crew performing their duties in accordance with the operations manual of the operator;

1.7 the importance of the cabin crews pre-flight briefing and the provision of necessary safety information with regards to their specific duties; and

1.8 the importance of identifying when cabin crew members have the authority and responsibility to initiate an evacuation and other emergency procedures.

2. Communication:
During training, emphasis shall be placed on the importance of effective communication between cabin crew and flight crew, including communication techniques, common language and terminology.

3. Introductory course on human factors (HF) in aviation and crew resource management (CRM)
This course shall be conducted by at least one cabin crew CRM instructor. The training elements shall be covered in depth and shall include at least the following:

3.1 General: human factors in aviation, general instructions on CRM principles and objectives, human performance and limitations;
3.2 Relevant to the individual cabin crew member: personality awareness, human error and reliability, attitudes and behaviours, self-assessment; stress and stress management; fatigue and vigilance; assertiveness; situation awareness, information acquisition and processing.

4 Passenger handling and cabin surveillance:

4.1 the importance of correct seat allocation with reference to aeroplane mass and balance, special categories of passengers and the necessity of seating able-bodied passengers adjacent to unsupervised exits;

4.2 rules covering the safe stowage of cabin baggage and cabin service items and the risk of it becoming a hazard to occupants of the passenger compartment or otherwise obstruction or damaging emergency equipment or exits;

4.3 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;

4.4 precautions to be taken when live animals are carried in the passenger compartment;

4.5 duties to be undertaken in the event of turbulence, including securing the passenger compartment; and

4.6 methods used to motivate passengers and the crowd control necessary to expedite an emergency evacuation.

5. Aero-medical aspects and first-aid:

5.1 general instruction on aero-medical aspects and survival;

5.2 the physiological effects of flying with particular emphasis on hypoxia and oxygen requirements;

5.3 basic first-aid, including care of:

   a air sickness;

   b hyperventilation;

   c burns;
d wounds;

e the unconscious; and

f fractures and soft tissue injuries;

5.4 in-flight medical emergencies and associated first-aid covering at least:

a asthma;

b stress and allergic reactions;

c shock;

d diabetes;

e choking;

f epilepsy;

g childbirth;

h stroke; and

i heart attack;

5.5 the use of appropriate equipment including first-aid oxygen, first-aid kits and emergency medical kits and their contents;

5.6 practical cardio-pulmonary resuscitation training by each cabin crew member using a specifically designed dummy and taking account of the characteristics of an aircraft environment; and

5.7 travel health and hygiene, including:

a hygiene on board;

b risk of contact with infectious diseases and means to reduce such risks;

c handling of clinical waste;

d aircraft disinfection;

e handling of death on board; and
f alertness management, physiological effects of fatigue, sleep physiology, circadian rhythm and time zone changes.

6. **Dangerous goods:**

6.1 general principles,

6.2 importance of procedures and reporting; and

6.3 applicable packaging and limitations.

7 **General security aspects in aviation, including awareness of the provisions laid down in security regulations.**

8. **Fire and smoke training:**

8.1 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;

8.2 the importance of informing the flight crew immediately, as well as the specific actions necessary for coordination and assistance, when fire or smoke is discovered;

8.3 the necessity for frequent checking of potential fire-risk areas including toilets, and the associated smoke detectors;

8.4 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

8.5 the general procedures of ground-based emergency services at aerodromes.

9. **Survival training:**

9.1 survival training on the ground, including hostile environments (e.g. polar, desert or jungle);

9.2 water survival training, including the actual donning and use of personal flotation equipment in water and the use of life-rafts or similar equipment, as well as actual practice in water.
CC.TRA.225 Aircraft type or variant qualification(s)

(a) Holders of a valid cabin crew certificate shall only operate on an aircraft if they are qualified in accordance with the applicable requirements of Part-CAT.

(b) To be qualified for an aircraft type or a variant, the holder:

(1) shall comply with the applicable training, checking and validity requirements, covering as relevant to the aircraft to be operated:

   (i) aircraft-type specific training, operator conversion training; and familiarisation;

   (ii) differences training;

   (iii) recurrent training; and

(2) shall have operated within the preceding 6 months on the aircraft type, or shall have completed the relevant refresher training and checking before operating again on that aircraft type.
G SECURITY

AOCR.SEC.100.A Flight crew compartment security

(a) In an aeroplane which is equipped with a flight crew compartment door, this door shall be capable of being locked, and means shall be provided 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 of a maximum certificated take-off mass exceeding 45,500 kg, or with a MOPSC of more than 60 engaged in the commercial transportation of passengers, shall be equipped with an approved 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.

(c) In all aeroplanes which are equipped with a flight crew compartment door in accordance with point (b) above:

(1) this door shall be closed prior to engine start for take-off and will be locked when required by security procedures or by the pilot-in-command until engine shut down after landing, except when deemed necessary for authorised persons to access or egress in compliance with National Civil Aviation Security programmes; and

(2) means shall be provided for monitoring from either pilot’s station the entire door area outside the flight crew compartment to identify persons requesting entry and to detect suspicious behaviour or potential threat.

AOCR.SEC.100.H Flight crew compartment security

If installed, the flight crew compartment door on a helicopter operated for the purpose of carrying passengers shall be capable of being locked from within the flight crew compartment in order to prevent unauthorised access.

GM1 AOCR.SEC.100 Training Programmes

An 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:

(a) determination of the seriousness of any occurrence;
(b) crew communication and coordination;
(c) appropriate self-defence responses;
(d) use of non-lethal protective devices assigned to crew members whose use is authorized by the State of the Operator;
(e) understanding of behaviour of terrorists so as to facilitate the ability of crew members to cope with hijacker behaviour and passenger responses;
(f) live situational training exercises regarding various threat conditions;
(g) flight crew compartment procedures to protect the aeroplane; and
(h) aeroplane search procedures and guidance on least-risk bomb locations where practicable.

**GM2 AOCR.SEC.100 Training Programmes**

An operator shall also 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.
HTECHNICAL CREW IN HEMS, HHO OR NVIS OPERATIONS

AOCR.TC.100 Scope

This Subpart establishes the requirements to be met by the operator when operating an aircraft with technical crew members in commercial air transport helicopter emergency medical service (HEMS), night vision imaging system (NVIS) operations or helicopter hoist operations (HHO).

AOCR.TC.105 Conditions for assignment to duties

(a) Technical crew members in commercial air transport HEMS, HHO or NVIS operations shall only be assigned duties if they:

1. are at least 18 years of age;
2. are physically and mentally fit to safely discharge assigned duties and responsibilities;
3. have completed all applicable training required by this Subpart to perform the assigned duties;
4. have been checked as proficient to perform all assigned duties in accordance with the procedures specified in the operations manual.

(b) Before assigning to duties technical crew members who are self-employed and/or working on a freelance or part-time basis, the operator shall verify that all applicable requirements of this Subpart are complied with, taking into account all services rendered by the technical crew member to other operator(s) to determine in particular:

1. the total number of aircraft types and variants operated;
2. the applicable flight and duty time limitations and rest requirements.

GENERAL

(a) The technical crew member in HEMS, HHO or NVIS operations should undergo an initial medical examination or assessment and, if applicable, a re-assessment before undertaking duties.
Any medical assessment or re-assessment should be carried out according to best aero-medical practice by a medical practitioner who has sufficient detailed knowledge of the applicant’s medical history.

The operator should maintain a record of medical fitness for each technical crew member.

Technical crew members should:

1. be in good health;
2. be free from any physical or mental illness that might lead to incapacitation or inability to perform crew duties;
3. have normal cardio-respiratory function;
4. have normal central nervous system;
5. have adequate visual acuity 6/9 with or without glasses;
6. have adequate hearing; and
7. have normal function of ear, nose and throat

AOCR.TC.110 Training and checking

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

Following the completion of initial, operator conversion, differences and recurrent training, each technical crew member shall undergo a check to demonstrate their proficiency in carrying out normal and emergency procedures.

Training and checking shall be conducted for each training course by personnel suitably qualified and experienced in the subject to be covered. The operator shall inform the competent authority about the personnel conducting the checks.

AMC1 AOCR.TC.110 Training and checking

GENERAL

Elements of training that require individual practice may be combined with practical checks.
(b) **The checks should be accomplished by the method appropriate to the type of training including:**

1. **practical demonstration;**
2. **computer-based assessment;**
3. **in-flight checks; and/or**
4. **oral or written tests.**

**AOCR.TC.115 Initial training**

Before undertaking the operator conversion training, each technical crew member shall complete initial training, including:

(a) **general theoretical knowledge on aviation and aviation regulations covering all elements relevant to the duties and responsibilities required of technical crew;**

(b) **fire and smoke training;**

(c) **survival training on ground and in water, appropriate to the type and area of operation;**

(d) **aero-medical aspects and first-aid;**

(e) **communication and relevant CRM elements of AOCR.FC.115 and AOCR.FC.215**

**AMC1 AOCR.TC.115 Initial training**

**ELEMENTS**

(a) **The elements of initial training mentioned in AOCR.TC.115 should include in particular:**

1. **General theoretical knowledge on aviation and aviation regulations relevant to duties and responsibilities:**

   (i) **the importance of crew members performing their duties in accordance with the operations manual;**
(ii) continuing competence and fitness to operate as a crew member with special regard to flight and duty time limitations and rest requirements;

(iii) an awareness of the aviation regulations relating to crew members and the role of the competent and inspecting authority;

(iv) general knowledge of relevant aviation terminology, theory of flight, passenger distribution, meteorology and areas of operation;

(v) pre-flight briefing of the crew members and the provision of necessary safety information with regard to their specific duties;

(vi) the importance of ensuring that relevant documents and manuals are kept up-to-date with amendments provided by the operator;

(vii) the importance of identifying when crew members have the authority and responsibility to initiate an evacuation and other emergency procedures; and

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

(2) Fire and smoke training:

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

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

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

(3) When conducting extended overwater operations, water survival training, including the use of personal flotation equipment.
Before first operating on an aircraft fitted with life-rafts or other similar equipment, training on the use of this equipment, including practice in water.

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

Aero-medical aspects and first aid, including:

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

(ii) the physiological effects of flying.

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

Effective communication between technical crew members and flight crew members including common language and terminology.

Relevant CRM elements of AMC1 and AMC1.1 AOCR.FC.115&.215.

**AOCR.TC.120 Operator conversion training**

Each technical crew member shall complete:

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

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

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

(b) Operator conversion training shall include:

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

(2) all normal and emergency procedures;

(3) on-board equipment used to carry-out duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, HHO or NVIS operations.
AMC1 AOCR.TC.120&.125 Operator conversion training and differences training

ELEMENTS

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

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

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

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

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

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

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

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

(iii) other in-flight emergencies.

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

(i) the pilot’s seat mechanism;

(ii) fastening and unfastening the pilot’s seat restraint system;

(iii) use of the pilot’s oxygen equipment, when applicable; and
(iv) use of pilots’ checklists.

(5) Training on, and demonstration of, the location and use of safety equipment including the following:

(i) life-rafts, including the equipment attached to, and/or carried in, the raft, where applicable;

(ii) life-jackets, infant life-jackets and flotation devices, where applicable;

(iii) fire extinguishers;

(iv) crash axe or crow bar;

(v) emergency lights including portable lights;

(vi) communication equipment, including megaphones;

(vii) survival packs, including their contents;

(viii) pyrotechnics (actual or representative devices);

(ix) first-aid kits, their contents and emergency medical equipment; and

(x) other safety equipment or systems, where applicable.

(6) Training on passenger briefing/safety demonstrations and preparation of passengers for normal and emergency situations.

(7) Training on the use of dangerous goods, if applicable.

(8) Task-specific training.

**AMC2 AOCR.TC.120&.125 Operator conversion training and differences training**

**GENERAL**

(a) The operator should determine the content of the conversion or differences training taking account of the technical crew member’s previous training as documented in the technical crew member’s training records.
(b) Aircraft conversion or differences training should be conducted according to a syllabus and include the use of relevant equipment and emergency procedures and practice on a representative training device or on the actual aircraft.

(c) The operator should specify in the operations manual the maximum number of types or variants that can be operated by a technical crew member.

**AOCR.TC.125 Differences training**

(a) Each technical crew member shall complete differences training when changing equipment or procedures on types or variants currently operated.

(b) The operator shall specify in the operations manual when such differences training is required.

**AOCR.TC.130 Familiarisation flights**

Following completion of the operator conversion training, each technical crew member shall undertake familiarisation flights prior to operating as a required technical crew member in HEMS, HHO or NVIS operations.

**AOCR.TC.135 Recurrent training**

(a) Within every 12 month period, each technical crew member shall undergo recurrent training relevant to the type or class of aircraft and equipment that the technical crew member operates. Elements of CRM shall be integrated into all appropriate phases of the recurrent training.

(b) Recurrent training shall include theoretical and practical instruction and practice.

**AMC1 AOCR.TC.135 Recurrent training**

**ELEMENTS**

(a) The 12-month period mentioned in AOCR.TC.135 (a) should be counted from the last day of the month when the first checking was made. Further training and checking should be undertaken within the last 3 calendar months of that period. The new 12-month period should be counted from the original expiry date.

(b) The recurrent practical training should include every year:
emergency procedures including pilot incapacitation;

(2) evacuation procedures;

(3) touch-drills by each technical crew member for opening normal and emergency exits for (passenger) evacuation;

(4) the location and handling of emergency equipment and the donning by each technical crew member of life-jackets and protective breathing equipment (PBE), when applicable;

(5) first aid and the contents of the first-aid kit(s);

(6) stowage of articles in the cabin;

(7) use of dangerous goods, if applicable;

(8) incident and accident review; and

(9) crew resource management: all major topics of the initial CRM training should be covered over a period not exceeding 3 years.

(c) Recurrent training should include every 3 years:

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

(2) practical training in the use of all fire fighting equipment as well as protective clothing representative of that carried in the aircraft. Each technical crew member should:

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

(ii) practise the donning and use of protective breathing equipment (when fitted) in an enclosed, simulated smoke-filled environment;

(3) use of pyrotechnics (actual or representative devices); and

(4) demonstration of the use of the life-raft, where fitted.
(a) Each technical crew member who has not undertaken duties in the previous 6 months shall complete the refresher training specified in the operations manual.

(b) The technical crew member who has not performed flying duties on one particular aircraft type or class during the preceding 6 months shall, before being assigned on that type or class, complete either:

(1) refresher training on the type or class; or

(2) two familiarisation sectors on the aircraft type or class.

**AMC1 AOAR.TC.140 Refresher training**

**ELEMENTS**

(a) Refresher training may include familiarisation flights.

(b) Refresher training should include at least the following:

(1) emergency procedures, including pilot incapacitation;

(2) evacuation procedures;

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

(4) the location and handling of emergency equipment, and the donning of life-jackets and protective breathing equipment, when applicable.
AIRCRAFT OPERATIONS

A. MOTOR POWERED AIRCRAFT - GENERAL

AO.CR.GEN.MPA.100 Crew responsibilities

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

(1) related to the safety of the aircraft and its occupants; and
(2) specified in the instructions and procedures in the operations manual.

(b) The crew member shall:

(1) report to the commander any fault, failure, malfunction or defect which the crew member believes may affect the airworthiness or safe operation of the aircraft including emergency systems, if not already reported by another crew member;
(2) report to the commander any incident that endangered, or could have endangered, the safety of the operation, if not already reported by another crew member;
(3) comply with the relevant requirements of the operator’s occurrence reporting schemes;
(4) comply with all flight and duty time limitations (FTL) and rest requirements applicable to their activities;
(5) when undertaking duties for more than one operator:
   (i) maintain his/her individual records regarding flight and duty times and rest periods as referred to in applicable FTL requirements; and
   (ii) provide each operator with the data needed to schedule activities in accordance with the applicable FTL requirements.

(c) The crew member shall not perform duties on an aircraft:
(1) when under the influence of psychoactive substances or alcohol or when unfit due to injury, fatigue, medication, sickness or other similar causes;

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

(3) if applicable medical requirements are not fulfilled;

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

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

**AMC1 AOCR.GEN.MPA.100 (b) Crew responsibilities**

**COPIES OF REPORTS**

Where a written report is required, a copy of the report should be communicated to the commander concerned, unless the terms of the operator’s reporting schemes prevent this.

**AMC1 AOCR.GEN.MPA.100(c) (1) Crew responsibilities**

**ALCOHOL CONSUMPTION**

The operator should issue instructions concerning the consumption of alcohol by crew members. The instructions should be not less restrictive than the following:

(a) no alcohol should be consumed less than 8 hours prior to the specified reporting time for a flight duty period or the commencement of standby;

(b) the blood alcohol level should not exceed the lower of the national requirements or 0.2 per thousand at the start of a flight duty period;

(c) no alcohol should be consumed during the flight duty period or whilst on standby.

**GM1 AOCR.GEN.MPA.100(c) (2) Crew responsibilities**

**ELAPSED TIME BEFORE RETURNING TO FLYING DUTY**
24 hours is a suitable minimum length of time to allow after normal blood donation or normal recreational (sport) diving before returning to flying duties. This should be considered by operators when determining a reasonable time period for the guidance of crew members.

MMED

Information on the effects of medication, drugs, other treatments and alcohol can be found in MMED.

AOCR.GEN.MPA.105 Responsibilities of the commander

(a) The commander, in addition to complying with AOCR.GEN.MPA.100, shall:

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

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

(i) for aeroplanes, from the moment the aeroplane is first ready to move for the purpose of taxiing prior to take-off, until the moment it finally comes to rest at the end of the flight and the engine(s) used as primary propulsion unit(s) is(are) shut down;

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

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

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

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

(6) have the right to refuse transportation of inadmissible passengers, deportees or persons in custody if their carriage increases the risk to the safety of the aircraft or its occupants;
(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 are complied with in accordance with the operations manual;

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

(10) ensure that flight recorders:
    (i) are not disabled or switched off during flight; and
    (ii) in the event of an accident or an incident that is subject to mandatory reporting:
        (A) are not intentionally erased;
        (B) are deactivated immediately after the flight is completed; and
        (C) are reactivated only with the agreement of the investigating authority;

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

(12) ensure that the pre-flight inspection has been carried out in accordance with the requirements of MCAR-Part-M;

(13) be satisfied that relevant emergency equipment remains easily accessible for immediate use.

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

(c) Whenever an aircraft in flight has manoeuvred in response to an airborne collision avoidance system (ACAS) resolution advisory (RA), the commander shall submit an ACAS report to the Authority.
(d) Bird hazards and strikes:

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

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

**AOCR.GEN.MPA.110 Authority of the commander**

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

**AOCR.GEN.MPA.115 Personnel or crew members other than cabin crew in the passenger compartment**

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

(a) are not confused by the passengers with operating cabin crew members;

(b) do not occupy required cabin crew assigned stations;

(c) do not impede operating cabin crew members in their duties.

**AMC1 AOCR.GEN.MPA.115(a) Personnel or crew members other than cabin crew in the passenger compartment**

**MEASURES TO PREVENT CONFUSION BY PASSENGERS**

*If personnel or crew members other than operating cabin crew members carry out duties in a passenger compartment, the operator should ensure that they do not perform tasks or wear a uniform in such a way that might lead passengers to identify them as members of the operating cabin crew.*

**GM1 CAT.GEN.MPA.115 Personnel or crew members other than cabin crew in the passenger compartment**
POSITIONING CABIN CREW MEMBERS

To prevent confusion by passengers and undue expectations in case of emergency, positioning cabin crew members should not wear, or should at least make invisible to passengers, parts of the operator’s cabin crew uniform, such as main jacket or crew signs or badges, that might identify them as members of the operating cabin crew.

AOCR.GEN.MPA.120 Common language

The operator shall ensure that all crew members can communicate with each other in a common language.

AOCR.GEN.MPA.124 Taxiing of aircraft

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

AMC1 AOCR.GEN.MPA.124 Taxiing of aircraft

PROCEDURES FOR TAXIING

Procedures for taxiing should include at least the following:

(a) application of the sterile flight crew compartment procedures;

(b) use of standard radio-telephony (RTF) phraseology;

(c) use of lights;

(d) measures to enhance the situational awareness of the minimum required flight crew members. The following list of typical items should be adapted by the operator to take into account its operational environment:

(1) each flight crew member should have the necessary aerodrome layout charts available;

(2) the pilot taxiing the aircraft should announce in advance his/her intentions to the pilot monitoring;

(3) all taxi clearances should be heard and should be understood by each flight crew member;
(4) all taxi clearances should be cross-checked against the aerodrome chart and aerodrome surface markings, signs, and lights;

(5) an aircraft taxiing on the manoeuvring area should stop and hold at all lighted stop bars, and may proceed further when an explicit clearance to enter or cross the runway has been issued by the aerodrome control tower, and when the stop bar lights are switched off;

(6) if the pilot taxiing the aircraft is unsure of his/her position, he/she should stop the aircraft and contact air traffic control;

(7) the pilot monitoring should monitor the taxi progress and adherence to the clearances, and should assist the pilot taxiing;

(8) any action which may disturb the flight crew from the taxi activity should be avoided or done with the parking brake set (e.g. announcements by public address);

(e) subparagraphs (d)(2) and (d)(7) are not applicable to single-pilot operations.

**AOCR.GEN.MPA.125 Taxiing of aeroplanes**

The operator shall ensure that an aeroplane is only taxied on the movement area of an aerodrome if the person at the controls:

(a) is an appropriately qualified pilot; or

(b) has been designated by the operator and:

(1) is trained to taxi the aircraft;

(2) is trained to use the radio telephone;

(3) has received instruction in respect of aerodrome layout, routes, signs, marking, lights, air traffic control (ATC) signals and instructions, phraseology and procedures;

(4) is able to conform to the operational standards required for safe aeroplane movement at the aerodrome.
SKILLS AND KNOWLEDGE
The following skills and knowledge may be assessed to check if a person can be authorised by the operator to taxi an aeroplane:

(a) positioning of the aeroplane to ensure safety when starting engine;
(b) obtaining automatic terminal information service (ATIS) reports and taxi clearance, where applicable;
(c) interpretation of airfield markings/lights/signals/indicators;
(d) interpretation of marshalling signals, where applicable;
(e) identification of suitable parking area;
(f) maintaining lookout and right-of-way rules and complying with air traffic control (ATC) or marshalling instructions when applicable;
(g) avoidance of adverse effect of propeller slipstream or jet wash on other aeroplanes, aerodrome facilities and personnel;
(h) inspection of taxi path when surface conditions are obscured;
(i) communication with others when controlling an aeroplane on the ground;
(j) interpretation of operational instructions;
(k) reporting of any problem that may occur while taxiing an aeroplane; and
(l) adapting the taxi speed in accordance with prevailing aerodrome, traffic, surface and weather conditions.

GM2 AOCR.GEN.MPA.125 Taxiing of aeroplanes
SAFETY-CRITICAL ACTIVITY
(a) Taxiing should be treated as a safety-critical activity due to the risks related to the movement of the aeroplane and the potential for a catastrophic event on the ground.
(b) Taxiing is a high-workload phase of flight that requires the full attention of the flight crew.

**AOCR.GEN.MPA.135 Admission to the flight crew compartment**

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

1. an operating crew member;
2. a representative of the Authority, if required to be there for the performance of his/her official duties;
3. permitted by and carried in accordance with instructions contained in the operations manual.

(b) The commander shall ensure that:

1. admission to the flight crew compartment does not cause distraction or interference with the operation of the flight; and
2. all persons carried in the flight crew compartment are made familiar with the relevant safety procedures.

(c) The commander shall make the final decision regarding the admission to the flight crew compartment.

**AMC1 AOCR.GEN.MPA.135(a)(3) Admission to the flight crew compartment**

**INSTRUCTIONS FOR SINGLE-PILOT OPERATIONS UNDER VFR BY DAY**

Where an aircraft is used in a single-pilot operation under visual flight rules (VFR) by day but has more than one pilot station, the instructions of the operator may permit passengers to be carried in the unoccupied pilot seat(s), provided that the commander is satisfied that:

(a) it will not cause distraction or interference with the operation of the flight; and

(b) the passenger occupying a pilot seat is familiar with the relevant restrictions and safety procedures.
AOCR.GEN.MPA.140 Portable electronic devices

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

AMC1 AOCR.GEN.MPA.140 Portable electronic devices

GENERAL

(a) Scope

This AMC provides means to prevent that portable electronic devices (PEDs) on board aircraft adversely affect the performance of the aircraft’s systems and equipment. This AMC 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 should be in place to control their use. The operator should ensure that all crew members and ground personnel are trained to enforce the restrictions on this equipment in line with these procedures. These procedures should 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 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 non-critical phases of flight, excluding taxiing.

(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) 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.

(v) 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 authorise 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 should 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 the following should apply:

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

(ii) PEDs should be disconnected from any in-seat electrical power supply, switched-off and stowed 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 should 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 should 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 should 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) should 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 should 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 should be operated. In all other cases, flight crew and other persons on board the aircraft involved in dispatching the aircraft should 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 T-PED for this purpose.

(d) PEDs not accessible during the flight

PEDs should be switched off, when not accessible for deactivation during flight. This should 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 should 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.
GM1 AO CR.GEN.MPA.140 Portable electronic devices

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 unauthorised 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.

**GM2 AOCR.GEN.MPA.140 Portable electronic devices**

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 PEDs2 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. Dass3.

**AOCR.GEN.MPA.145 Information on emergency and survival equipment carried**

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

**AMC1 AOCR.GEN.MPA.145 Information on emergency and survival equipment carried**

**ITEMS FOR COMMUNICATION TO THE RESCUE COORDINATION CENTRE**

The information, compiled in a list, should include, as applicable, the number, colour and type of life rafts and pyrotechnics, details of emergency medical supplies, e.g. first-aid kits, emergency medical kits, water supplies and the type and frequencies of emergency portable radio equipment.

**AOCR.GEN.MPA.150 Ditching — aeroplanes**

The operator shall only operate an aeroplane with a passenger seating configuration of more than 30 on overwater flights at a distance from land suitable for making an emergency landing, greater than 120 minutes at cruising speed, or 400 NM, whichever is less, if the aeroplane complies with the ditching provisions prescribed in the applicable airworthiness code.
AOCR.GEN.MPA.155 Carriage of weapons of war and munitions of war

(a) The operator shall only transport weapons of war or munitions of war by air if an approval to do so has been granted by all States whose airspace is intended to be used for the flight.

(b) Where an approval has been granted, the operator shall ensure that weapons of war and munitions of war are:

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

(2) in the case of firearms, unloaded.

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

WEAPONS OF WAR AND MUNITIONS OF WAR

(a) In accordance with Civil Aviation Regulations, weapons of war may be carried on board an aircraft, in a place that is not inaccessible, if the required security conditions in accordance with national laws have been fulfilled and authorisation has been given by the States involved.

(b) 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.

(c) It is 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 munitions of war. In this context, States that 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.

(d) Where weapons of war or munitions of war are also dangerous goods by definition (e.g. torpedoes, bombs, etc.), AOCR.GEN.MPA.200 Transport of dangerous goods also applies.
AOCR.GEN.MPA.160 Carriage of sporting weapons and ammunition

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

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

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

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

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

**GM1 AOCR.GEN.MPA.160 Carriage of sporting weapons and ammunition**

**SPORTING WEAPONS**

(a) In accordance with Civil Aviation Regulations sporting weapons may be carried on board an aircraft, in a place that is not inaccessible, if the required security conditions in accordance with national laws have been fulfilled and authorisation has been given by the States involved.

(b) There is no internationally agreed definition of sporting weapons. In general it may be any weapon that is not a weapon of war or munitions of war. Sporting weapons include hunting knives, bows and other similar articles. An antique weapon, which at one time may have been a weapon of war or munitions of war, such as a musket, may now be regarded as a sporting weapon.

(c) A firearm is any gun, rifle or pistol that fires a projectile.

(d) The following firearms are generally regarded as being sporting weapons:

(1) those designed for shooting game, birds and other animals;

(2) those used for target shooting, clay-pigeon shooting and competition shooting, providing the weapons are not those on standard issue to military forces; and
(3) air guns, dart guns, starting pistols, etc.

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

**AOCR.GEN.MPA.161 Carriage of sporting weapons and ammunition — alleviations**

Notwithstanding AOCR.GEN.MPA.160(b), for helicopters with a maximum certified take-off mass (MCTOM) of 3 175 kg or less operated by day and over routes navigated by reference to visual landmarks, a sporting weapon may be carried in a place that is accessible during flight, provided that the operator has established appropriate procedures and it is impracticable to stow it in an inaccessible stowage during flight.

**AOCR.GEN.MPA.165 Method of carriage of persons**

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

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

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

**AOCR.GEN.MPA.170 Alcohol and drugs**

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

**AOCR.GEN.MPA.175 Endangering safety**

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

(a) endanger an aircraft or person therein; or

(b) cause or permit an aircraft to endanger any person or property.
AOCR.GEN.MPA.180 Documents, manuals and information to be carried

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

(1) the aircraft flight manual (AFM), or equivalent document(s);
(2) the original certificate of registration;
(3) the original certificate of airworthiness (C of A);
(4) the noise certificate, including an English translation, where one has been provided by the authority responsible for issuing the noise certificate;
(5) a certified true copy of the air operator certificate (AOC);
(6) the operations specifications relevant to the aircraft type, issued with the AOC;
(7) the original aircraft radio licence, if applicable;
(8) the third party liability insurance certificate(s);
(9) the journey log, or equivalent, for the aircraft;
(10) the aircraft technical log, in accordance with MCAR-Part-M;
(11) details of the filed ATS flight plan, if applicable;
(12) current and suitable aeronautical charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
(13) procedures and visual signals information for use by intercepting and intercepted aircraft;
(14) information concerning search and rescue services for the area of the intended flight, which shall be easily accessible in the flight crew compartment;
(15) the current parts of the operations manual that are relevant to the duties of the crew members, which shall be easily accessible to the crew members;
(16) the MEL;
(17) appropriate notices to airmen (NOTAMs) and aeronautical information service (AIS) briefing documentation;

(18) appropriate meteorological information;

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

(20) mass and balance documentation;

(21) the operational flight plan, if applicable;

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

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

(b) Notwithstanding (a), for operations under visual flight rules (VFR) by day with other-than-complex motor-powered aircraft taking off and landing at the same aerodrome or operating site within 24 hours, or remaining within a local area specified in the operations manual, the following documents and information may be retained at the aerodrome or operating site instead:

(1) noise certificate;

(2) aircraft radio licence;

(3) journey log, or equivalent;

(4) aircraft technical log;

(5) NOTAMs and AIS briefing documentation;

(6) meteorological information;

(7) notification of SCPs and special loads, if applicable; and

(8) mass and balance documentation.

(c) Notwithstanding (a), in case of loss or theft of documents specified in (a)(2) to (a)(8), the operation may continue until the flight reaches its destination or a place where replacement documents can be provided.
AMC1 AOCR.GEN.MPA.180 Documents, manuals and information to be carried

GENERAL

The documents, manuals and information may be available in a form other than on printed paper. An electronic storage medium is acceptable if accessibility, usability and reliability can be assured.

GM1 AOCR.GEN.MPA.180(a)(1) Documents, manuals and information to be carried

AIRCRAFT FLIGHT MANUAL OR EQUIVALENT DOCUMENT(S)

“Aircraft flight manual, or equivalent document(s)” means in the context of this rule the flight manual for the aircraft, or other documents containing information required for the operation of the aircraft within the terms of its certificate of airworthiness, unless these data are available in the parts of the operations manual carried on board.

GM1 AOCR.GEN.MPA.180(a)(5) Documents, manuals and information to be carried

THE AIR OPERATOR CERTIFICATE

Certified true copies may be provided:

(a) directly by the Authority; or

(b) by persons holding privileges for certification of official documents in accordance with applicable legislation, e.g., public notaries, authorised officials in public services.

GM1 AOCR.GEN.MPA.180(a)(9) Documents, manuals and information to be carried

JOURNEY LOG OR EQUIVALENT

“Journey log, or equivalent” means in this context that the required information may be recorded in documentation other than a log book, such as the operational flight plan or the aircraft technical log.
PROCEDURES AND VISUAL SIGNALS FOR USE BY INTERCEPTING AND INTERCEPTED AIRCRAFT

The procedures and the visual signals for use by intercepting and intercepted aircraft should reflect those contained in the International Civil Aviation Organisation (ICAO) Annex 2. This may be part of the operations manual.

SEARCH AND RESCUE INFORMATION

This information is usually found in the State’s aeronautical information publication.

DOCUMENTS THAT MAY BE PERTINENT TO THE FLIGHT

Any other documents that may be pertinent to the flight or required by the States concerned with the flight may include, for example, forms to comply with reporting requirements.

STATES CONCERNED WITH THE FLIGHT

The States concerned are those of origin, transit, overflight and destination of the flight.

Information to be retained on the ground

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

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

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

(3) the same information is carried in a fireproof container in the aircraft.
(b) The information referred to in (a) includes:

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

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

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

(4) mass and balance documentation if required; and

(5) special loads notification.

**AOCR.GEN.MPA.190 Provision of documentation and records**

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

**AOCR.GEN.MPA.195 Preservation, production and use of flight recorder recordings**

(a) Following an accident or an incident that is subject to mandatory reporting, the operator of an aircraft shall preserve the original recorded data for a period of 60 days unless otherwise directed by the investigating authority.

(b) The operator shall conduct operational checks and evaluations of flight data recorder (FDR) recordings, cockpit voice recorder (CVR) recordings and data link recordings to ensure the continued serviceability of the recorders.

(c) The operator shall save the recordings for the period of operating time of the FDR as required by AOCR.IDE.A.190 or AOCR.IDE.H.190, except that, for the purpose of testing and maintaining the FDR, up to one hour of the oldest recorded material at the time of testing may be erased.

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

(e) The operator shall make available any flight recorder recording that has been preserved, if so determined by the Authority.

(f) Without prejudice to Regulations:
(1) CVR recordings shall only be used for purposes other than for the investigation of an accident or an incident subject to mandatory reporting, if all crew members and maintenance personnel concerned consent.

(2) FDR recordings or data link recordings shall only be used for purposes other than for the investigation of an accident or an incident which is subject to mandatory reporting, if such records are:

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

(ii) de-identified; or

(iii) disclosed under secure procedures.

**GM1 AOCR.GEN.MPA.195(a) Preservation, production and use of flight recorder recordings**

**REMOVAL OF RECORDERS AFTER A REPORTABLE OCCURRENCE**

The need for removal of the recorders from the aircraft is determined by the investigating authority with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

**AMC1 AOCR.GEN.MPA.195(b) Preservation, production and use of flight recorder recordings**

**OPERATIONAL CHECKS**

Whenever a recorder is required to be carried, the operator should:

(a) perform an annual inspection of FDR recording and CVR recording, unless one or more of the following applies:

(1) Where two solid-state FDRs both fitted with internal built-in-test equipment sufficient to monitor reception and recording of data share the same acquisition unit, a comprehensive recording inspection need only be performed for one FDR. For the second FDR, checking its internal built-in-test equipment is sufficient. The inspection should be performed alternately such that each FDR is inspected once every other year.
Where the following conditions are met, the FDR recording inspection is not needed:

(i) the aircraft flight data are collected in the frame of a flight data monitoring (FDM) programme;

(ii) the data acquisition of mandatory flight parameters is the same for the FDR and for the recorder used for the FDM programme;

(iii) the integrity of all mandatory flight parameters is verified by the FDM programme; and

(iv) the FDR is solid-state and is fitted with an internal built-in-test equipment sufficient to monitor reception and recording of data.

Where two solid-state CVRs are both fitted with internal built-in-test equipment sufficient to monitor reception and recording of data, a comprehensive recording inspection need only to be performed for one CVR. For the second CVR, checking its internal built-in-test equipment is sufficient. The inspection should be performed alternately such that each CVR is inspected once every other year.

perform every 5 years an inspection of the data link recording.

check every 5 years, or in accordance with the recommendations of the sensor manufacturer, that the parameters dedicated to the FDR and not monitored by other means are being recorded within the calibration tolerances and that there is no discrepancy in the engineering conversion routines for these parameters.

GM1 AOVR.GEN.MPA.195(b) Preservation, production and use of flight recorder recordings

INSPECTION OF THE FLIGHT RECORDERS RECORDING

The inspection of the FDR recording usually consists of the following:

(1) Making a copy of the complete recording file.

(2) Examining a whole flight in engineering units to evaluate the validity of all mandatory parameters - this could reveal defects or noise in the measuring and processing chains and indicate
necessary maintenance actions. The following should be considered:

(i) when applicable, each parameter should be expressed in engineering units and checked for different values of its operational range - for this purpose, some parameters may need to be inspected at different flight phases; and

(ii) if the parameter is delivered by a digital data bus and the same data are utilised for the operation of the aircraft, then a reasonableness check may be sufficient; otherwise a correlation check may need to be performed;

(A) a reasonableness check is understood in this context as a subjective, qualitative evaluation, requiring technical judgement, of the recordings from a complete flight; and

(B) a correlation check is understood in this context as the process of comparing data recorded by the flight data recorder against the corresponding data derived from flight instruments, indicators or the expected values obtained during specified portion(s) of a flight profile or during ground checks that are conducted for that purpose.

(3) Retaining the most recent copy of the complete recording file and the corresponding recording inspection report.

(b) The inspection of the CVR recording usually consists of:

(1) checking that the CVR operates correctly for the nominal duration of the recording;

2) examining, where practicable and subject to prior approval by the flight crew, a sample of in-flight recording of the CVR for evidence that the signal is acceptable on each channel; and

(3) preparing and retaining an inspection report.

(c) The inspection of the DLR recording usually consists of:

(1) Checking the consistency of the data link recording with other recordings for example, during a designated flight, the flight crew speaks out a few data link messages sent and received. After the
flight, the data link recording and the CVR recording are compared for consistency.

(2) Retaining the most recent copy of the complete recording and the corresponding inspection report.

**AOCR.GEN.MPA.200 Transport of dangerous goods**

(a) Unless otherwise permitted by these requirements, the transport of dangerous goods by air shall be conducted in accordance with Annex 18 to the Chicago Convention as last amended and amplified by the “Technical instructions for the safe transport of dangerous goods by air” (ICAO Doc 9284-AN/905), including its supplements and any other addenda or corrigenda.

(b) Dangerous goods shall only be transported by an operator approved in accordance with these requirements, except when:

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

(2) they are carried by passengers or crew members, or are in baggage, in accordance with Part 8 of the technical instructions.

(c) An operator shall establish procedures to ensure that all reasonable measures are taken to prevent dangerous goods from being carried on board inadvertently.

(d) The operator shall provide personnel with the necessary information enabling them to carry out their responsibilities, as required by the technical instructions.

(e) The operator shall, in accordance with the technical instructions, report without delay to the Authority and the appropriate authority of the State of occurrence in the event of:

(1) any dangerous goods accidents or incidents;

(2) the discovery of undeclared or misdeclared dangerous goods in cargo or mail; or

(3) the finding of dangerous goods carried by passengers or crew members, or in their baggage, when not in accordance with Part 8 of the technical instructions.
(f) The operator shall ensure that passengers are provided with information about dangerous goods in accordance with the technical instructions.

(g) The operator shall ensure that notices giving information about the transport of dangerous goods are provided at acceptance points for cargo as required by the technical instructions.

**AMC1 AOCP.GEN.MPA.200(e) Transport of dangerous goods**

**DANGEROUS GOODS ACCIDENT AND INCIDENT REPORTING**

(a) Any type of dangerous goods accident or incident, or the finding of undeclared or misdeclared dangerous goods should be reported, irrespective of whether the dangerous goods are contained in cargo, mail, passengers” baggage or crew baggage. For the purposes of the reporting of undeclared and misdeclared dangerous goods found in cargo, the Technical Instructions considers this to include items of operators” stores that are classified as dangerous goods.

(b) The first report should be dispatched within 72 hours of the event. It may be sent by any means, including e-mail, telephone or fax. This report should include the details that are known at that time, under the headings identified in (c). If necessary, a subsequent report should 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 should be sent as soon as possible.

(c) The first and any subsequent report should be as precise as possible and should contain the following data, where relevant:

1. date of the incident or accident or the finding of undeclared or misdeclared dangerous goods;
2. location, the flight number and flight date;
3. description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc.;
4. proper shipping name (including the technical name, if appropriate) and UN/ID number, when known;
5. class or division and any subsidiary risk;
6. type of packaging, and the packaging specification marking on it;
(7) quantity;

(8) name and address of the shipper, passenger, etc.;

(9) any other relevant details;

(10) suspected cause of the incident or accident;

(11) action taken;

(12) any other reporting action taken; and

(13) name, title, address and telephone number of the person making the report.

(d) Copies of relevant documents and any photographs taken should be attached to the report.

(e) A dangerous goods accident or incident may also constitute an aircraft accident, serious incident or incident. Reports should be made for both types of occurrences when the criteria for each are met.

(f) The following dangerous goods reporting form should be used, but other forms, including electronic transfer of data, may be used provided that at least the minimum information of this AMC is supplied:
<table>
<thead>
<tr>
<th><strong>1. Operator:</strong></th>
<th><strong>2. Date of occurrence:</strong></th>
<th><strong>3. Local time of occurrence:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>4. Flight Date:</strong></td>
<td><strong>Flight No:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>6. Departure Aerodrome:</strong></td>
<td><strong>7. Destination Aerodrome:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>8. Aircraft Type:</strong></td>
<td><strong>9. Aircraft Registration No:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>10. Location of occurrence:</strong></td>
<td><strong>11. Origin of the Goods:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>12. Description of the occurrence, including details of injury, damage, etc.</strong> (if necessary continue on the reverse of this form):</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>13. Proper shipping name (including the technical name):</strong></td>
<td><strong>14. UN/ID No (when known):</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>15. Class/Division (when known):</strong></td>
<td><strong>16. Susidiary Risk(s):</strong></td>
<td><strong>17. Packing group:</strong></td>
</tr>
<tr>
<td><strong>18. Category (Class 7 only):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>19. Type of Packaging:</strong></td>
<td><strong>20. Packaging specification marking:</strong></td>
<td><strong>21. No of packages:</strong></td>
</tr>
<tr>
<td><strong>22. Quantity (or transport index, if applicable):</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>23. Reference No of Airway Bill</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
24. Reference No of courier pouch, baggage tag, or passenger ticket

25. Name and address of shipper, agent, passenger, etc.

26. Other relevant information (including suspected case, any action taken)

27. Name and title of person making report

28. Telephone Number:

29. Company:

30. Reporters reference:

31. Address:

32. Signature:

33. Date:

Description of occurrence (continuation)
Notes for completion of the form:

1 A dangerous goods accident is as defined in the Civil Aviation Regulations. For this purpose serious injury is as defined in the Civil Aviation Regulations.

2 This form should also be used to report any occasion when undeclared or misdeclared dangerous goods are discovered in cargo, mail or unaccompanied baggage or when accompanied baggage contains dangerous goods which passengers or crew are not permitted to take on aircraft.

3 The initial report should be dispatched unless exceptional circumstances prevent this. This occurrence report form, duly completed, should be sent as soon as possible, even if all the information is not available.

4 Copies of all relevant documents and any photographs should be attached to this report.

5 Any further information, or any information not included in the initial report, should be sent as soon as possible to authorities identified in AOCR.GEN.MPA.200 (e).

6 Providing it is safe to do so, all dangerous goods, packaging, documents, etc., relating to the occurrence should be retained until after the initial report has been sent to the authorities identified in AOCR.GEN.MPA.200 (e) and they have indicated whether or not these should continue to be retained.

GM1 AOCR.GEN.MPA.200 Transport of dangerous goods

GENERAL

(a) The requirement to transport dangerous goods by air in accordance with the Technical Instructions is irrespective of whether:

(1) the flight is wholly or partly within or wholly outside the territory of a state; or

(2) an approval to carry dangerous goods in accordance with Part SPA is held.

(b) The Technical Instructions provide that in certain circumstances dangerous goods, which are normally forbidden on an aircraft, may be carried. These circumstances include cases of extreme urgency or...
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 an overall level of safety which is at least equivalent to that provided by the Technical Instructions is achieved. Although exemptions are most likely to be granted for the carriage of dangerous goods that 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 Technical Instructions also make provision for some dangerous goods to be carried when an approval has been granted only by the State of Origin and the State of the Operator.

(c) When an exemption is required, the States concerned are those of origin, transit, overflight and destination of the consignment and that of the operator. For the State of overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved.

(d) The Technical Instructions provide that 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 the 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.

(e) The exemption or approval referred to in (b) to (d) is in addition to the approval required by Part SPA.
B. MOTOR POWERED AIRCRAFT – OPERATING PROCEDURES

AOCR.OP.MPA.100 Use of air traffic services

(a) The operator shall ensure that:

(1) air traffic services (ATS) appropriate to the airspace and the applicable rules of the air are used for all flights whenever available;

(2) in-flight operational instructions involving a change to the ATS flight plan, when practicable, are coordinated with the appropriate ATS unit before transmission to an aircraft.

(b) Notwithstanding (a), the use of ATS is not required unless mandated by air space requirements for:

(1) operations under VFR by day of other-than-complex motor-powered aeroplanes;

(2) helicopters with an MCTOM of 3 175 kg or less operated by day and over routes navigated by reference to visual landmarks; or

(3) local helicopter operations,

provided that search and rescue service arrangements can be maintained.

GM1 AOCR.OP.MPA.100 (a) (2) Use of air traffic services

IN-FLIGHT OPERATIONAL INSTRUCTIONS

When coordination with an appropriate air traffic service (ATS) unit has not been possible, in-flight operational instructions do not relieve a commander of responsibility for obtaining an appropriate clearance from an ATS unit, if applicable, before making a change in flight plan.

AOCR.OP.MPA.105 Use of aerodromes and operating sites

(a) The operator shall only use aerodromes and operating sites that are adequate for the type(s) of aircraft and operation(s) concerned.

(b) The use of operating sites shall only apply to:

(1) other-than-complex motor-powered aeroplanes; and

(2) helicopters.
AOCR.OP.MPA.106 Use of isolated aerodromes — aeroplanes

(a) Using an isolated aerodrome as destination aerodrome with aeroplanes requires the prior approval by the Authority.

(b) An isolated aerodrome is one for which the alternate and final fuel reserve required to the nearest adequate destination alternate aerodrome is more than:

1. for aeroplanes with reciprocating engines, fuel to fly for 45 minutes plus 15% of the flying 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.

AOCR.OP.MPA.107 Adequate aerodrome

The operator shall consider an aerodrome as adequate if, at the expected time of use, the aerodrome is available and equipped with necessary ancillary services such as air traffic services (ATS), sufficient lighting, communications, weather reporting, navigation aids and emergency services.

AOCR.OP.MPA.110 Aerodrome operating minima

(a) The operator shall establish aerodrome operating minima for each departure, destination or alternate aerodrome planned to be used. These minima shall not be lower than those established for such aerodromes by the State in which the aerodrome is located, except when specifically approved by that State. Any increment specified by the Authority shall be added to the minima.

(b) The use of a head-up display (HUD), head-up guidance landing system (HUDLS) or enhanced vision system (EVS) may allow operations with lower visibilities than the established aerodrome operating minima if approved in accordance with AOCR.SPA.LVO.

(c) When establishing aerodrome operating minima, the operator shall take the following into account:

1. the type, performance and handling characteristics of the aircraft;

2. the composition, competence and experience of the flight crew;
(3) the dimensions and characteristics of the runways/final approach and take-off areas (FATOs) that may be selected for use;

(4) the adequacy and performance of the available visual and non-visual ground aids;

(5) the equipment available on the aircraft for the purpose of navigation and/or control of the flight path during the take-off, the approach, the flare, the landing, rollout and the missed approach;

(6) for the determination of obstacle clearance, the obstacles in the approach, missed approach and the climb-out areas necessary for the execution of contingency procedures;

(7) the obstacle clearance altitude/height for the instrument approach procedures;

(8) the means to determine and report meteorological conditions; and

(9) the flight technique to be used during the final approach.

(d) The operator shall specify the method of determining aerodrome operating minima in the operations manual.

(e) The minima for a specific approach and landing procedure shall only be used if all the following conditions are met:

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

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

(3) the required aircraft performance criteria are met; and

(4) the crew is appropriately qualified.

**AMC1 AOCR.OP.MPA.110 Aerodrome operating minima**

**TAKE-OFF OPERATIONS - AEROPLANES**

(a) **General**
(1) Take-off minima should be expressed as visibility or runway visual range (RVR) limits, taking into account all relevant factors for each aerodrome planned to be used and aircraft 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, should be specified.

(2) The commander should 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 weather-permissible take-off alternate aerodrome is available.

(3) When the reported meteorological visibility (VIS) is below that required for take-off and RVR is not reported, a take-off should only be commenced if the commander can determine that the visibility along the take-off runway is equal to or better than the required minimum.

(4) When no reported meteorological visibility or RVR is available, a take-off should only be commenced if the commander can determine that the visibility along the

(b) Visual reference

(1) The take-off minima should be selected to ensure sufficient guidance to control the aircraft in the event of both a rejected take-off in adverse circumstances and a continued take-off after failure of the critical engine.

(2) For night operations, ground lights should be available to illuminate the runway and any obstacles.

(c) Required RVR/VIS – aeroplanes

(1) For multi-engined aeroplanes, with performance such that in the event of a critical engine failure at any point during take-off the aeroplane can either stop or continue the take-off to a height of 1 500 ft above the aerodrome while clearing obstacles by the required margins, the take-off minima specified by the operator should be expressed as RVR/CMV (converted meteorological visibility) values not lower than those specified in Table 1.A.

(2) For multi-engined aeroplanes without the performance to comply with the conditions in (c) (1) in the event of a critical engine 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 specified by the operator should be based upon the height from which the one-engine-inoperative (OEI) net take-off flight path can be constructed. The RVR minima used should not be lower than either of the values specified in Table 1.A or Table 2.A.

(3) When RVR or meteorological visibility is not available, the commander should not commence take-off unless he/she can determine that the actual conditions satisfy the applicable take-off minima.

**Table 1.A: Take-off – aeroplanes (without an approval for low visibility take-off (LVTO)) RVR/VIS**

<table>
<thead>
<tr>
<th>Facilities</th>
<th>RVR/VIS (m) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day only: Nil**</td>
<td>500</td>
</tr>
<tr>
<td>Day: at least runway edge lights or runway centreline markings</td>
<td></td>
</tr>
<tr>
<td>Night: at least runway edge lights and runway end lights or runway centreline lights and runway end lights</td>
<td>400</td>
</tr>
</tbody>
</table>

*: The reported RVR/VIS value representative of the initial part of the take-off run can be replaced by pilot assessment.
**: The pilot is able to continuously identify the take-off surface and maintain directional control.

**Table 2.A: Take-off - aeroplanes Assumed engine failure height above the runway versus RVR/VIS**

<table>
<thead>
<tr>
<th>Assumed engine failure height above the take-off runway (ft)</th>
<th>RVR/VIS (m) **</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50</td>
<td>400 (200 with LVTO approval)</td>
</tr>
<tr>
<td>51 – 100</td>
<td>400 (300 with LVTO approval)</td>
</tr>
</tbody>
</table>
AMC3 AOCR.OP.MPA.110 Aerodrome operating minima

NPA, APV, CAT I OPERATIONS

(a) The decision height (DH) to be used for a non-precision approach (NPA) flown with the continuous descent final approach (CDFA) technique, approach procedure with vertical guidance (APV) or CAT 1 operation should not be lower than the highest of:

1. the minimum height to which the approach aid can be used without the required visual reference;
2. the obstacle clearance height (OCH) for the category of aircraft;
3. the published approach procedure DH where applicable;
4. the system minimum specified in Table 3; or
5. the minimum DH specified in the aircraft flight manual (AFM) or equivalent document, if stated.

(b) The minimum descent height (MDH) for an NPA operation flown without the CDFA technique should not be lower than the highest of:

1. the OCH for the category of aircraft;
2. the system minimum specified in Table 3; or
3. the minimum MDH specified in the AFM, if stated.

*: 1 500 m is also applicable if no positive take-off flight path can be constructed.

**: The reported RVR/VIS value representative of the initial part of the take-off run can be replaced by pilot assessment.
### Table 3: System minima

<table>
<thead>
<tr>
<th>Facility</th>
<th>Lowest DH/MDH (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS/MLS/GLS</td>
<td>200</td>
</tr>
<tr>
<td>GNSS/SBAS (LPV)</td>
<td>200</td>
</tr>
<tr>
<td>GNSS (LNAV)</td>
<td>250</td>
</tr>
<tr>
<td>GNSS/Baro-VNAV (LNAV/ VNAV)</td>
<td>250</td>
</tr>
<tr>
<td>LOC with or without DME</td>
<td>250</td>
</tr>
<tr>
<td>SRA (terminating at ½ NM)</td>
<td>250</td>
</tr>
<tr>
<td>SRA (terminating at 1 NM)</td>
<td>300</td>
</tr>
<tr>
<td>SRA (terminating at 2 NM or more)</td>
<td>350</td>
</tr>
<tr>
<td>VOR</td>
<td>300</td>
</tr>
<tr>
<td>VOR/DME</td>
<td>250</td>
</tr>
<tr>
<td>NDB</td>
<td>350</td>
</tr>
<tr>
<td>NDB/DME</td>
<td>300</td>
</tr>
<tr>
<td>VDF</td>
<td>350</td>
</tr>
</tbody>
</table>

DME: distance measuring equipment;

GNSS: global navigation satellite system;

ILS: instrument landing system;

LNAV: lateral navigation;

LOC: localiser;

LPV: localiser performance with vertical guidance

SBAS: satellite-based augmentation system;

SRA: surveillance radar approach;

VDF: VHF direction finder;

VNAV: vertical navigation;

VOR: VHF omnidirectional radio range.

**AMC4.OP.MPA.110 Aerodrome operating minima**

**CRITERIA FOR ESTABLISHING RVR/CMV**

(a) Aeroplanes
The following criteria for establishing RVR/CMV should apply:

(1) In order to qualify for the lowest allowable values of RVR/CMV specified in Table 6.A the instrument approach should meet at least the following facility specifications 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 where the facilities are:

(A) ILS / microwave landing system (MLS) / GBAS landing system (GLS) / precision approach radar (PAR); or

(B) APV; and where the final approach track is offset by not more than 15° for category A and B aeroplanes or by not more than 5° for category C and D aeroplanes.

(ii) Instrument approach operations 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, where the facilities are NDB, NDB/DME, VOR, VOR/DME, LOC, LOC/DME, VDF, SRA or GNSS/LNAV, with a final approach segment of at least 3 NM, which also fulfil the following criteria:

(A) the final approach track is offset by not more than 15° for category A and B aeroplanes or by not more than 5° for category C and D aeroplanes;

(B) the final approach fix (FAF) or another appropriate fix where descent is initiated is available, or distance to threshold (THR) is available by flight management system / GNSS (FMS/GNSS) or DME; and

(C) if the missed approach point (MAPt) is determined by timing, the distance from FAF or another appropriate fix to THR is ≤ 8 NM.

(iii) Instrument approaches where the facilities are NDB, NDB/DME, VOR, VOR/DME, LOC, LOC/DME, VDF, SRA or GNSS/LNAV, not fulfilling the criteria in (a) (1) (ii), or with an MDH ≥ 1 200 ft.

(2) The missed approach operation, after an approach operation has been flown using the CDFA technique, should be executed when reaching the DA/H or the MAPt, whichever occurs first. The lateral part of the missed
approach procedure should be flown via the MAPt unless otherwise stated on the approach chart.

**AMC5 AOCR.OP.MPA.110 Aerodrome operating minima**

**DETERMINATION OF RVR/CMV/VIS MINIMA FOR NPA, APV, CAT I - AEROPLANES**

(a) Aeroplanes

The RVR/CMV/VIS minima for NPA, APV and CAT I operations should be determined as follows:

1. The minimum RVR/CMV/VIS should be the highest of the values specified in Table 5 or Table 6.A but not greater than the maximum values specified in Table 6.A, where applicable.

2. The values in Table 5 should be derived from the formula below,

   
   $$\text{Required RVR/VIS (m)} = \left[ \frac{(\text{DH}/\text{MDH} \ (\text{ft}) \times 0.3048)}{\tan \alpha} \right] - \text{length of approach lights (m)}$$

   where $\alpha$ is the calculation angle, being a default value of $3.00^\circ$ increasing in steps of $0.10^\circ$ for each line in Table 5 up to $3.77^\circ$ and then remaining constant.

3. If the approach is flown with a level flight segment at or above MDA/H, 200 m should be added for category A and B aeroplanes and 400 m for category C and D aeroplanes to the minimum RVR/CMV/VIS value resulting from the application of Tables 5 and 6.A.

4. An RVR of less than 750 m as indicated in Table 5 may be used:

   (i) for CAT I operations to runways with full approach lighting system (FALS), runway touchdown zone lights (RTZL) and runway centreline lights (RCLL);

   (ii) for CAT I operations to runways without RTZL and RCLL when using an approved head-up guidance landing system (HUDLS), or equivalent approved system, or when conducting a coupled approach or flight-director-flown approach to a DH. The ILS should not be published as a restricted facility; and

   (iii) for APV operations to runways with FALS, RTZL and RCLL when using an approved head-up display (HUD).
(5) Lower values than those specified in Table 5, for HUDLS and auto-land operations may be used if approved in accordance with Annex V (Part-SPA), Subpart E (SPA.LVO).

(6) The visual aids should comprise standard runway day markings and approach and runway lights as specified in Table 4. 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 210 m due to terrain or water, but where at least one cross-bar is available.

(7) For night operations or for any operation where credit for runway and approach lights is required, the lights should be on and serviceable except as provided for in Table 9.

(8) For single-pilot operations, the minimum RVR/VIS should be calculated in accordance with the following additional criteria:

- (i) an RVR of less than 800 m as indicated in Table 5 may be used for CAT I approaches provided any of the following is used at least down to the applicable DH:
  - (A) a suitable autopilot, coupled to an ILS, MLS or GLS that is not published as restricted; or
  - (B) an approved HUDLS, including, where appropriate, enhanced vision system (EVS), or equivalent approved system;

- (ii) where RTZL and/or RCLL are not available, the minimum RVR/CMV should not be less than 600 m; and

- (iii) an RVR of less than 800 m 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.

**Table 4: Approach lighting systems**

<table>
<thead>
<tr>
<th>Class of lighting facility</th>
<th>Length, configuration and intensity of approach lights</th>
</tr>
</thead>
<tbody>
<tr>
<td>FALS</td>
<td>CAT I lighting system (HIALS ≥720 m) distance coded</td>
</tr>
<tr>
<td>IALS</td>
<td>Simple approach lighting system (HIALS 420 – 719 m) single source, Barrette</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>BALS</td>
<td>Any other approach lighting system (HIALS, MALS or ALS 210 - 419 m)</td>
</tr>
<tr>
<td>NALS</td>
<td>Any other approach light system (HIALS, MALS or ALS &lt;210 m) or no approach lights</td>
</tr>
</tbody>
</table>

*Note: HIALS: high intensity approach lighting system; MALS: medium intensity approach lighting system.*
### Table 5 RVR/CMV for Cat I vs DH

<table>
<thead>
<tr>
<th>DH or MDH (Feet)</th>
<th>Class of Lighting Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FALS</td>
</tr>
<tr>
<td>200</td>
<td>—</td>
</tr>
<tr>
<td>211</td>
<td>—</td>
</tr>
<tr>
<td>241</td>
<td>—</td>
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<tr>
<td>251</td>
<td>—</td>
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<tr>
<td>261</td>
<td>—</td>
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<tr>
<td>281</td>
<td>—</td>
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<tr>
<td>301</td>
<td>—</td>
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<tr>
<td>321</td>
<td>—</td>
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<tr>
<td>341</td>
<td>—</td>
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<tr>
<td>361</td>
<td>—</td>
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<tr>
<td>381</td>
<td>—</td>
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<tr>
<td>401</td>
<td>—</td>
</tr>
<tr>
<td>421</td>
<td>—</td>
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<tr>
<td>441</td>
<td>—</td>
</tr>
<tr>
<td>461</td>
<td>—</td>
</tr>
<tr>
<td>481</td>
<td>—</td>
</tr>
<tr>
<td>501</td>
<td>—</td>
</tr>
<tr>
<td>521</td>
<td>—</td>
</tr>
<tr>
<td>541</td>
<td>—</td>
</tr>
<tr>
<td>561</td>
<td>—</td>
</tr>
<tr>
<td>581</td>
<td>—</td>
</tr>
<tr>
<td>601</td>
<td>—</td>
</tr>
<tr>
<td>621</td>
<td>—</td>
</tr>
<tr>
<td>641</td>
<td>—</td>
</tr>
<tr>
<td>661</td>
<td>—</td>
</tr>
<tr>
<td>681</td>
<td>—</td>
</tr>
<tr>
<td>701</td>
<td>—</td>
</tr>
<tr>
<td>721</td>
<td>—</td>
</tr>
<tr>
<td>741</td>
<td>—</td>
</tr>
<tr>
<td>761</td>
<td>—</td>
</tr>
<tr>
<td>801</td>
<td>—</td>
</tr>
<tr>
<td>851</td>
<td>—</td>
</tr>
<tr>
<td>901</td>
<td>—</td>
</tr>
<tr>
<td>951</td>
<td>—</td>
</tr>
<tr>
<td>1 001</td>
<td>—</td>
</tr>
<tr>
<td>1 101</td>
<td>—</td>
</tr>
</tbody>
</table>

*1 201 and above*
### Table 6.A: CAT I, APV, NPA - aeroplanes Minimum and maximum applicable RVR/CMV (lower and upper cut-off limits)

<table>
<thead>
<tr>
<th>Facility/conditions</th>
<th>RVR/CMV (m)</th>
<th>Aeroplane category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>ILS, MLS, GLS, PAR,</td>
<td>Min</td>
<td></td>
</tr>
<tr>
<td>GNSS/SBAS,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNSS/VNAV</td>
<td>Max</td>
<td>1 500</td>
</tr>
<tr>
<td>NDB, NDB/DME, VOR,</td>
<td>Min</td>
<td>750</td>
</tr>
<tr>
<td>VOR/DME, LOC, LOC/</td>
<td>Max</td>
<td>1 500</td>
</tr>
<tr>
<td>DME, VDF, SRA,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNSS/LNAV with a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>procedure that fulfils the criteria in AMC4 CAT.OP.MPA.110, (a)(1)(ii)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For NDB, NDB/DME,</td>
<td>Min</td>
<td>1 000</td>
</tr>
<tr>
<td>VOR, VOR/DME, LOC,</td>
<td>Max</td>
<td>According to Table 5 if flown using the CDFA technique, otherwise an add-on of 200 m for Category A and B aeroplanes and 400 m for Category C and D aeroplanes applies to the values in Table 5 but not to result in a value exceeding 5 000 m.</td>
</tr>
<tr>
<td>LOC/DME, VDF, SRA,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GNSS/LNAV:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- not fulfilling the criteria in in AMC4 CAT.OP.MPA.110, (a)(1)(ii), or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- with a DH or MDH ( \geq 1 200 \text{ ft} )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AMC7 AOCR.OP.MPA.110 Aerodrome operating minima**

**CIRCLING OPERATIONS - AEROPLANES**

(a) **Circling minima**

The following standards should apply for establishing circling minima for operations with aeroplanes:

(1) the MDH for circling operation should not be lower than the highest of:
(i) the published circling OCH for the aeroplane category;
(ii) the minimum circling height derived from Table 7; or
(iii) the DH/MDH of the preceding instrument approach procedure;

(2) the MDA for circling should be calculated by adding the published aerodrome elevation to the MDH, as determined by (a) (1); and

(3) the minimum visibility for circling should be the highest of:

(i) the circling visibility for the aeroplane category, if published;
(ii) the minimum visibility derived from Table 7; or
(iii) the RVR/CMV derived from Tables 5 and 6.A for the preceding instrument approach procedure.

Table 7: Circling - aeroplanes MDH and minimum visibility vs. aeroplane category

<table>
<thead>
<tr>
<th>Aeroplane category</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDH (ft)</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>Minimum meteorological visibility (m)</td>
<td>1500</td>
<td>1600</td>
<td>2400</td>
<td>3600</td>
</tr>
</tbody>
</table>

(b) Conduct of flight – general:

(1) the MDH and OCH included in the procedure are referenced to aerodrome elevation;
(2) the MDA is referenced to mean sea level;
(3) for these procedures, the applicable visibility is the meteorological visibility; and
(4) operators should provide tabular guidance of the relationship between height above threshold and the in-flight visibility required to obtain and sustain visual contact during the circling manoeuvre.

(c) Instrument approach followed by visual manoeuvring (circling) without prescribed tracks
(1) When the aeroplane is on the initial instrument approach, before visual reference is stabilised, but not below MDA/H, the aeroplane should follow the corresponding instrument approach procedure until the appropriate instrument MAPt is reached.

(2) At the beginning of the level flight phase at or above the MDA/H, the instrument approach track determined by radio navigation aids, RNAV, RNP, ILS, MLS or GLS should be maintained until the pilot:

(i) 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;

(ii) estimates that the aeroplane is within the circling area before commencing circling; and (iii) is able to determine the airplane’s position in relation to the runway of intended landing with the aid of the appropriate external references.

(3) When reaching the published instrument MAPt and the conditions stipulated in (c) (2) are unable to be established by the pilot, a missed approach should be carried out in accordance with that instrument approach procedure.

(4) After the aeroplane has left the track of the initial 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:

(i) to attain a controlled and stable descent path to the intended landing runway; and

(ii) to 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.

(5) Flight manoeuvres should be carried out at an altitude/height that is not less than the circling MDA/H.

(6) Descent below MDA/H should not be initiated until the threshold of the runway to be used has been appropriately identified. The aeroplane should be in a position to continue with a normal rate of descent and land within the touchdown zone.
(d) **Instrument approach followed by a visual manoeuvring (circling) with prescribed track**

(1) **The aeroplane should remain on the initial instrument approach procedure until one of the following is reached:**

(i) the prescribed divergence point to commence circling on the prescribed track; or

(ii) the MAPt.

(2) **The aeroplane should be established on the instrument approach track determined by the radio navigation aids, RNAV, RNP, ILS, MLS or GLS in level flight at or above the MDA/H at or by the circling manoeuvre divergence point.**

(3) **If the divergence point is reached before the required visual reference is acquired, a missed approach should be initiated not later than the MAPt and completed in accordance with the instrument approach procedure.**

(4) **When commencing the prescribed circling manoeuvre at the published divergence point, the subsequent manoeuvres should be conducted to comply with the published routing and published heights/altitudes.**

(5) **Unless otherwise specified, once the aeroplane is established on the prescribed track(s), the published visual reference does not need to be maintained unless:**

(i) required by the State of the aerodrome; or

(ii) the circling MAPt (if published) is reached.

(6) **If the prescribed circling manoeuvre has a published MAPt and the required visual reference has not been obtained by that point, a missed approach should be executed in accordance with (e) (2) and (e) (3).**

(7) **Subsequent further descent below MDA/H should only commence when the required visual reference has been obtained.**

(8) **Unless otherwise specified in the procedure, final descent should not be commenced from MDA/H until the threshold of the intended landing runway has been identified and the aeroplane**
is in a position to continue with a normal rate of descent to land within the touchdown zone.

(e) **Missed approach**

(1) **Missed approach during the instrument procedure prior to circling:**

(i) if the missed approach procedure is required to be flown when the aeroplane is positioned on the instrument approach track defined by radio-navigation aids RNAV, RNP, or ILS, MLS, and before commencing the circling manoeuvre, the published missed approach for the instrument approach should be followed; or

(ii) if the instrument approach procedure is carried out with the aid of an ILS, MLS or an stabilised approach (SAP), the MAPt associated with an ILS, MLS procedure without glide path (GP-out procedure) or the SAP, where applicable, should be used.

(2) If a prescribed missed approach is published for the circling manoeuvre, this overrides the manoeuvres prescribed below.

(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 to a position overhead the aerodrome where the pilot will establish the aeroplane in a climb on the instrument missed approach segment.

(4) **The aeroplane should not leave the visual manoeuvring (circling) area, which is obstacle protected, unless:**

(i) established on the appropriate missed approach procedure; or

(ii) at minimum sector altitude (MSA).

(5) **All turns should be made in the same direction and the aeroplane should remain within the circling protected area while climbing either:**

(i) to the altitude assigned to any published circling missed approach manoeuvre if applicable;
(ii) to the altitude assigned to the missed approach of the initial instrument approach;

(iii) to the MSA;

(iv) to the minimum holding altitude (MHA) applicable for transition to a holding facility or fix, or continue to climb to an MSA; or

(v) as directed by ATS.

When the missed approach procedure 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.

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.

(6) Because 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.

(7) If a missed approach procedure is published for a particular runway 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 unit should be informed of the intention to fly the published missed approach procedure for that particular runway.

(8) The commander should advise ATS when any missed approach procedure has been 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.

**AMCS AOCR.OP.MPA.110 Aerodrome operating minima**
ONSHELRE CIRCLING OPERATIONS - HELICOPTERS

For circling the specified MDH should not be less than 250 ft, and the meteorological visibility not less than 800 m.

AMC9 AOCR.OP.MPA.110 Aerodrome operating minimum

VISUAL APPROACH OPERATIONS

The operator should not use an RVR of less than 800 m for a visual approach operation.

AMC10 AOCR.OP.MPA.110 Aerodrome operating minima

CONVERSION OF REPORTED METEOROLOGICAL VISIBILITY TO RVR

(a) A conversion from meteorological visibility to RVR/CMV should not be used:

(1) when reported RVR is available;

(2) for calculating take-off minima; and

(3) for any RVR minima less than 800 m.

(b) If the RVR is reported as being above the maximum value assessed by the aerodrome operator, e.g. “RVR more than 1 500 m”, it should not be considered as a reported value for (a) (1).

(c) When converting meteorological visibility to RVR in circumstances other than those in (a), the conversion factors specified in Table 8 should be used.

Table 8: Conversion of reported meteorological visibility to RVR/CMV

<table>
<thead>
<tr>
<th>Light elements in operation</th>
<th>RVR/CMV = reported meteorological visibility x</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>HI approach and runway lights</td>
<td>1.5</td>
</tr>
</tbody>
</table>
Any type of light installation other than above

<table>
<thead>
<tr>
<th>Light Installation</th>
<th>1.0</th>
<th>1.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>No lights</td>
<td>1.0</td>
<td>not applicable</td>
</tr>
</tbody>
</table>

**AMC11 AOGR.OP.MPA.110 Aerodrome operating minima**

**EFFECT ON LANDING MINIMA OF TEMPORARILY FAILED OR DOWNGRADED GROUND EQUIPMENT**

(a) General

These instructions are intended for use both pre-flight and in-flight. It is however not expected that the commander would consult such instructions after passing 1 000 ft above the aerodrome. If failures of ground aids are announced at such a late stage, the approach could be continued at the commander’s discretion. If failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in Table 9, and the approach may have to be abandoned.

(b) Conditions applicable to Tables 9:

(1) multiple failures of runway/FATO lights other than indicated in Table 9 should not be acceptable;

(2) deficiencies of approach and runway/FATO lights are treated separately; and

(3) failures other than ILS, MLS affect RVR only and not DH.
Table 9: Failed or downgraded equipment – effect on landing minima Operations without a low visibility operations (LVO) approval

<table>
<thead>
<tr>
<th>Failed or downgraded equipment</th>
<th>Effect on landing minima</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS/MLS stand-by transmitter</td>
<td>No effect</td>
</tr>
<tr>
<td>Outer Marker</td>
<td>Not allowed except if replaced by height check at 1,000 ft</td>
</tr>
<tr>
<td></td>
<td>APV – not applicable</td>
</tr>
<tr>
<td></td>
<td>NPA with FAF: no effect unless used as FAF</td>
</tr>
<tr>
<td></td>
<td>If the FAF cannot be identified (e.g. no method available for timing of descent), non-precision operations cannot be conducted</td>
</tr>
<tr>
<td>Middle marker</td>
<td>No effect</td>
</tr>
<tr>
<td></td>
<td>No effect unless used as MAPt</td>
</tr>
<tr>
<td>RVR Assessment Systems</td>
<td>No effect</td>
</tr>
<tr>
<td>Approach lights</td>
<td>Minima as for NALS</td>
</tr>
<tr>
<td>Approach lights except the last 210 m</td>
<td>Minima as for BALS</td>
</tr>
<tr>
<td>Approach lights except the last 420 m</td>
<td>Minima as for IALS</td>
</tr>
<tr>
<td>Standby power for approach lights</td>
<td>No effect</td>
</tr>
<tr>
<td>Edge lights, threshold lights and runway end lights</td>
<td>Day: no effect; Night: not allowed</td>
</tr>
<tr>
<td>Centreline lights</td>
<td>No effect if F/D, HUDLS or auto-land</td>
</tr>
<tr>
<td></td>
<td>otherwise RVR 750 m</td>
</tr>
<tr>
<td>Centreline lights spacing increased to 30 m</td>
<td>No effect</td>
</tr>
<tr>
<td>Touchdown zone lights</td>
<td>No effect if F/D, HUDLS or auto-land; otherwise RVR 750 m</td>
</tr>
</tbody>
</table>
### GM2 AOCR.OP.MPA.110 Aerodrome operating minima

**APPROACH LIGHTING SYSTEMS – ICAO, FAA**

The following table provides a comparison of ICAO and FAA specifications.

**Table 1: Approach lighting systems**

<table>
<thead>
<tr>
<th>Class of lighting facility</th>
<th>Length, configuration and intensity of approach lights</th>
</tr>
</thead>
</table>
| FALS                       | ICAO: CAT I lighting system (HIALS ≥ 900 m) distance coded centreline, Barrette centreline  
FAA: ALSF1, ALSF2, SSALR, MALS, high or medium intensity and/or flashing lights, 720 m or more |
| IALS                       | ICAO: simple approach lighting system (HIALS 420 – 719 m) single source, Barrette  
FAA: MALS, SALS, SALS/SALS, SSALF, SSALS, high or medium intensity and/or flashing lights, 420 – 719 m |
| BALS                       | Any other approach lighting system (HIALS, MALS or ALS 210-419 m)  
FAA: ODALS, high or medium intensity or flashing lights 210 - 419 m |
| NALS                       | Any other approach lighting system (HIALS, MALS or ALS <210 m) or no approach lights |
Note:

**ALSF**: approach lighting system with sequenced flashing lights;  
**MALS**: medium intensity approach lighting system;  
**MALSF**: medium intensity approach lighting system with sequenced flashing lights;  
**MALSR**: medium intensity approach lighting system with runway alignment indicator lights;  
**ODALS**: omnidirectional approach lighting system;  
**SALS**: simple approach lighting system;  
**SALSF**: short approach lighting system with sequenced flashing lights;  
**SSALF**: simplified short approach lighting system with sequenced flashing lights;  
**SSALR**: simplified short approach lighting system with runway alignment indicator lights;  
**SSALS**: simplified short approach lighting system.

**GM3 AOCR.OP.MPA.110 Aerodrome operating minima**

**SBAS OPERATIONS**

(a) SBAS CAT I operations with a DH of 200 ft depend on an SBAS system approved for operations down to a DH of 200 ft.

(b) The following systems are in operational use or in a planning phase:

1. European geostationary navigation overlay service (EGNOS) operational in Europe;  
2. wide area augmentation system (WAAS) operational in the USA;  
3. multi-functional satellite augmentation system (MSAS) operational in Japan;  
4. system of differential correction and monitoring (SDCM) planned by Russia;
GPS aided geo augmented navigation (GAGAN) system, planned by India; and

satellite navigation augmentation system (SNAS), planned by China.

**GM1 AOCR.OP.MPA.110 (a) Aerodrome operating minima**

**INCREMENTS SPECIFIED BY THE AUTHORITY**

Additional increments to the published minima may be specified by the Authority to take into account certain operations, such as downwind approaches and single-pilot operations.

**AOCR.OP.MPA.115 Approach flight technique — aeroplanes**

(a) All approaches shall be flown as stabilised approaches unless otherwise approved by the Authority for a particular approach to a particular runway.

(b) Non-precision approaches

(1) The continuous descent final approach (CDFA) technique shall be used for all non-precision approaches.

(2) Notwithstanding (1), another approach flight technique may be used for a particular approach/runway combination if approved by the Authority. In such cases, the applicable minimum runway visual range (RVR):

   (i) shall be increased by 200 m for category A and B aeroplanes and by 400 m for category C and D aeroplanes; or

   (ii) for aerodromes where there is a public interest to maintain current operations and the CDFA technique cannot be applied, shall be established and regularly reviewed by the Authority taking into account the operator’s experience, training programme and flight crew qualification.
AMC1 AOCR.OP.MPA.115 Approach flight technique - aeroplanes

CONTINUOUS DESCENT FINAL APPROACH (CDFA)

(a) Flight techniques:

(1) The CDFA technique should ensure that an approach can be flown on the desired vertical path and track in a stabilised manner, without significant vertical path changes during the final segment descent to the runway. This technique applies to an approach with no vertical guidance and controls the descent path until the DA/DH. This descent path can be either:

(i) a recommended descent rate, based on estimated ground speed;

(ii) a descent path depicted on the approach chart; or

(iii) a descent path coded in the flight management system in accordance with the approach chart descent path.

(2) 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 usable format. Generally, the MAPt is published on the chart.

(3) The approach should be flown as an SAp.

(4) The required descent path should be flown to the DA/H, observing any step-down crossing altitudes if applicable.

(5) This DA/H should take into account any add-on to the published minima as identified by the operator’s management system and should be specified in the OM (aerodrome operating minima).

(6) During the descent the pilot monitoring 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.

(7) The operator should establish a procedure to ensure that an appropriate callout 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.
(8) The descent path should ensure that little or no adjustment of attitude or thrust/power is needed after the DA/H to continue the landing in the visual segment.

(9) The missed approach should be initiated no later than reaching the MAPt or at the DA/H, whichever comes first. The lateral part of the missed approach should be flown via the MAPt unless otherwise stated on the approach chart.

(b) **Flight techniques conditions:**

(1) The approach should be considered to be fully stabilised when the aeroplane is:

   (i) tracking on the required approach path and profile;
   
   (ii) in the required configuration and attitude;
   
   (iii) flying with the required rate of descent and speed; and
   
   (iv) flying with the appropriate thrust/power and trim.

(2) The aeroplane is considered established on the required approach path at the appropriate energy for stable flight using the CDFA technique when:

   (i) 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
   
   (ii) it is at the appropriate attitude and speed for the required target rate of descent (ROD) with the appropriate thrust/power and trim.

(3) 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 the CDFA technique, 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.
(4) For approaches where the pilot has visual reference with the ground, stabilisation should be achieved not later than 500 ft above aerodrome elevation. However, the aeroplane should be stabilised when passing 1000 ft above runway threshold elevation; in the case of circling approaches flown after a CDFA, the aircraft should be stabilised in the circling configuration not later than passing 1 000 ft above the runway elevation.

(5) To ensure that the approach can be flown in a stabilised manner, the bank angle, rate of descent and thrust/power management should meet the following performances:

(i) The bank angle should be less than 30 degrees.

(ii) The target rate of descent (ROD) should not exceed 1 000 fpm and the ROD deviations should not exceed ± 300 fpm, except under exceptional circumstances which have been anticipated and briefed prior to commencing the approach; for example, a strong tailwind. Zero ROD 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 0.3 NM before the descent point, dependent upon ground speed, which may vary for each type/class of aeroplane.

(iii) The limits of thrust/power and the appropriate range should be specified in the OM Part B or equivalent document.

(iv) The optimum angle for the approach slope is 3° and should not exceed 4.5°.

(v) The CDFA technique should be applied only to approach procedures based on NDB, NDB/DME, VOR, VOR/DME, LOC, LOC/DME, VDF, SRA, GNSS/LNAV and fulfil the following criteria:

(A) the final approach track off-set ≤ 5° except for Category A and B aeroplanes, where the approach-track off-set is ≤ 15°; and

(B) a FAF, or another appropriate fix, e.g., final approach point, where descent initiated is available; and
(C) the distance from the FAF or another appropriate fix to the threshold (THR) is less than or equal to 8 NM in the case of timing; or

(D) the distance to the THR is available by FMS/GNSS or DME; or

(E) 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.

(7) The CDFA techniques support a common method for the implementation of flight-director-guided or auto-coupled RNAV approaches.

**AMC2 AOCR.OP.MPA.115 Approach flight technique - aeroplanes**

**NPA OPERATIONS WITHOUT APPLYING THE CDFA TECHNIQUE**

(a) 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 the MAPt.

(b) Even when the approach procedure is flown without the CDFA technique the relevant procedures for ensuring a controlled and stable path to MDA/H should be followed.

(c) In case the CDFA technique is not used when flying an approach, the 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:

(1) awareness of radio altimeter information with reference to the approach profile;

(2) terrain awareness warning system (TAWS);

(3) limitation of rate of descent;

(4) limitation of the number of repeated approaches;

5) safeguards against too early descents with prolonged flight at MDA/H; and

(6) specification of visual requirements for the descent from the MDA/H.
(d) In case the CDFA technique is not used and when the MDA/H is high, it may be appropriate to make an early descent to MDA/H with appropriate safeguards such as the application of a significantly higher RVR/VIS.

(e) The procedures that are flown with level flight at/or above MDA/H should be listed in the OM.

(f) Operators should categorise aerodromes where there are approaches that require level flight at/or above MDA/H as B and C. Such aerodrome categorisation will depend upon the operator’s experience, operational exposure, training programme(s) and flight crew qualification(s).

**AMC3 AOCR.OP.MPA.115 Approach flight technique - aeroplanes**

**OPERATIONAL PROCEDURES AND INSTRUCTIONS AND TRAINING**

(a) The operator should establish procedures and instructions for flying approaches using the CDFA technique and not using it. These procedures should be included in the OM and should include the duties of the flight crew during the conduct of such operations.

(b) The operator should at least specify in the OM the maximum ROD for each aeroplane type/class operated and the required visual reference to continue the approach below:

(1) the DA/H, when applying the CDFA technique; and

(2) the MDA/H, when not applying the CDFA technique.

(c) The operator should establish procedures which prohibit level flight at MDA/H without the flight crew having obtained the required visual references. It is not the intention to prohibit level flight at MDA/H when conducting a circling approach, which does not come within the definition of the CDFA technique.

(d) The operator should provide the flight crew with unambiguous details of the technique used (CDFA or not). The corresponding relevant minima should include:

(1) type of decision, whether DA/H or MDA/H;

(2) MAPt as applicable; and
(3) appropriate RVR/VIS for the approach operation and aeroplane category.

(e) Training

(1) Prior to using the CDFA technique, each flight crew member should undertake appropriate training and checking as required by AOCR.FC. The operator’s proficiency check should include at least one approach to a landing or missed approach 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 FSTD, the approach should be operated to the lowest approved RVR. The approach is not in addition to any manoeuvre currently required by either MFCL or AOCR.MPA. The provision may be fulfilled by undertaking any currently required approach, engine out or otherwise, other than a precision approach (PA), whilst using the CDFA technique.

(2) The policy for the establishment of constant predetermined vertical path and approach stability is to be enforced both during initial and recurrent pilot training and checking. The relevant training procedures and instructions should be documented in the operations manual.

(3) The training should emphasise the need to establish and facilitate joint crew procedures and crew resource management (CRM) to enable accurate descent path control and the provision to establish the aeroplane in a stable condition as required by the operator’s operational procedures.

(4) During training, emphasis should be placed on the flight crews need to:

(i) maintain situational awareness at all times, in particular with reference to the required vertical and horizontal profile;

(ii) ensure good communication channels throughout the approach;

(iii) ensure accurate descent-path control particularly during any manually-flown descent phase. The monitoring pilot should facilitate good flight path control by:

(A) communicating any altitude/height crosschecks prior to the actual passing of the range/altitude or height crosscheck;
(B) prompting, as appropriate, changes to the target ROD; and

(C) monitoring flight path control below DA/MDA;

(iv) understand the actions to be taken if the MAPt is reached prior to the MDA/H;

(v) ensure that the decision for a missed approach is taken no later than when reaching the DA/H or MDA/H;

(vi) ensure that prompt action for a missed approach 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 missed approach procedure manoeuvre is delayed;

(vii) understand the significance of using the CDFA technique to a DA/H with an associated MAPt and the implications of early missed approach manoeuvres; and

(viii) understand the possible loss of the required visual reference due to pitch-change/climb when not using the CDFA technique for aeroplane types or classes that require a late change of configuration and/or speed to ensure the aeroplane is in the appropriate landing configuration.

(5) Additional specific training when not using the CDFA technique with level flight at or above MDA/H

(i) The training should detail:

(A) the need to facilitate CRM with appropriate 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 that 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 the 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 missed approach 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:
   
   (a) inappropriate and close-in acquisition of the required visual reference; or
   
   (b) unstable aeroplane energy and or flight path control; and

(J) the increased risk of controlled flight into terrain (CFIT).

**GM1 AOCR.OP.MPA.115 Approach flight technique - aeroplanes**

**CONTINUOUS DESCENT FINAL APPROACH (CDFA)**

(a) **Introduction**

(1) Controlled flight into terrain (CFIT) is a major hazard in 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.

(2) The elimination of level flight segments at MDA close to the ground during approaches, and the avoidance of major changes in attitude and power/thrust close to the runway that can
destabilise approaches, are seen as ways to reduce operational risks significantly.

(3) The term CDFA has been selected to cover a flight technique for any type of NPA operation.

(4) The advantages of CDFA are as follows:

(i) the technique enhances safe approach operations by the utilisation of standard operating practices;

(ii) the technique is similar to that used when flying an ILS approach, including when executing the missed approach and the associated missed approach procedure manoeuvre;

(iii) the aeroplane attitude may enable better acquisition of visual cues;

(iv) the technique may reduce pilot workload;

(v) the approach profile is fuel-efficient;

(vi) the approach profile affords reduced noise levels;

(vii) the technique affords procedural integration with APV operations; and

(viii) when used and the approach is flown in a stabilised manner, CDFA is the safest approach technique for all NPA operations.

(b) CDFA

(1) Continuous descent final approach is defined in Annex I to this Regulation.

(2) An approach is only suitable for application of a CDFA technique when it is flown along a nominal vertical profile: a nominal vertical profile is not forming part of the approach procedure design, but can be flown as a continuous descent. 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. Approaches with a nominal vertical profile are considered to be:

(i) NDB, NDB/DME;
(ii) VOR, VOR/DME;

(iii) LOC, LOC/DME;

(iv) VDF, SRA; or

(v) GNSS/LNAV.

(3) Stabilised approach (SAp) is defined in Annex I to this Regulation.

(i) The control of the descent path is not the only consideration when using the CDFA technique. Control of the airplane’s configuration and energy is also vital to the safe conduct of an approach.

(ii) The control of the flight path, described above as one of the specifications for conducting an SAp, should not be confused with the path specifications for using the CDFA technique. The predetermined path specification for conducting an SAp are established by the operator and published in the operations manual part B.

(iii) The predetermined approach slope specifications for applying the CDFA technique are established by the following:

(A) the published “nominal” slope information when the approach has a nominal vertical profile; and

(B) the designated final-approach segment minimum of 3 NM, and maximum, when using timing techniques, of 8 NM.

(iv) An SAp will never have any level segment of flight at DA/H or MDA/H as applicable. This enhances safety by mandating a prompt missed approach procedure manoeuvre at DA/H or MDA/H.

(v) An approach using the CDFA technique will always be flown as an SAp, since this is a specification for applying CDFA. However, an SAp does not have to be flown using the CDFA technique, for example a visual approach.
(a) The operator shall ensure that instrument departure and approach procedures established by the State of the aerodrome are used.

(b) Notwithstanding (a), the 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. In any case, the final approach shall be flown visually or in accordance with the established instrument approach procedures.

(c) Notwithstanding (a), the operator may use procedures other than those referred to in (a) provided they have been approved by the State in which the aerodrome is located and are specified in the operations manual.

**AOCR.OP.MPA.130 Noise abatement procedures — aeroplanes**

(a) Except for VFR operations of other-than-complex motor-powered aeroplanes, the operator shall establish appropriate operating departure and arrival/approach procedures for each aeroplane type taking into account the need to minimise the effect of aircraft noise.

(b) The procedures shall:

(1) ensure that safety has priority over noise abatement; and

(2) be simple and safe to operate with no significant increase in crew workload during critical phases of flight.

**AMC1 AOCR.OP.MPA.130 Noise abatement procedures - aeroplanes**

**NADP DESIGN**

(a) For each aeroplane type two departure procedures should be defined, in accordance with ICAO Doc. 8168 (Procedures for Air Navigation Services, “PANS-OPS”), Volume I:

(1) noise abatement departure procedure one (NADP 1), designed to meet the close-in noise abatement objective; and

(2) noise abatement departure procedure two (NADP 2), designed to meet the distant noise abatement objective.

(b) For each type of NADP (1 and 2), a single climb profile should be specified for use at all aerodromes, which is associated with a single sequence of actions. The NADP 1 and NADP 2 profiles may be identical.
GM1 AOCR.OP.MPA.130 Noise abatement procedures - aeroplanes

TERMINOLOGY

(a) “Climb profile” means in this context the vertical path of the NADP as it results from the pilot’s actions (engine power reduction, acceleration, slats/flaps retraction).

(b) “Sequence of actions” means the order in which these pilot’s actions are done and their timing.

GENERAL

(c) The rule addresses only the vertical profile of the departure procedure. Lateral track has to comply with the standard instrument departure (SID).

EXAMPLE

(d) For a given aeroplane type, when establishing the distant NADP, the operator should choose either to reduce power first and then accelerate, or to accelerate first and then wait until slats/flaps are retracted before reducing power. The two methods constitute two different sequences of actions.

(e) For an aeroplane type, each of the two departure climb profiles may be defined by one sequence of actions (one for close-in, one for distant) and two above aerodrome level (AAL) altitudes/heights. These are:

(1) the altitude of the first pilot’s action (generally power reduction with or without acceleration). This altitude should not be less than 800 ft AAL; or

(2) the altitude of the end of the noise abatement procedure. This altitude should usually not be more than 3 000 ft AAL.

These two altitudes may be runway specific when the aeroplane flight management system (FMS) has the relevant function which permits the crew to change thrust reduction and/or acceleration altitude/height. If the aeroplane is not FMS equipped or the FMS is not fitted with the relevant function, two fixed heights should be defined and used for each of the two NADPs.
AOCR.OP.MPA.135 Routes and areas of operation — general

(a) The operator shall ensure that operations are only conducted along routes, or within areas, for which:

(1) ground facilities and services, including meteorological services, adequate for the planned operation are provided;

(2) the performance of the aircraft is adequate to comply with minimum flight altitude requirements;

(3) the equipment of the aircraft meets the minimum requirements for the planned operation; and

(4) appropriate maps and charts are available.

(b) The operator shall ensure that operations are conducted in accordance with any restriction on the routes or the areas of operation specified by the Authority.

(c) (a) (1) shall not apply to operations under VFR by day of other-than-complex motor-powered aircraft on flights that depart from and arrive at the same aerodrome or operating site.

AOCR.OP.MPA.136 Routes and areas of operation — single-engined aeroplanes

The operator shall ensure that operations of single-engined aeroplanes are only conducted along routes, or within areas, where surfaces are available that permit a safe forced landing to be executed.

AOCR.OP.MPA.140 Maximum distance from an adequate aerodrome for two-engined aeroplanes without an ETOPS approval

(a) Unless approved by the Authority in accordance with Part-SPA, the operator shall not operate a two-engined aeroplane over a route that contains a point further from an adequate aerodrome, under standard conditions in still air, than:

(1) for performance class A aeroplanes with either:

(i) a maximum operational passenger seating configuration (MOPSC) of 20 or more; or

(ii) a maximum take-off mass of 45 360 kg or more,
the distance flown in 60 minutes at the one-engine-inoperative (OEI) cruising speed determined in accordance with (b);

(2) for performance class A aeroplanes with:

(i) an MOPSC of 19 or less; and

(ii) a maximum take-off mass less than 45 360 kg, the distance flown in 120 minutes or, subject to approval by the Authority, up to 180 minutes for turbo-jet aeroplanes, at the OEI cruise speed determined in accordance with (b);

(3) for performance class B or C aeroplanes:

(i) the distance flown in 120 minutes at the OEI cruise speed determined in accordance with (b); or

(ii) 300 NM, whichever is less.

(b) The operator shall determine a speed for the calculation of the maximum distance to an adequate aerodrome for each two-engined aeroplane type or variant operated, not exceeding V MO (maximum operating speed) based upon the true airspeed that the aeroplane can maintain with one engine inoperative.

(c) The operator shall include the following data, specific to each type or variant, in the operations manual:

(1) the determined OEI cruising speed; and

(2) the determined maximum distance from an adequate aerodrome.

(d) To obtain the approval referred to in (a) (2); the operator shall provide evidence that:

(1) the aeroplane/engine combination holds an extended range operations with two-engined aeroplanes (ETOPS) type design and reliability approval for the intended operation;

(2) a set of conditions has been implemented to ensure that the aeroplane and its engines are maintained to meet the necessary reliability criteria; and
the flight crew and all other operations personnel involved are trained and suitably qualified to conduct the intended operation.

**AMC1 AOCR.OP.MPA.140(c) Maximum distance from an adequate aerodrome for two-engined aeroplanes without an ETOPS approval**

**OPERATION OF NON-ETOPS COMPLIANT TWIN TURBO-JET AEROPLANES WITH MOPSC OF 19 OR LESS AND MCTOM LESS THAN 45 360 KG BETWEEN 120 AND 180 MINUTES FROM AN ADEQUATE AERODROME**

(a) For operations between 120 and 180 minutes, due account should be taken of the airplane’s design and capabilities as outlined below and the operator’s experience related to such operations. Relevant information should be included in the operations manual and the operator’s maintenance procedures. The term “the airplane’s design” in this AMC does not imply any additional type design approval specifications beyond the applicable original type certificate (TC) specifications.

(b) Systems capability

Aeroplanes should be certified to CS-25 as appropriate or equivalent (e.g. FAR-25). 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 OEI 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:

(1) Propulsion systems: the aeroplane engine should meet the applicable specifications prescribed in CS-25 and CS-E or equivalent (e.g. FAR-25, FAR-E), concerning engine TC, installation and system operation. In addition to the performance standards established 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).

(2) Airframe systems: with respect to electrical power, three or more reliable as defined by CS-25 or equivalent (e.g. FAR-25) and independent electrical power sources should be available, each of which should be capable of providing power for all essential services which should at least include the following:
(i) sufficient instruments for the flight crew providing, as a minimum, attitude, heading, airspeed and altitude information;

(ii) appropriate pitot heating;

(iii) adequate navigation capability;

(iv) adequate radio communication and intercommunication capability;

(v) adequate flight deck and instrument lighting and emergency lighting;

(vi) adequate flight controls;

(vii) adequate engine controls and restart capability with critical type fuel (from the stand-point of flame-out and restart capability) and with the aeroplane initially at the maximum relight altitude;

(viii) adequate engine instrumentation;

(ix) 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;

(x) such warnings, cautions and indications as are required for continued safe flight and landing;

(xi) fire protection (engines and auxiliary power unit (APU));

(xii) adequate ice protection including windshield de-icing; and

(xiii) adequate control of the flight crew compartment and cabin environment including heating and pressurisation.

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.

For single-engine operations, the remaining power electrical, hydraulic, and 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:

(A) to ensure hydraulic power (hydraulic motor generator) reliability, it may be necessary to provide two or more independent energy sources;

(B) the ADG/RAT, if fitted, should not require engine dependent power for deployment; and

(C) the APU should meet the criteria in (b) (3).

(3) APU: the APU, if required for extended range operations, should be certified as an essential APU and should meet the applicable CS-25 and CS-APU provisions or equivalent (e.g. FAR-25).

(4) 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.

(c) Engine events and corrective action

(1) All engine events and operating hours should be reported by the operator to the airframe and engine supplemental type certificate (STC) holders as well as to the Authority.

(2) These events should be evaluated by the operator in consultation with the Authority and with the engine and airframe (S) TC holders. The Authority may consult other parties to ensure that world wide data are evaluated.

(3) Where statistical assessment alone is not applicable, e.g. where the fleet size or accumulated flight hours are small, individual engine events should be reviewed on a case-by-case basis.

(4) The evaluation or statistical assessment, when available, may result in corrective action or the application of operational restrictions.
(5) Engine events could include engine shutdowns, both on ground and in-flight, 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.

(6) Arrangements to ensure that all corrective actions required by the Authority are implemented.

(d) Maintenance

The maintenance programme in accordance with (Part-M) should be based upon reliability programmes including, but not limited to, the following elements:

(1) engine oil consumption programmes: such programmes are intended to support engine condition trend monitoring; and

(2) engine condition monitoring programme: a programme for each engine 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.

(e) Flight crew training

Flight crew training for this type of operation should include, in addition to the requirements of (AOCR.FC), particular emphasis on the following:

(1) 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 indicate fuel remaining. Confirmation that the fuel remaining is sufficient to satisfy the critical fuel reserves.

(2) 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 weather-permissible alternate aerodrome in terms of time.

(3) OEI performance data: drift down procedures and OEI service ceiling data.
(4) Weather reports and flight requirements: meteorological aerodrome reports (METARs) and aerodrome forecast (TAF) reports and obtaining in-flight weather updates on the en-route alternate (ERA), 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 OEI cruising altitude and throughout the approach and landing.

(f) Pre-departure check

A pre-departure check, additional to the pre-flight inspection required by Part-M should be reflected in the operations manual. Flight crew members who are responsible for the pre-departure check of an aeroplane should be fully trained and competent to do it. The training programme required should cover all relevant tasks with particular emphasis on checking required fluid levels.

(g) MEL

The MEL should take into account all items specified by the manufacturer relevant to operations in accordance with this AMC.

(h) Dispatch/flight planning rules

The operator’s dispatch rules should address the following:

(1) 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 the following:

(i) Critical fuel scenario - 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 the fuel requirements in CAT.OP.MPA, as follows:

(A) fly from the critical point to an alternate aerodrome:
(a) at 10000 ft;

(b) at 25000 ft or the single-engine ceiling, whichever is lower, provided that all occupants can be supplied with and use oxygen for the time required to fly from the critical point to an alternate aerodrome; or

(c) at the single-engine ceiling, provided that the aeroplane is type certified to operate above flight level 450;

(B) descend and hold at 1500 ft for 15 minutes in international standard atmosphere (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.

(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 are 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.

(2) Communication facilities: the availability of communications facilities in order to allow reliable two-way voice communications between the aeroplane and the appropriate ATC unit at OEI cruise altitudes.

(3) Aircraft technical log review to ensure proper MEL procedures, deferred items, and required maintenance checks completed.

(4) ERA aerodrome(s): ensuring that ERA aerodromes are available for the intended route, within the distance flown in 180 minutes based upon the OEI cruising speed which is a speed within the certificated limits of the aeroplane, selected by the operator and approved by the Authority, confirming that, based on the available meteorological information, the weather conditions at
ERA aerodromes are at or above the applicable minima for the period of time during which the aerodrome(s) may be used.

**Table 1: Planning minima**

<table>
<thead>
<tr>
<th>Approach facility</th>
<th>Alternate aerodrome ceiling</th>
<th>Weather minima RVR/VIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>DA/H +200 ft</td>
<td>RVR/VIS +800 m</td>
</tr>
<tr>
<td>NPA Circling approach</td>
<td>MDA/H +400 ft</td>
<td>RVR/VIS +1500 m</td>
</tr>
</tbody>
</table>

**GM1 AOCR.OP.MPA.140(c) Maximum distance from an adequate aerodrome for two-engined aeroplanes without an ETOPS approval**

**ONE-ENGINE-INOPERATIVE (OEI) CRUISING SPEED**

The OEI cruising speed is intended to be used solely for establishing the maximum distance from an adequate aerodrome.

**AOCR.OP.MPA.145 Establishment of minimum flight altitudes**

(a) The operator shall establish for all route segments to be flown:

(1) minimum flight altitudes that provide the required terrain clearance, taking into account the requirements of Subpart C; and

(2) a method for the flight crew to determine those altitudes.

(b) The method for establishing minimum flight altitudes shall be approved by the Authority.

(c) Where the minimum flight altitudes established by the operator and a State overflown differ, the higher values shall apply.

**AMC1 AOCR.OP.MPA.145 (a) Establishment of minimum flight altitudes**

**CONSIDERATIONS FOR ESTABLISHING MINIMUM FLIGHT ALTITUDES**
(a) The operator should take into account the following factors when establishing minimum flight altitudes:

(1) the accuracy with which the position of the aircraft can be determined;

(2) the probable inaccuracies in the indications of the altimeters used;

(3) the characteristics of the terrain, such as sudden changes in the elevation, along the routes or in the areas where operations are to be conducted;

(4) the probability of encountering unfavourable meteorological conditions, such as severe turbulence and descending air currents; and

(5) possible inaccuracies in aeronautical charts.

(b) The operator should also consider:

(1) corrections for temperature and pressure variations from standard values;

(2) ATC requirements; and

(3) any foreseeable contingencies along the planned route.

AMC1.1 AOCR.OP.MPA.145 (a) Establishment of minimum flight altitudes

CONSIDERATIONS FOR ESTABLISHING MINIMUM FLIGHT ALTITUDES

This AMC provides another means of complying with the rule for VFR operations of other-than-complex motor-powered aircraft by day, compared to that presented in AMC1 AOCR.OP.MPA.145(a). The safety objective should be satisfied if the operator ensures that operations are only conducted along such routes or within such areas for which a safe terrain clearance can be maintained and take account of such factors as temperature, terrain and unfavourable meteorological conditions.

GM1 AOCR.OP.MPA.145 (a) Establishment of minimum flight altitudes

MINIMUM FLIGHT ALTITUDES
(a) The following are examples of some of the methods available for calculating minimum flight altitudes.

(b) KSS formula:

(1) Minimum obstacle clearance altitude (MOCA)

(i) MOCA is the sum of:

(A) the maximum terrain or obstacle elevation, whichever is higher; plus

(B) 1000 ft for elevation up to and including 6000 ft; or

(C) 2000 ft for elevation exceeding 6000 ft rounded up to the next 100 ft.

(ii) The lowest MOCA to be indicated is 2000 ft.

(iii) 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: Corridor width from a VOR station

(iv) From a non-directional beacon (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).
(v) MOCA does not cover any overlapping of the corridor.

(2) Minimum off-route altitude (MORA). MORA is calculated for an area bounded by each 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 6000 ft (2000 m) – 1000 ft above the highest terrain and obstructions;

(ii) terrain with elevation above 6000 ft (2000 m) – 2000 ft above the highest terrain and obstructions.

(c) Jeppesen formula (see Figure 3)

(1) MORA is a minimum flight altitude computed by Jeppesen from current operational navigation charts (ONCs) or world aeronautical charts (WACs). Two types of MORAs are charted which are:

(i) route MORAs e.g. 9800a; and

(ii) grid MORAs e.g. 98.

(2) Route MORA values are computed on the basis of an area extending 10 NM to either side of route centreline and including a 10 NM radius beyond the radio fix/reporting point or mileage break defining the route segment.

(3) MORA values clear all terrain and man-made obstacles by 1000 ft in areas where the highest terrain elevation or obstacles are up to 5000 ft. A clearance of 2000 ft is provided above all terrain or obstacles that are 5001 ft and above.
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 (c) (3) apply.

**Figure 3: Jeppesen formula**

(d) **ATLAS formula**

(1) Minimum 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 in Table 1 below:

**Table 1: Minimum safe en-route altitude**

<table>
<thead>
<tr>
<th>Segment length</th>
<th>Distance either side of track</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 100 NM</td>
<td>10 NM *</td>
</tr>
<tr>
<td>More than 100 NM</td>
<td>10 % of segment length up to a maximum of 60 NM **</td>
</tr>
</tbody>
</table>

*: This distance may be reduced to 5 NM within terminal control areas (TMAs) where, due to the number and type of available navigational aids, a high degree of navigational accuracy is warranted.
**: In exceptional cases, where this calculation results in an operationally impracticable value, an additional special MEA may be calculated based on a distance of not less than 10 NM either side of track. Such special MEA will be shown together with an indication of the actual width of protected airspace.

(2) The MEA is calculated by adding an increment to the elevation specified above as appropriate, following Table 2 below. The resulting value is adjusted to the nearest 100 ft.

<table>
<thead>
<tr>
<th>Elevation of highest point</th>
<th>Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not above 5000 ft</td>
<td>1500 ft</td>
</tr>
<tr>
<td>Above 5000 ft but not above 10000 ft</td>
<td>2000 ft</td>
</tr>
<tr>
<td>Above 10000 ft</td>
<td>10 % of elevation plus 1000 ft</td>
</tr>
</tbody>
</table>

*: For the last route segment ending over the initial approach fix, a reduction to 1000 ft is permissible within TMAs where, due to the number and type of available navigation aids, a high degree of navigational accuracy is warranted.

(3) Minimum safe grid altitude (MGA). Calculation of the MGA is based on the elevation of the highest point within the respective grid area.

The MGA is calculated by adding an increment to the elevation specified above as appropriate, following Table 3 below. The resulting value is adjusted to the nearest 100 ft.

<table>
<thead>
<tr>
<th>Elevation of highest point</th>
<th>Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not above 5000 ft</td>
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</tr>
<tr>
<td>Above 5000 ft but not above 10000 ft</td>
<td>2000 ft</td>
</tr>
<tr>
<td>Above 100000 ft</td>
<td>10 % of elevation plus 1000 ft</td>
</tr>
</tbody>
</table>

(e) Lido formula

(1) Minimum terrain clearance altitude (MTCA)

The MTCA represents an altitude providing terrain and obstacle clearance for all airways/ATS routes, all standard terminal
arrival route (STAR) segments up to IAF or equivalent end point and for selected standard instrument departures (SIDs).

The MTCA is calculated by Lido and covers terrain and obstacle clearance relevant for air navigation with the following buffers:

(i) Horizontal:

(A) for SID and STAR procedures 5 NM either side of centre line; and

(B) for airways/ATS routes 10 NM either side of centre line.

(ii) Vertical:

(A) 1000 ft up to 6000 ft; and

(B) 2000 ft above 6000 ft.

MTCAs are always shown in feet. The lowest indicated MTCA is 3100 ft.

(2) Minimum grid altitude (MGA)

MGA represents the lowest safe altitude which can be flown off-track. The MGA is calculated by rounding up the elevation of the highest obstruction within the respective grid area to the next 100 ft and adding an increment of

(i) 1000 ft for terrain or obstructions up to 6000 ft; and

(ii) 2000 ft for terrain or obstructions above 6000 ft.

MGA is shown in hundreds of feet. The lowest indicated MGA is 2000 ft. This value is also provided for terrain and obstacles that would result in an MGA below 2000 ft. An exception is over water areas where the MGA can be omitted.

AOCR.OP.MPA.150 Fuel policy

(a) The operator shall 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. The fuel policy and any change to it require prior approval by the Authority.
(b) The operator shall ensure that the planning of flights is based upon at least:

(1) procedures contained in the operations manual and:
   (i) data provided by the aircraft manufacturer; or
   (ii) current aircraft-specific data derived from a fuel consumption monitoring system; and

(2) the operating conditions under which the flight is to be conducted including:
   (i) aircraft fuel consumption data;
   (ii) anticipated masses;
   (iii) expected meteorological conditions; and
   (iv) air navigation services provider(s) procedures and restrictions.

(c) The operator shall ensure that the pre-flight calculation of usable fuel required for a flight includes:

(1) taxi fuel;
(2) trip fuel;
(3) reserve fuel consisting of:
   (i) contingency fuel;
   (ii) alternate fuel, if a destination alternate aerodrome is required;
   (iii) final reserve fuel; and
   (iv) additional fuel, if required by the type of operation; and
(4) extra fuel if required by the commander.

(d) The operator shall ensure that in-flight replanning procedures for calculating usable fuel required when a flight has to proceed along a route or to a destination aerodrome other than originally planned includes:
(1) trip fuel for the remainder of the flight; and

(2) reserve fuel consisting of:
   (i) contingency fuel;
   (ii) alternate fuel, if a destination alternate aerodrome is required;
   (iii) final reserve fuel; and
   (iv) additional fuel, if required by the type of operation; and

(3) extra fuel if required by the commander.

**AMC1 AOCR.OP.MPA.150 (b) Fuel policy**

**PLANNING CRITERIA - AEROPLANES**

The operator should base the defined 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 should be the sum of the following:

(1) Taxi fuel, which should not be less than the amount, expected to be used prior to take-off. Local conditions at the departure aerodrome and auxiliary power unit (APU) consumption should be taken into account.

(2) Trip fuel, which should include:
   (i) fuel for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;
   (ii) fuel from top of climb to top of descent, including any step climb/descent;
   (iii) fuel from top of descent to the point where the approach 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 (b), which should be the higher of:

(i) Either:

(A) 5% of the planned trip fuel or, in the event of in-flight replanning, 5% of the trip fuel for the remainder of the flight;

(B) not less than 3% of the planned trip fuel or, in the event of in-flight replanning, 3% of the trip fuel for the remainder of the flight, provided that an en-route alternate (ERA) aerodrome is available;

(C) an amount of fuel sufficient for 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 that 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;

(ii) or an amount to fly for 5 minutes at holding speed at 1 500 ft (450 m), above the destination aerodrome in standard conditions.

(4) Alternate fuel, which should:

(i) include:

(A) fuel for a missed approach from the applicable DA/H or MDA/H at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure;
(B) fuel for climb from missed approach altitude to cruising level/altitude, taking into account the expected departure routing;

(C) fuel for cruise from top of climb to top of descent, taking into account the expected routing;

(D) fuel for descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

(E) fuel for executing an approach and landing at the destination alternate aerodrome;

(ii) where two destination alternate aerodromes are required, be sufficient to proceed to the alternate aerodrome that requires the greater amount of alternate fuel.

(5) Final reserve fuel, which should be:

(i) for aeroplanes with reciprocating engines, fuel to fly for 45 minutes; or

(ii) for aeroplanes with turbine engines, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) 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.

(6) The minimum additional fuel, which should 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 15 minutes at 1 500 ft (450 m) 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 (a)(2) to (a)(5) is not sufficient for such an event; and
(ii) holding for 15 minutes at 1 500 ft (450 m) above destination aerodrome elevation in standard conditions, when a flight is operated without a destination alternate aerodrome.

(7) Extra fuel, which should be at the discretion of the commander.

(b) Reduced contingency fuel (RCF) procedure

If the operator’s fuel policy includes pre-flight planning to a destination 1 aerodrome (commercial destination) with an RCF 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, should be the greater of (b)(1) or (b)(2):

(1) The sum of:

(i) taxi fuel;

(ii) trip fuel to the destination 1 aerodrome, via the decision point;

(iii) contingency fuel equal to not less than 5% of the estimated fuel consumption from the decision point to the destination 1 aerodrome;

(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 AOCR.OP.MPA.180(b)(2), are fulfilled;

(v) final reserve fuel;

(vi) additional fuel; and

(vii) extra fuel if required by the commander.

(2) The sum of:

(i) taxi fuel;

(ii) trip fuel to the destination 2 aerodrome, via the decision point;

(iii) contingency fuel equal to not less than the amount calculated in accordance with (a)(3) above from departure aerodrome to the destination 2 aerodrome;
(iv) alternate fuel, if a destination 2 alternate aerodrome is required;

(v) final reserve fuel;

(vi) additional fuel; and

(vii) extra fuel if required by the commander.

(c) Predetermined point (PDP) procedure

If the 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, should be the greater of (c)(1) or (c)(2):

(1) The sum of:

(i) taxi fuel;

(ii) trip fuel from the departure aerodrome to the destination aerodrome, via the predetermined point;

(iii) contingency fuel calculated in accordance with (a)(3);

(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 2 hours, whichever is less; or

(B) for aeroplanes with turbine engines, fuel to fly for 2 hours at normal cruise consumption above the destination aerodrome, this should not be less than final reserve fuel; and

(v) extra fuel if required by the commander.

(2) The sum of:

(i) taxi fuel;
(ii) trip fuel from the departure aerodrome to the destination alternate aerodrome, via the predetermined point;

(iii) contingency fuel calculated in accordance with (a) (3);

(iv) additional fuel if required, but not less than:

(A) for aeroplanes with reciprocating engines: fuel to fly for 45 minutes; or

(B) for aeroplanes with turbine engines: fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above the destination alternate aerodrome elevation in standard conditions, this should not be less than final reserve fuel; and

(v) extra fuel if required by the commander.

(d) Isolated aerodrome procedure
If the operator’s fuel policy includes planning to an isolated aerodrome, the last possible point of diversion to any available en-route alternate (ERA) aerodrome should be used as the predetermined point.

**AMC2 AOCR.OP.MPA.150 (b) Fuel policy**

**LOCATION OF THE FUEL EN-ROUTE ALTERNATE (FUEL ERA) AERODROME**

(a) The fuel ERA aerodrome should 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 should be calculated in still air conditions (see Figure 1).

**Figure 1: Location of the fuel ERA aerodrome for the purposes of reducing contingency fuel to 3 %**
GM1 AOCR.OP.MPA.150 (b) Fuel policy

CONTINGENCY FUEL STATISTICAL METHOD - AEROPLANES

(a) As an example, the following values of statistical coverage of the deviation from the planned to the actual trip fuel provide appropriate statistical coverage.
(1) 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 weather-permissible ERA aerodrome is available.

(2) 99 % coverage if the calculated flight time is more than 2 hours and a weather-permissible ERA aerodrome is available.

(3) 90 % coverage if:
   (i) the calculated flight time is more than 2 hours;
   (ii) a weather-permissible ERA aerodrome is available; and
   (iii) at the destination aerodrome two separate runways are available and usable, one of which is equipped with an ILS/MLS, and the weather conditions are in compliance with AOCR.OP.MPA.180(b)(2), or the ILS/MLS is operational to CAT II/III operating minima and the weather conditions are at or above 500 ft.

(b) The fuel consumption database used in conjunction with these values should be based on fuel consumption monitoring for each route/aeroplane combination over a rolling 2 year period.

**GM1 AOCR.OP.MPA.150(c) (3) (i) Fuel policy**

**CONTINGENCY FUEL**

Factors that may influence fuel required on a particular flight in an unpredictable way include 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.

**GM1 AOCR.OP.MPA.150(c) (3) (ii) Fuel policy**

**DESTINATION ALTERNATE AERODROME**

The departure aerodrome may be selected as the destination alternate aerodrome.

**AOCR.OP.MPA.151 Fuel policy — alleviations**

Notwithstanding AOCR.OP.MPA.150 (b) to (d), for operations of performance class B aeroplanes the operator shall ensure that the pre-flight calculation of usable fuel required for a flight includes:
(i) taxi fuel, if significant;

(ii) trip fuel;

(iii) reserve fuel, consisting of:

(A) contingency fuel that is not less than 5% of the planned trip fuel or, in the event of in-flight replanning, 5% of the trip fuel for the remainder of the flight; and

(B) final reserve fuel to fly for an additional period of 45 minutes for reciprocating engines or 30 minutes for turbine engines;

(iv) alternate fuel to reach the destination alternate aerodrome via the destination, if a destination alternate aerodrome is required; and

(v) extra fuel, if specified by the commander.

**AOCR.OP.MPA.155 Carriage of special categories of passengers (SCPs)**

(a) Persons requiring special conditions, assistance and/or devices when carried on a flight shall be considered as SCPs including at least:

(1) persons with reduced mobility (PRMs) who, are understood to be any person whose mobility is reduced due to any physical disability, sensory or locomotory, permanent or temporary, intellectual disability or impairment, any other cause of disability, or age;

(2) infants and unaccompanied children; and

(3) deportees, inadmissible passengers or prisoners in custody.

(b) SCPs shall be carried under conditions that ensure the safety of the aircraft and its occupants according to procedures established by the operator.

(c) SCPs shall not be allocated, nor occupy, seats that permit direct access to emergency exits or where their presence could:

(1) impede crew members in their duties;

(2) obstruct access to emergency equipment; or

(3) impede the emergency evacuation of the aircraft.
(d) The commander shall be notified in advance when SCPs are to be carried on board.

**AMC1 AOCR.OP.MPA.155 (b) Carriage of special categories of passengers (SCPs)**

**PROCEDURES**

When establishing the procedures for the carriage of special categories of passengers, the operator should take into account the following factors:

(a) the aircraft type and cabin configuration;

(b) the total number of passengers carried on board;

(c) the number and categories of SCPs, which should not exceed the number of passengers capable of assisting them in case of an emergency evacuation; and

(d) any other factor(s) or circumstances possibly impacting on the application of emergency procedures by the operating crew members.

**AOCR.OP.MPA.160 Stowage of baggage and cargo**

The operator shall establish procedures to ensure that:

(a) only hand baggage that can be adequately and securely stowed is taken into the passenger compartment; and

(b) all baggage and cargo on board that might cause injury or damage, or obstruct aisles and exits if displaced, is stowed so as to prevent movement.

**AMC1 AOCR.OP.MPA.160 Stowage of baggage and cargo**

**STOWAGE PROCEDURES**

Procedures established by the operator to ensure that hand baggage and cargo are adequately and securely stowed should take account of the following:

(a) each item carried in a cabin should be stowed only in a location that is capable of restraining it;
(b) weight limitations placarded on or adjacent to stowages should not be exceeded;

c) under seat stowages should 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;

d) items should not be stowed in lavatories 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;

e) baggage and cargo placed in lockers should not be of such size that they prevent latched doors from being closed securely;

f) baggage and cargo should not be placed where it can impede access to emergency equipment; and

g) checks should 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.

AMC2 AOGR.OP.WPA.160 Stowage of baggage and cargo

CARRIAGE OF CARGO IN THE PASSENGER COMPARTMENT

The following should be observed before carrying cargo in the passenger compartment:

(a) for aeroplanes:

(1) dangerous goods should not be allowed; and

(2) a mix of passengers and live animals should only be allowed for pets weighing not more than 8 kg and guide dogs;

(b) for aeroplanes and helicopters:

(1) the mass of cargo should not exceed the structural loading limits of the floor or seats;

(2) the number/type of restraint devices and their attachment points should be capable of restraining the cargo in accordance with applicable certification specifications; and
(3) the location of the cargo should be such that, in the event of an emergency evacuation, it will not hinder egress nor impair the crew’s view.

**AOCR.OP.MPA.165 Passenger seating**

The operator shall establish procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they are able to assist and not hinder evacuation of the aircraft.

**AMC1 AOCR.OP.MPA.165 Passenger seating**

**PROCEDURES**

The operator should make provision so that:

(a) those passengers who are allocated seats that permit direct access to emergency exits appear to be reasonably fit, strong and able to assist the rapid evacuation of the aircraft in an emergency after an appropriate briefing by the crew;

(b) in all cases, passengers who, because of their condition, might hinder other passengers during an evacuation or who might impede the crew in carrying out their duties should not be allocated seats that permit direct access to emergency exits. If procedures cannot be reasonably implemented at the time of passenger “check-in”, the operator should establish an alternative procedure which ensures that the correct seat allocations will, in due course, be made.

**AMC2 AOCR.OP.MPA.165 Passenger seating**

**ACCESS TO EMERGENCY EXITS**

The following categories of passengers are among those who should not be allocated to, or directed to, seats that permit direct access to emergency exits:

(a) passengers suffering from obvious physical or mental disability to the extent that they would have difficulty in moving quickly if asked to do so;

(b) passengers who are either substantially blind or substantially deaf to the extent that they might not readily assimilate printed or verbal instructions given;
(c) passengers who because of age or sickness are so frail that they have difficulty in moving quickly;

(d) passengers who are so obese that they 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, inadmissible passengers or persons in custody; and

(g) passengers with animals.

**GM1 AOCR.OP.MPA.165 Passenger seating**

**DIRECT ACCESS**

“Direct access” means a seat from which a passenger can proceed directly to the exit without entering an aisle or passing around an obstruction.

**AOCR.OP.MPA.170 Passenger briefing**

The operator shall ensure that passengers are:

(a) given briefings and demonstrations relating to safety in a form that facilitates the application of the procedures applicable in the event of an emergency; and

(b) provided with a safety briefing card on which picture-type instructions indicate the operation of emergency equipment and exits likely to be used by passengers.

**AMC1 AOCR.OP.MPA.170 Passenger briefing**

**PASSENGER BRIEFING**

Passenger briefings should contain the following:

(a) **Before take-off**

   (1) passengers should be 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 should receive a demonstration of the following:

(i) the use of safety belts or restraint systems, including how to fasten and unfasten the safety belts or restraint systems;
(ii) the location and use of oxygen equipment, if required. Passengers should also be briefed to extinguish all smoking materials when oxygen is being used; and
(iii) the location and use of life-jackets, if required.

(b) After take-off

(1) passengers should be reminded of the following, if applicable:

(i) smoking regulations; and
(ii) use of safety belts or restraint systems including the safety benefits of having safety belts fastened when seated irrespective of seat belt sign illumination.

(c) Before landing

(1) passengers should be reminded of the following, if applicable:

(i) smoking regulations;
(ii) use of safety belts or restraint systems;
(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.

(d) After landing

(1) passengers should be reminded of the following:

(i) smoking regulations; and

(ii) use of safety belts and/or restraint systems.

(e) Emergency during flight

(1) passengers should be instructed as appropriate to the circumstances.

AMC1.1 AOCR.OP.MPA.170 Passenger briefing

PASSENGER BRIEFING

(a) The operator may replace the briefing/demonstration as set out in AMC1 AOCR.OP.MPA.170 with a passenger training programme covering all safety and emergency procedures for a given type of aircraft.

(b) Only passengers who have been trained according to this programme and have flown on the aircraft type within the last 90 days may be carried on board without receiving a briefing/demonstration.

AMC2 CAT.OP.MPA.170 Passenger briefing

SINGLE-PILOT OPERATIONS WITHOUT CABIN CREW

For single-pilot operations without cabin crew, the commander should provide safety briefings to passengers except during critical phases of flight and taxiing.

AOCR.OP.MPA.175 Flight preparation

(a) An operational flight plan shall be completed for each intended flight based on considerations of aircraft performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes/operating sites concerned.

(b) The flight shall not be commenced unless the commander is satisfied that:
(1) all items stipulated in MCAR Airworthiness concerning the airworthiness and registration of the aircraft, instrument and equipment, mass and centre of gravity (CG) location, baggage and cargo and aircraft operating limitations can be complied with;

(2) the aircraft is not operated contrary to the provisions of the configuration deviation list (CDL);

(3) the parts of the operations manual that are required for the conduct of the flight are available;

(4) the documents, additional information and forms required to be available by AOCR.GEN.MPA.180 are on board;

(5) current maps, charts and associated documentation or equivalent data are available to cover the intended operation of the aircraft including any diversion that may reasonably be expected;

(6) ground facilities and services required for the planned flight are available and adequate;

(7) the provisions specified in the operations manual in respect of fuel, oil, oxygen, minimum safe altitudes, aerodrome operating minima and availability of alternate aerodromes, where required, can be complied with for the planned flight; and

(8) any additional operational limitation can be complied with.

(c) Notwithstanding (a), an operational flight plan is not required for operations under VFR of:

(1) other-than-complex motor-powered aeroplane taking off and landing at the same aerodrome or operating site; or

(2) helicopters with an MCTOM of 3 175 kg or less, by day and over routes navigated by reference to visual landmarks in a local area as specified in the operations manual.

AMC1 AOCR.OP.MPA.175 (a) Flight preparation

OPERATIONAL FLIGHT PLAN – COMPLEX MOTOR-POWERED AIRCRAFT

(a) The operational flight plan used and the entries made during flight should contain the following items:
(1) aircraft registration;
(2) aircraft 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 checkpoints/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 (a) (12) to (15);
(19) initial ATS flight plan clearance and subsequent reclearance;
(20) in-flight replanning calculations; and
(21) relevant meteorological information.
(b) Items that 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) The operational flight plan and its use should be described in the operations manual.

(d) All entries on the operational flight plan should be made concurrently and be permanent in nature.

OPERATIONAL FLIGHT PLAN - OTHER-TAN-COMPLEX MOTOR-POWERED AIRCRAFT OPERATIONS AND LOCAL OPERATIONS

An operational flight plan may be established in a simplified form relevant to the kind of operation for operations with other-than-complex motor-powered aircraft as well as local operations with any aircraft.

GM1 AOCR.OP.MPA.175 (b) (5) Flight preparation

CONVERSION TABLES

The documentation should include any conversion tables necessary to support operations where metric heights, altitudes and flight levels are used.

AOCR.OP.MPA.180 Selection of aerodromes — aeroplanes

(a) Where it is not possible to use the departure aerodrome as a take-off alternate aerodrome due to meteorological or performance reasons, the operator shall select another adequate take-off alternate aerodrome that is no further from the departure aerodrome than:

(1) for two-engined aeroplanes:

(i) one hour flying time at an OEI cruising speed according to the AFM in still air standard conditions based on the actual take-off mass; or

(ii) the ETOPS diversion time approved in accordance with Part-SPA, subject to any MEL restriction, up to a maximum of two hours, at the OEI cruising speed according to the AFM in still air standard conditions based on the actual take-off mass;

(2) for three and four-engined aeroplanes, two hours flying time at the OEI cruising speed according to the AFM in still air standard conditions based on the actual take-off mass.
If the AFM does not contain an OEI cruising speed, the speed to be used for calculation shall be that which is achieved with the remaining engine(s) set at maximum continuous power.

(b) The operator shall select at least one destination alternate aerodrome for each instrument flight rules (IFR) flight unless the destination aerodrome is an isolated aerodrome or:

1. the duration of the planned flight from take-off to landing or, in the event of in-flight replanning in accordance with AOCR.OP.MPA.150(d), the remaining flying time to destination does not exceed six hours; and

2. two separate runways are available and usable at the destination aerodrome and the appropriate weather reports and/or forecasts for the destination aerodrome indicate that, for the period from one hour before until one hour after the expected time of arrival at the destination aerodrome, the ceiling will be at least 2,000 ft or circling height + 500 ft, whichever is greater, and the ground visibility will be at least 5 km.

(c) The operator shall select two destination alternate aerodromes when:

1. the appropriate weather reports and/or forecasts for the destination aerodrome indicate that during a period commencing one hour before and ending one hour after the estimated time of arrival, the weather conditions will be below the applicable planning minima; or

2. no meteorological information is available.

(d) The operator shall specify any required alternate aerodrome(s) in the operational flight plan.

**AOCR.OP.MPA.185 Planning minima for IFR flights — aeroplanes**

(a) *Planning minima for a take-off alternate aerodrome*

The operator shall only select an aerodrome as a take-off alternate aerodrome when the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one 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 AOCR.OP.MPA.110. The ceiling shall be taken into account when the only approach operations available are non-precision approaches (NPA) and/or circling
operations. Any limitation related to OEI operations shall be taken into account.

(b) **Planning minima for a destination aerodrome other than an isolated destination aerodrome**

The operator shall only select the destination aerodrome when:

1. the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one 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 (VIS) specified in accordance with CAT.OP.MPA.110; and
   
   ii. for an NPA or a circling operation, the ceiling at or above MDH; or

2. two destination alternate aerodromes are selected.

(c) **Planning minima for a destination alternate aerodrome, isolated aerodrome, fuel en-route alternate (fuel ERA) aerodrome, en-route alternate (ERA) aerodrome**

The operator shall only select an aerodrome for one of these purposes when the appropriate weather reports and/or forecasts indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the weather conditions will be at or above the planning minima in Table 1.

### Table 1

**Planning minima**

| Destination alternate aerodrome, isolated destination aerodrome, fuel ERA and ERA aerodrome |
|---|---|
| **Type of approach** | **Planning Minima** |
| CAT II and III | CAT I RVR |
| CAT I | NPA RVR/VIS  
Ceiling shall be at or above MDH |
<table>
<thead>
<tr>
<th>NPA</th>
<th>NPA RVR/VIS + 1 000 m Ceiling shall be at or above MDH + 200 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circling</td>
<td>Circling</td>
</tr>
</tbody>
</table>

**GM1 AOCR.OP.MPA.185 Planning minima for IFR flights - aeroplanes**

**PLANNING MINIMA FOR ALTERNATE AERODROMES**

Non-precision minima (NPA) in Table 1 of AOCR.OP.MPA.185 mean the next highest minima that apply 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). Unsuitable serviceability should, however, be fully taken into account.

As Table 1 does not include planning minima requirements for APV, LTS CAT I and OTS CAT II operations, the operator may use the following minima:

(a) for APV operations – NPA or CAT I minima, depending on the DH/MDH;

(b) for LTS CAT I operations – CAT I minima; and

(c) for OTS CAT II operations – CAT II minima.

**GM2 AOCR.OP.MPA.185 Planning minima for IFR flights – aeroplanes**

**AERODROME WEATHER FORECASTS**
AOCR.OP.MPA.190 Submission of the ATS flight plan

(a) If an ATS flight plan is not submitted because it is not required by the rules of the air, adequate information shall be deposited in order to permit alerting services to be activated if required.

(b) When operating from a site where it is impossible to submit an ATS flight plan, the ATS flight plan shall be transmitted as soon as possible after take-off by the commander or the operator.

AMC1 AOCR.OP.MPA.190 Submission of the ATS flight plan

FLIGHTS WITHOUT ATS FLIGHT PLAN

(a) 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, the operator should establish procedures, instructions and a list of nominated persons to be responsible for alerting search and rescue services.

(b) To ensure that each flight is located at all times, these instructions should:
(1) provide the nominated person with at least the information required to be included in a VFR flight plan, and the location, date and estimated time for re-establishing communications;

(2) if an aircraft is overdue or missing, provide for notification to the appropriate ATS or search and rescue facility; and

(3) provide that the information will be retained at a designated place until the completion of the flight.

AOCR.OP.MPA.195 Refuelling/defueling with passengers embarking, on board or disembarking

(a) An aircraft shall not be refueled/defueled with Avgas (aviation gasoline) or wide-cut type fuel or a mixture of these types of fuel, when passengers are embarking, on board or disembarking.

(b) For all other types of fuel, necessary precautions shall be taken and the aircraft shall be properly manned by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available.

AMC1 AOCR.OP.MPA.195 Refuelling/defueling with passengers embarking, on board or disembarking

OPERATIONAL PROCEDURES - GENERAL

(a) When refueling/defueling with passengers on board, ground servicing activities and work inside the aircraft, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and allow emergency evacuation to take place through those aisles and exits intended for emergency evacuation.

(b) The deployment of integral aircraft stairs or the opening of emergency exits as a prerequisite to refueling is not necessarily required.

OPERATIONAL PROCEDURES - AEROPLANES

(c) Operational procedures should specify that at least the following precautions are taken:

(1) one qualified person should remain at a specified location during fueling operations with passengers on board. This qualified person should be capable of handling emergency procedures concerning fire protection and fire-fighting, handling communications and initiating and directing an evacuation;
(2) two-way communication should be established and should remain available by the airplane’s inter-communication system or other suitable means between the ground crew supervising the refueling and the qualified personnel on board the aeroplane; the involved personnel should remain within easy reach of the system of communication;

(3) crew, personnel and passengers should be warned that re/defueling will take place;

(4) “Fasten Seat Belts” signs should be off;

(5) “NO SMOKING” signs should be on, together with interior lighting to enable emergency exits to be identified;

(6) passengers should be instructed to unfasten their seat belts and refrain from smoking;

(7) the minimum required number of cabin crew should 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/defueling, fueling should be stopped immediately;

(9) the ground area beneath the exits intended for emergency evacuation and slide deployment areas should be kept clear at doors where stairs are not in position for use in the event of evacuation; and

(10) provision is made for a safe and rapid evacuation.

**AOCR.OP.MPA.200 Refuelling/defueling with wide-cut fuel**

Refuelling/defueling with wide-cut fuel shall only be conducted if the operator has established appropriate procedures taking into account the high risk of using wide-cut fuel types.

**GM1 AOCR.OP.MPA.200 Refuelling/defueling with wide-cut fuel**

**PROCEDURES**

(a) “Wide cut fuel” (designated JET B, JP-4 or AVTAG) is an aviation turbine fuel that falls between gasoline and kerosene in the distillation range and consequently, compared to kerosene (JET A or JET A1), it
has the properties of higher volatility (vapour pressure), lower flash point and lower freezing point.

(b) Wherever possible, the operator should avoid the use of wide-cut fuel types. If a situation arises such that only wide-cut fuels are available for refueling/defueling, 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 fueling precautions set out below are considered adequate.

(c) Wide-cut fuel is considered to be “involved” when it is being supplied or when it is already present in aircraft fuel tanks.

(d) When wide-cut fuel has been used, this should be recorded in the technical log. The next two uplifts of fuel should be treated as though they too involved the use of wide-cut fuel.

(e) When refueling/defueling with turbine fuels not containing a static dissipator, and where wide-cut fuels are involved, a substantial reduction on fueling flow rate is advisable. Reduced flow rate, as recommended by fuel suppliers and/or aeroplane manufacturers, has the following benefits:

(1) it allows more time for any static charge build-up in the fueling equipment to dissipate before the fuel enters the tank;

(2) it reduces any charge which may build up due to splashing; and

(3) until the fuel inlet point is immersed, it reduces misting in the tank and consequently the extension of the flammable range of the fuel.

(f) The flow rate reduction necessary is dependent upon the fueling equipment in use and the type of filtration employed on the aeroplane fueling distribution system. It is difficult, therefore, to quote precise flow rates. Reduction in flow rate is advisable whether pressure fueling or over-wing fueling is employed.

(g) With over-wing fueling, 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.

AOCA.OP.MPA.205 Push back and towing — aeroplanes

Push back and towing procedures specified by the operator shall be conducted in accordance with established aviation standards and procedures.

AMC1 AOCA.OP.MPA.205 Push back and towing - aeroplanes

BARLESS TOWING

(a) Barless towing should be based on the applicable SAE ARP (Aerospace Recommended Practices), i.e. 4852B/4853B/5283/5284/5285 (as amended).

(b) Pre- or post-taxi positioning of the aeroplanes should only be executed by barless towing if one of the following conditions are met:

(1) an aeroplane is protected by its own design from damage to the nose wheel steering system;

(2) a system/procedure is provided to alert the flight crew that damage referred to in (b) (1) may have or has occurred;

(3) the towing vehicle is designed to prevent damage to the aeroplane type; or

(4) the aeroplane manufacturer has published procedures and these are included in the operations manual.

AOCA.OP.MPA.210 Crew members at stations

(a) Flight crew members

(1) During take-off and landing each flight crew member required to be on duty in the flight crew compartment shall be at the assigned station.

(2) During all other phases of flight each flight crew member required to be on duty in the flight crew compartment shall remain at the assigned station, unless absence is necessary for the performance of duties in connection with the operation or for physiological needs, provided at least one suitably qualified pilot remains at the controls of the aircraft at all times.
(3) During all phases of flight each flight crew member required to be on duty in the flight crew compartment 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, may be used if workload permits. Controlled rest taken in this way shall not be considered to be part of a rest period for purposes of calculating flight time limitations nor used to justify any extension of the duty period.

(b) Cabin crew members

During critical phases of flight, each cabin crew member shall be seated at the assigned station and shall not perform any activities other than those required for the safe operation of the aircraft.

**AMC1 AOCR.OP.MPA.210 (b) Crew members at stations**

**CABIN CREW SEATING POSITIONS**

(a) When determining cabin crew seating positions, the operator should ensure that they are:

1. close to a floor level door/exit;
2. provided with a good view of the area(s) of the passenger cabin for which the cabin crew member is responsible; and
3. evenly distributed throughout the cabin, in the above order of priority.

(b) Item (a) should not be taken as implying that, in the event of there being more cabin crew stations than required cabin crew, the number of cabin crew members should be increased.

**GM1 AOCR.OP.MPA.210 Crew members at stations**

**MITIGATING MEASURES – CONTROLLED REST**

(a) This GM addresses controlled rest taken by the minimum certified flight crew. It is not related to planned in-flight rest by members of an augmented crew.

(b) Although flight 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 in the flight crew compartment, organised by the commander may be used, if workload permits and a controlled rest procedure is described in the operations manual. “Controlled rest” means a period of time “off task” that may include actual sleep. The use of controlled rest has been shown to significantly increase the levels of alertness during the later phases of flight, particularly after the top of descent, and is considered to be good use of crew resource management (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.

(c) Controlled rest taken in this way should not be considered to be part of a rest period for the purposes of calculating flight time limitations, nor used to justify any duty period. Controlled rest may be used to manage both sudden unexpected fatigue and fatigue that is expected to become more severe during higher workload periods later in the flight. Controlled rest is not related to fatigue management, which is planned before flight.

(d) 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.

(e) When applying controlled rest procedures, the commander should ensure that:

(1) the other flight crew member(s) is/are adequately briefed to carry out the duties of the resting flight crew member;

(2) one flight crew member is fully able to exercise control of the aircraft at all times; and

(3) any system intervention that would normally require a cross-check according to multi-crew principles is avoided until the resting flight crew member resumes his/her duties.

(f) Controlled rest procedures should satisfy all of the following criteria:

(1) Only one flight crew member at a time should take rest at his/her station; the restraint device should be used and the seat positioned to minimise unintentional interference with the controls.
(2) The rest period should be no longer than 45 minutes (in order to limit any actual sleep to approximately 30 minutes) to limit deep sleep and associated long recovery time (sleep inertia).

(3) After this 45-minute period, there should be a recovery period of 20 minutes to overcome sleepiness of the flight crew member. At the end of this recovery period an appropriate briefing should be given.

(4) In the case of two-crew operations, means should be established to ensure that the non-resting flight crew member remains alert. This may include:

   (i) appropriate alarm systems;
   
   (ii) on-board systems to monitor flight crew activity; and
   
   (iii) frequent cabin crew checks. In this case, the commander should inform the senior cabin crew member 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 non-resting flight crew member and the cabin crew by communication means, and the cabin crew should check that the resting flight crew member is awake at the end of the period.

(5) There should be a minimum of 20 minutes between two subsequent controlled rest periods in order to overcome the effects of sleep inertia and allow for adequate briefing.

(6) If necessary, a flight crew member may take more than one rest period, if time permits, on longer sectors, subject to the restrictions above.

(7) Controlled rest periods should terminate at least 30 minutes before the top of descent.

AOCR.OP.MPA.215 Use of headset — aeroplanes

(a) Each flight crew member required to be on duty in the flight crew compartment shall wear a headset with boom microphone or equivalent. The headset shall be used as the primary device for voice communications with ATS:

   (1) when on the ground:

   (i) when receiving the ATC departure clearance via voice communication; and
(ii) when engines are running;

(2) when in flight:

(i) below transition altitude; or

(ii) 10000 ft, whichever is higher; and

(3) whenever deemed necessary by the commander.

(b) In the conditions of (a), the boom microphone or equivalent shall be in a position that permits its use for two-way radio communications.

**AOCR.OP.MPA.220 Assisting means for emergency evacuation**

The operator shall establish procedures to ensure that before taxiing, take-off and landing and when safe and practicable to do so, all means of assistance for emergency evacuation that deploy automatically are armed.

**AOCR.OP.MPA.225 Seats, safety belts and restraint systems**

(a) *Crew members*

(1) During take-off and landing, and whenever decided by the commander in the interest of safety, each crew member shall be properly secured by all safety belts and restraint systems provided.

(2) During other phases of the flight, each flight crew member in the flight crew compartment shall keep the assigned station safety belt fastened while at his/her station.

(b) *Passengers*

(1) Before take-off and landing, and during taxiing, and whenever deemed necessary in the interest of safety, the commander shall be satisfied that each passenger on board occupies a seat or berth with his/her safety belt or restraint system properly secured.

(2) The operator shall make provisions for multiple occupancy of aircraft seats that is only allowed on specified seats. The commander shall be satisfied that multiple occupancy does not occur other than by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device.
AOCR.OP.MPA.230 Securing of passenger compartment and galley(s)

(a) The operator shall establish procedures to ensure that before taxiing, take-off and landing all exits and escape paths are unobstructed.

(b) The commander shall ensure that before take-off and landing, and whenever deemed necessary in the interest of safety, all equipment and baggage are properly secured.

AOCR.OP.MPA.240 Smoking on board

The commander shall not allow smoking on board:

(a) whenever considered necessary in the interest of safety;

(b) during refueling and defueling of the aircraft;

(c) while the aircraft is on the surface unless the operator has determined procedures to mitigate the risks during ground operations;

(d) outside designated smoking areas, in the aisle(s) and lavatory (ies);

(e) in cargo compartments and/or other areas where cargo is carried that is not stored in flame-resistant containers or covered by flame-resistant canvas; and

(f) in those areas of the passenger compartment where oxygen is being supplied.

AOCR.OP.MPA.245 Meteorological conditions — all aircraft

(a) On IFR flights the commander shall only:

(1) commence take-off; or

(2) continue beyond the point, from which a revised ATS flight plan applies in the event of in-flight replanning,

when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) are at or above the planning minima.

(b) On IFR flights, the commander shall only continue towards the planned destination aerodrome 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 VFR flights, the commander shall only commence take-off when the appropriate weather reports and/or forecasts indicate that the meteorological conditions along the part of the route to be flown under VFR will, at the appropriate time, be at or above the VFR limits.

**AOCR.OP.MPA.246 Meteorological conditions — aeroplanes**

In addition to AOCR.OP.MPA.245, on IFR flights with aeroplanes, the commander shall only continue beyond:

(a) the decision point when using the reduced contingency fuel (RCF) procedure; or

(b) the pre-determined point when using the pre-determined point (PDP) procedure,

when information is available indicating that the expected weather conditions, at the time of arrival, at the destination and/or required alternate aerodrome(s) are at or above the applicable aerodrome operating minima.

**AOCR.OP.MPA.250 Ice and other contaminants — ground procedures**

(a) The operator shall establish procedures to be followed when ground de-icing and anti-icing and related inspections of the aircraft are necessary to allow the safe operation of the aircraft.

(b) The commander shall only commence take-off if the aircraft is clear of any deposit that might adversely affect the performance or controllability of the aircraft, except as permitted under (a) and in accordance with the AFM.

**GM1 AOCR.OP.MPA.250 Ice and other contaminants – ground procedures**

**TERMINOLOGY**

Terms used in the context of de-icing/anti-icing have the meaning defined in the following subparagraphs.

(a) “Anti-icing fluid” includes, but is not limited to, the following:

(1) Type I fluid if heated to min 60 °C at the nozzle;
(2) mixture of water and Type I fluid if heated to min 60 °C at the nozzle;

(3) Type II fluid;

(4) mixture of water and Type II fluid;

(5) Type III fluid;

(6) mixture of water and Type III fluid;

(7) Type IV fluid;

(8) mixture of water and Type IV fluid.

On uncontaminated aircraft surfaces Type II, III and IV anti-icing fluids are normally applied unheated.

(b) “Clear ice”: a coating of ice, generally clear and smooth, but with some air pockets. It forms on exposed objects, the temperatures of which are at, below or slightly above the freezing temperature, by the freezing of super-cooled drizzle, droplets or raindrops.

(c) Conditions conducive to aircraft icing on the ground (e.g. freezing fog, freezing precipitation, frost, rain or high humidity (on cold soaked wings), snow or mixed rain and snow).

(d) “Contamination”, in this context, is understood as being all forms of frozen or semi-frozen moisture, such as frost, snow, slush or ice.

(e) “Contamination check”: a check of aircraft for contamination to establish the need for de-icing.

(f) “De-icing fluid”: such fluid includes, but is not limited to, the following:

(1) heated water;

(2) Type I fluid;

(3) mixture of water and Type I fluid;

(4) Type II fluid;

(5) mixture of water and Type II fluid;
(6) Type III fluid;

(7) mixture of water and Type III fluid;

(8) Type IV fluid;

(9) mixture of water and Type IV fluid.

De-icing fluid is normally applied heated to ensure maximum efficiency.

(g) “De-icing/anti-icing”: this is the combination of de-icing and anti-icing performed in either one or two steps.

(h) “Ground ice detection system (GIDS)”: system used during aircraft ground operations to inform the personnel involved in the operation and/or the flight crew about the presence of frost, ice, snow or slush on the aircraft surfaces.

(i) “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:

1. 10°C for a Type I de-icing/anti-icing fluid; or
2. 7°C for Type II, III or IV de-icing/anti-icing fluids.

(j) “Post-treatment check”: an external check of the aircraft after de-icing and/or anti-icing treatment accomplished from suitably elevated observation points (e.g. from the de-icing/anti-icing equipment itself or other elevated equipment) to ensure that the aircraft is free from any frost, ice, snow, or slush.

(k) “Pre take-off check”: an assessment normally performed by the flight crew, to validate the applied HoT.

(l) “Pre take-off contamination check”: a check of the treated surfaces for contamination, performed when the HoT 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 commencement of the take-off run.

ANTI-ICING CODES

(m) The following are examples of anti-icing codes:
(1) “Type I” at (start time) – to be used if anti-icing treatment has been performed with a Type I fluid;

(2) “Type II/100” at (start time) – to be used if anti-icing treatment has been performed with undiluted Type II fluid;

(3) “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;

(4) “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.

(n) When a two-step de-icing/anti-icing operation has been carried out, the anti-icing code should be determined by the second step fluid. Fluid brand names may be included, if desired.

GM2 AOCR.OP.MPA.250 Ice and other contaminants – ground procedures

DE-ICING/ANTI-ICING - PROCEDURES

(a) De-icing and/or anti-icing procedures should take into account manufacturer’s recommendations, including those that are type-specific and cover:

(1) contamination checks, including detection of clear ice and under-wing frost; limits on the thickness/area of contamination published in the AFM or other manufacturers” documentation should be followed;

(2) procedures to be followed if de-icing and/or anti-icing procedures are interrupted or unsuccessful;

(3) post-treatment checks;

(4) pre-take-off checks;

(5) pre-take-off contamination checks;

(6) the recording of any incidents relating to de-icing and/or anti-icing; and

(7) the responsibilities of all personnel involved in de-icing and/or anti-icing.
(b) Operator’s procedures should ensure the following:

(1) When aircraft 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 aircraft type-specific provisions.

(2) Account is taken of the wing skin temperature versus outside air temperature (OAT), as this may affect:

(i) the need to carry out aircraft de-icing and/or anti-icing; and/or

(ii) the performance of the de-icing/anti-icing fluids.

(3) When freezing precipitation occurs or there is a risk of freezing precipitation occurring that would contaminate the surfaces at the time of take-off, aircraft 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 hold-over time (HoT). One-step de-icing/anti-icing means that de-icing and anti-icing are carried out at the same time, using a mixture of de-icing/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 aircraft is first de-iced using heated water only or a heated mixture of de-icing/anti-icing fluid and water. After completion of the de-icing operation a layer of a mixture of de-icing/anti-icing fluid and water, or of de-icing/anti-icing fluid only, is sprayed over the aircraft surfaces. The second step will be applied before the first step fluid freezes, typically within three minutes and, if necessary, area by area.

(4) When an aircraft is anti-iced and a longer HoT is needed/desired, the use of a less diluted Type II or Type IV fluid should be considered.

(5) All restrictions relative to OAT and fluid application (including, but not necessarily limited to, temperature and pressure) published by the fluid manufacturer and/or aircraft manufacturer, are followed and procedures, limitations and recommendations to prevent the formation of fluid residues are followed.
(6) During conditions conducive to aircraft icing on the ground or after de-icing and/or anti-icing, an aircraft 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 aircraft and be performed from points offering sufficient accessibility to these parts. To ensure that there is no clear ice on suspect areas, it may be necessary to make a physical check (e.g. tactile).

(7) The required entry is made in the technical log.

(8) The commander continually monitors the environmental situation after the performed treatment. Prior to take-off he/she performs a pre-take-off check, which is an assessment of whether the applied HoT is still appropriate. This pre-take-off check includes, but is not limited to, factors such as precipitation, wind and OAT.

(9) If any doubt exists as to whether a deposit may adversely affect the aircraft’s performance and/or controllability characteristics, the commander should arrange for a pre take-off contamination check to be performed in order to verify that the aircraft’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 before take-off, re-treatment should be applied.

(10) When retreatment is necessary, any residue of the previous treatment should be removed and a completely new de-icing/anti-icing treatment should be applied.

(11) When a ground ice detection system (GIDS) is used to perform an aircraft surfaces check prior to and/or after a treatment, the use of GIDS by suitably trained personnel should be part of the procedure.

(c) Special operational considerations

(1) When using thickened de-icing/anti-icing fluids, the operator should consider a two-step de-icing/anti-icing procedure, the first step preferably with hot water and/or un-thickened fluids.

(2) The use of de-icing/anti-icing fluids should be in accordance with the aircraft manufacturer’s documentation. This is particularly
important for thickened fluids to assure sufficient flow-off during take-off.

(3) The operator should comply with any type-specific operational provision(s), such as an aircraft mass decrease and/or a take-off speed increase associated with a fluid application.

(4) The operator should take into account any flight handling procedures (stick force, rotation speed and rate, take-off speed, aircraft attitude etc.) laid down by the aircraft manufacturer when associated with a fluid application.

(5) The limitations or handling procedures resulting from (c) (3) and/or (c) (4) above should be part of the flight crew pre take-off briefing.

(d) Communications

(1) Before aircraft treatment. When the aircraft is to be treated with the flight crew on board, the flight and personnel involved in the operation should confirm the fluid to be used, the extent of treatment required and any aircraft type-specific procedure(s) to be used. Any other information needed to apply the HoT tables should be exchanged.

(2) Anti-icing code. The operator’s procedures should include an anti-icing code, which indicates the treatment the aircraft has received. This code provides the flight crew with the minimum details necessary to estimate a HoT and confirms that the aircraft is free of contamination.

(3) After treatment. Before reconfiguring or moving the aircraft, the flight crew should receive a confirmation from the personnel involved in the operation that all de-icing and/or anti-icing operations are complete and that all personnel and equipment are clear of the aircraft.

(e) Hold-over protection

The operator should publish in the operations manual, when required, the HoTs in the form of a table or a 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 the pre take-off check.

(f) Training
The operator’s initial and recurrent de-icing and/or anti-icing training programmes (including communication training) for flight crew and those of its personnel involved in the operation who are involved in de-icing and/or anti-icing should include additional training if any of the following is introduced:

(1) a new method, procedure and/or technique;

(2) a new type of fluid and/or equipment; or

(3) a new type of aircraft.

(g) Contracting

When the operator contracts training on de-icing/anti-icing, the operator should ensure that the contractor complies with the operator’s training/qualification procedures, together with any specific procedures in respect of:

(1) de-icing and/or anti-icing methods and procedures;

(2) fluids to be used, including precautions for storage and preparation for use;

(3) specific aircraft provisions (e.g. no-spray areas, propeller/engine de-icing, APU operation etc.); and

(4) checking and communications procedures.

(h) Special maintenance considerations

(1) General

The operator should take proper account of the possible side-effects of fluid use. Such effects may include, but are not necessarily limited to, dried and/or re-hydrated residues, corrosion and the removal of lubricants.

(2) Special considerations regarding 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 the operator’s own experience:
(i) Dried fluid residues

Dried fluid residues could occur when surfaces have been treated and the aircraft has not subsequently been flown and has 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/build-up 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, such as around flight control hinges, pulleys, grommets, on cables and in gaps.

(iii) Operators are strongly recommended to obtain information about the fluid dry-out and re-hydration 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.

**GM3 AOCR.OP.MPA.250 Ice and other contaminants – ground procedures**

**DE-ICING/ANTI-ICING BACKGROUND INFORMATION**

(a) General

(1) Any deposit of frost, ice, snow or slush on the external surfaces of an aircraft 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/auxiliary power unit (APU)/systems performance may deteriorate due to the presence of frozen contaminants on blades, intakes and components. Also, engine operation may be seriously affected by the ingestion of snow or ice, thereby causing engine stall or compressor damage. In addition, ice/frost may form on certain external surfaces (e.g. wing upper and lower surfaces, etc.) due to the effects of cold fuel/structures, even in ambient temperatures well above 0 °C.

(2) Procedures established by the operator for de-icing and/or anti-icing are intended to ensure that the aircraft 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 HoT.

(3) Under certain meteorological conditions, de-icing and/or anti-icing procedures may be ineffective in providing sufficient protection for continued operations. Examples of these conditions are freezing rain, ice pellets and hail, heavy snow, high wind velocity, fast dropping OAT or any time when freezing precipitation with high water content is present. No HoT guidelines exist for these conditions.

(4) Material for establishing operational procedures can be found, for example, in:

(i) ICAO Annex 3, Meteorological Service for International Air Navigation;

(ii) ICAO Manual of Aircraft Ground De-icing/Anti-icing Operations;

(iii) ISO 11075 Aircraft - De-icing/anti-icing fluids - ISO type I;

(iv) ISO 11076 Aircraft - De-icing/anti-icing methods with fluids;
(v) ISO 11077 Aerospace - Self-propelled de-icing/anti-icing vehicles - Functional requirements;

(vi) ISO 11078 Aircraft - De-icing/anti-icing fluids -- ISO types II, III and IV;

(vii) AEA “Recommendations for de-icing/anti-icing of aircraft on the ground”;

(viii) AEA “Training recommendations and background information for de-icing/anti-icing of aircraft on the ground”;  

(ix) EUROCAE ED-104A Minimum Operational Performance Specification for Ground Ice Detection Systems;

(x) SAE AS5681 Minimum Operational Performance Specification for Remote On-Ground Ice Detection Systems;

(xi) SAE ARP4737 Aircraft - De-icing/anti-icing methods;

(xii) SAE AMS1424 De-icing/anti-Icing Fluid, Aircraft, SAE Type I;

(xiii) SAE AMS1428 Fluid, Aircraft De-icing/anti-Icing, Non-Newtonian, (Pseudoplastic), SAE Types II, III, and IV;

(xiv) SAE ARP1971 Aircraft De-icing Vehicle - Self-Propelled, Large and Small Capacity;

(xv) SAE ARP5149 Training Programme Guidelines for De-icing/anti-icing of Aircraft on Ground; and

(xvi) SAE ARP5646 Quality Program Guidelines for De-icing/anti-icing of Aircraft on the Ground.

(b) Fluids

(1) Type I fluid: Due to its properties, Type I fluid forms a thin, liquid-wetting film on surfaces to which it is applied which, under certain weather conditions, gives a very limited HoT. With this type of fluid, increasing the concentration of fluid in the fluid/water mix does not provide any extension in HoT.

(2) Type II and Type IV fluids contain thickeners which enable the fluid to form a thicker liquid-wetting film on surfaces to which it is
applied. Generally, this fluid provides a longer HoT than Type I fluids in similar conditions. With this type of fluid, the HoT can be extended by increasing the ratio of fluid in the fluid/water mix.

(3) Type III fluid is a thickened fluid especially intended for use on aircraft with low rotation speeds.

(4) Fluids used for de-icing and/or anti-icing should be acceptable to the operator and the aircraft manufacturer. These fluids normally conform to specifications such as SAE AMS1424, SAE AMS1428 or equivalent. Use of non-conforming fluids is not recommended due to their characteristics being unknown. The anti-icing and aerodynamic properties of thickened fluids may be seriously degraded by, for example, inappropriate storage, treatment, application, application equipment and age.

c) Hold-over protection

(1) Hold-over protection is achieved by a layer of anti-icing fluid remaining on and protecting aircraft surfaces for a period of time. With a one-step de-icing/anti-icing procedure, the HoT begins at the commencement of de-icing/anti-icing. With a two-step procedure, the HoT begins at the commencement of the second (anti-icing) step. The hold-over protection runs out:

(i) at the commencement of the take-off roll (due to aerodynamic shedding of fluid); or

(ii) when frozen deposits start to form or accumulate on treated aircraft surfaces, thereby indicating the loss of effectiveness of the fluid.

(2) The duration of hold-over protection may vary depending on the influence of factors other than those specified in the 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 aircraft and its surroundings, such as aircraft component inclination angle, contour and surface roughness, surface temperature, operation in close proximity to other aircraft (jet or propeller blast) and ground equipment and structures.
(3) HoTs are not meant to imply that flight is safe in the prevailing conditions if the specified HoT has not been exceeded. Certain meteorological conditions, such as freezing drizzle or freezing rain, may be beyond the certification envelope of the aircraft.

(4) References to usable HoT tables may be found in the AEA “Recommendations for de-icing/anti-icing of aircraft on the ground”.

AOCR.OP.MPA.255 Ice and other contaminants — flight procedures

(a) The operator shall establish procedures for flights in expected or actual icing conditions.

(b) The commander shall only commence a flight or intentionally fly into expected or actual icing conditions if the aircraft is certified and equipped to cope with such conditions.

(c) If icing exceeds the intensity of icing for which the aircraft is certified or if an aircraft not certified for flight in known icing conditions encounters icing, the commander shall exit the icing conditions without delay, by a change of level and/or route, if necessary by declaring an emergency to ATC.

AMC1 AOCR.OP.MPA.255 Ice and other contaminants — flight procedures

FLIGHT IN EXPECTED OR ACTUAL ICING CONDITIONS - AEROPLANES

(a) In accordance with MCAR-PART-21 (Essential requirements for air operations), in case of flight into known or expected icing conditions, the aircraft must be certified, equipped and/or treated to operate safely in such conditions. The procedures to be established by the operator should take account of the design, the equipment, the configuration of the aircraft and the necessary training. For these reasons, different aircraft 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 AFM and other documents produced by the manufacturer.

(b) The operator should ensure that the procedures take account of the following:

(1) the equipment and instruments which must be serviceable for flight in icing conditions;
(2) the limitations on flight in icing conditions for each phase of flight. These limitations may be imposed by the aircraft’s de-icing or anti-icing equipment or the necessary performance corrections that have to be made;

(3) the criteria the flight crew should use to assess the effect of icing on the performance and/or controllability of the aircraft;

(4) the means by which the flight crew detects, by visual cues or the use of the aircraft’s ice detection system, that the flight is entering icing conditions; and

(5) 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 aircraft, due to:

(i) the failure of the aircraft’s anti-icing or de-icing equipment to control a build-up of ice; and/or

(ii) ice build-up on unprotected areas.

(c) Training for dispatch and flight in expected or actual icing conditions. The content of the operations manual should reflect the training, both conversion and recurrent, which flight crew, cabin crew and all other relevant operational personnel require in order to comply with the procedures for dispatch and flight in icing conditions:

(1) For the flight crew, the training should include:

(i) instruction on 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 on 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 on the differing intensities and forms of ice accretion and the consequent action which should be taken.

(2) For the cabin crew, the training should include;
(i) awareness of the conditions likely to produce surface contamination; and

(ii) the need to inform the flight crew of significant ice accretion.

**AOCR.OP.MPA.260 Fuel and oil supply**

The commander shall only commence a flight or continue in the event of in-flight replanning when satisfied that the aircraft carries at least the planned amount of usable fuel and oil to complete the flight safely, taking into account the expected operating conditions.

**AOCR.OP.MPA.265 Take-off conditions**

Before commencing take-off, the commander shall be satisfied that:

(a) according to the information available to him/her, the weather at the aerodrome or operating site and the condition of the runway or FATO intended to be used would not prevent a safe take-off and departure; and

(b) established aerodrome operating minima will be complied with.

**AOCR.OP.MPA.270 Minimum flight altitudes**

The commander or the pilot to whom conduct of the flight has been delegated shall not fly below specified minimum altitudes except when:

(a) necessary for take-off or landing; or

(b) descending in accordance with procedures approved by the Authority.

**AOCR.OP.MPA.275 Simulated abnormal situations in flight**

The operator shall ensure that when carrying passengers or cargo the following are not simulated:

(a) abnormal or emergency situations that require the application of abnormal or emergency procedures; or

(b) flight in IMC by artificial means.

**AOCR.OP.MPA.280 In-flight fuel management — aeroplanes**
The operator shall establish a procedure to ensure that in-flight fuel checks and fuel management are carried out according to the following criteria.

(a) **In-flight fuel checks**

(1) The commander shall ensure that fuel checks are carried out in-flight at regular intervals. The usable remaining fuel shall 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 (b); and

(iii) determine the expected usable fuel remaining on arrival at the destination aerodrome.

(2) The relevant fuel data shall be recorded.

(b) **In-flight fuel management**

(1) The flight shall 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) If an in-flight fuel check shows that 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 shall take into account 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 shall 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 commander shall declare an emergency when the calculated usable fuel on 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, to proceed to the destination 1 aerodrome, the commander shall 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;
(B) contingency fuel equal to 5 % of trip fuel from the decision point to the destination 1 aerodrome;
(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 to proceed to the destination aerodrome, the commander shall 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;
(B) contingency fuel from the PDP to the destination aerodrome; and
(C) additional fuel.

AOCR.OP.MPA.285 Use of supplemental oxygen

The commander shall ensure that flight crew members engaged in performing duties essential to the safe operation of an aircraft in flight use supplemental oxygen continuously whenever the cabin altitude exceeds 10000 ft for a period of more than 30 minutes and whenever the cabin altitude exceeds 13000 ft.
AOCR.OP.MPA.290 Ground proximity detection

When undue proximity to the ground is detected by a flight crew member or by a ground proximity warning system, the pilot flying shall take corrective action immediately to establish safe flight conditions.

**GM1 AOCR.OP.MPA.290 Ground proximity detection**

**TERRAIN AWARENESS WARNING SYSTEM (TAWS) FLIGHT CREW TRAINING PROGRAMMES**

(a) **Introduction**

(1) This GM contains performance-based training objectives for TAWS flight crew training.

(2) The training objectives cover five areas: theory of operation; pre-flight operations; general in-flight operations; response to TAWS cautions; and response to TAWS warnings.

(3) The term “TAWS” in this GM means a ground proximity warning system (GPWS) enhanced by a forward-looking terrain avoidance function. Alerts include both cautions and warnings.

(4) The content of this GM is intended to assist operators who are producing training programmes. The information it contains has not been tailored to any specific aircraft or TAWS equipment, but highlights features which are typically available where such systems are installed. It is the responsibility of the individual operator to determine the applicability of the content of this guidance material to each aircraft and TAWS equipment installed and their operation. Operators should refer to the AFM and/or aircraft/flight crew operating manual (A/FCOM), or similar documents, for information applicable to specific configurations. If there should be any conflict between the content of this guidance material and that published in the other documents described above, then information contained in the AFM or A/FCOM will take precedence.

(b) **Scope**

(1) The scope of this GM is designed to identify training objectives in the areas of: academic training; manoeuvre training; initial evaluation; and recurrent qualification. Under each of these four areas, the training material has been separated into those items which are considered essential training items and those that are
considered to be desirable. In each area, objectives and acceptable performance criteria are defined.

(2) No attempt is made to define how the training programme should be implemented. Instead, objectives are established to define the knowledge that a pilot operating a TAWS is expected to possess and the performance expected from a pilot who has completed TAWS training. However, the guidelines do indicate those areas in which the pilot receiving the training should demonstrate his/her understanding, or performance, using a real-time, interactive training device, i.e. a flight simulator. Where appropriate, notes are included within the performance criteria which amplify or clarify the material addressed by the training objective.

(c) Performance-based training objectives

(1) TAWS academic training

(i) This training is typically conducted in a classroom environment. The knowledge demonstrations specified in this section may be completed through the successful completion of written tests or by providing correct responses to non-real-time computer-based training (CBT) questions.

(ii) Theory of operation. The pilot should demonstrate an understanding of TAWS operation and the criteria used for issuing cautions and warnings. This training should address system operation. Objective: To demonstrate knowledge of how a TAWS functions. Criteria: The pilot should demonstrate an understanding of the following functions:

(A) Surveillance

(a) The GPWS computer processes data supplied from an air data computer, a radio altimeter, an instrument landing system (ILS)/microwave landing system (MLS)/multi-mode (MM) receiver, a roll attitude sensor, and actual position of the surfaces and of the landing gear.

(b) The forward looking terrain avoidance function utilises an accurate source of known aircraft position, such as that which may be provided
by a flight management system (FMS) or GPS, or an electronic terrain database. The source and scope of the terrain, obstacle and airport data, and features such as the terrain clearance floor, the runway picker, and geometric altitude (where provided) should all be described.

(c) Displays required to deliver TAWS outputs include a loudspeaker for voice announcements, visual alerts (typically amber and red lights), and a terrain awareness display (that may be combined with other displays). In addition, means should be provided for indicating the status of the TAWS and any partial or total failures that may occur.

(B) Terrain avoidance. Outputs from the TAWS computer provide visual and audio synthetic voice cautions and warnings to alert the flight crew about potential conflicts with terrain and obstacles.

(C) Alert thresholds. Objective: To demonstrate knowledge of the criteria for issuing cautions and warnings. Criteria: The pilot should be able to demonstrate an understanding of the methodology used by a TAWS to issue cautions and alerts and the general criteria for the issuance of these alerts, including:

(a) basic GPWS alerting modes specified in the ICAO Standard:

- Mode 1: excessive sink rate;
- Mode 2: excessive terrain closure rate;
- Mode 3: descent after take-off or go-around;
- Mode 4: unsafe proximity to terrain;
- Mode 5: descent below ILS glide slope (caution only); and
(b) an additional, optional alert mode - Mode 6: radio altitude call-out (information only); TAWS cautions and warnings which alert the flight crew to obstacles and terrain ahead of the aircraft in line with or adjacent to its projected flight path (forward-looking terrain avoidance (FLTA) and premature descent alert (PDA) functions).

(D) TAWS limitations. Objective: To verify that the pilot is aware of the limitations of TAWS. Criteria: The pilot should demonstrate knowledge and an understanding of TAWS limitations identified by the manufacturer for the equipment model installed, such as:

(a) navigation should not be predicated on the use of the terrain display;

(b) unless geometric altitude data is provided, use of predictive TAWS functions is prohibited when altimeter subscale settings display “QFE”;

(c) nuisance alerts can be issued if the aerodrome of intended landing is not included in the TAWS airport database;

(d) in cold weather operations, corrective procedures should be implemented by the pilot unless the TAWS has in-built compensation, such as geometric altitude data;

(e) loss of input data to the TAWS computer could result in partial or total loss of functionality. Where means exist to inform the flight crew that functionality has been degraded, this should be known and the consequences understood;

(f) radio signals not associated with the intended flight profile (e.g. ILS glide path transmissions from an adjacent runway) may cause false alerts;
(g) inaccurate or low accuracy aircraft position data could lead to false or non-annunciation of terrain or obstacles ahead of the aircraft; and

(h) minimum equipment list (MEL) restrictions should be applied in the event of the TAWS becoming partially or completely unserviceable. (It should be noted that basic GPWS has no forward-looking capability.)

(E) TAWS inhibits. Objective: To verify that the pilot is aware of the conditions under which certain functions of a TAWS are inhibited. Criteria: The pilot should demonstrate knowledge and an understanding of the various TAWS inhibits, including the following means of:

(a) silencing voice alerts;

(b) inhibiting ILS glide path signals (as may be required when executing an ILS back beam approach);

(c) inhibiting flap position sensors (as may be required when executing an approach with the flaps not in a normal position for landing);

(d) inhibiting the FLTA and PDA functions; and

(e) selecting or deselecting the display of terrain information, together with appropriate annunciation of the status of each selection.

(2) Operating procedures. The pilot should demonstrate the knowledge required to operate TAWS avionics and to interpret the information presented by a TAWS. This training should address the following topics:

(i) Use of controls. Objective: To verify that the pilot can properly operate all TAWS controls and inhibits. Criteria: The pilot should demonstrate the proper use of controls, including the following means by which:

(A) before flight, any equipment self-test functions can be initiated;
(B) TAWS information can be selected for display; and

(C) all TAWS inhibits can be operated and what the consequent annunciations mean with regard to loss of functionality.

(ii) Display interpretation. Objective: To verify that the pilot understands the meaning of all information that can be annunciated or displayed by a TAWS. Criteria: The pilot should demonstrate the ability to properly interpret information annunciated or displayed by a TAWS, including the following:

(A) knowledge of all visual and aural indications that may be seen or heard;

(B) response required on receipt of a caution;

(C) response required on receipt of a warning; and

(D) response required on receipt of a notification that partial or total failure of the TAWS has occurred (including annunciation that the present aircraft position is of low accuracy).

(iii) Use of basic GPWS or use of the FLTA function only. Objective: To verify that the pilot understands what functionality will remain following loss of the GPWS or of the FLTA function. Criteria: The pilot should demonstrate knowledge of how to recognise the following:

(A) un-commanded loss of the GPWS function, or how to isolate this function and how to recognise the level of the remaining controlled flight into terrain (CFIT) protection (essentially, this is the FLTA function); and

(B) un-commanded loss of the FLTA function, or how to isolate this function and how to recognise the level of the remaining CFIT protection (essentially, this is the basic GPWS).

(iv) Crew coordination. Objective: To verify that the pilot adequately briefs other flight crew members on how TAWS alerts will be handled. Criteria: The pilot should demonstrate that the pre-flight briefing addresses
procedures that will be used in preparation for responding to TAWS cautions and warnings, including the following:

(A) the action to be taken, and by whom, in the event that a TAWS caution and/or warning is issued; and

(B) how multi-function displays will be used to depict TAWS information at take-off, in the cruise and for the descent, approach, landing (and any go-around). This will be in accordance with procedures specified by the operator, who will recognise that it may be more desirable that other data is displayed at certain phases of flight and that the terrain display has an automatic “pop-up” mode in the event that an alert is issued.

(v) Reporting rules. Objective: To verify that the pilot is aware of the rules for reporting alerts to the controller and other authorities. Criteria: The pilot should demonstrate knowledge of the following:

(A) when, following recovery from a TAWS alert or caution, a transmission of information should be made to the appropriate ATC unit; and

(B) the type of written report that is required, how it is to be compiled, and whether any cross reference should be made in the aircraft technical log and/or voyage report (in accordance with procedures specified by the operator), following a flight in which the aircraft flight path has been modified in response to a TAWS alert, or if any part of the equipment appears not to have functioned correctly.

(vi) Alert thresholds. Objective: To demonstrate knowledge of the criteria for issuing cautions and warnings. Criteria: The pilot should be able to demonstrate an understanding of the methodology used by a TAWS to issue cautions and warnings and the general criteria for the issuance of these alerts, including awareness of the following:

(A) modes associated with basic GPWS, including the input data associated with each; and
(B) visual and aural annunciations that can be issued by TAWS and how to identify which are cautions and which are warnings.

(3) TAWS manoeuvre training. The pilot should demonstrate the knowledge required to respond correctly to TAWS cautions and warnings. This training should address the following topics:

(i) Response to cautions:

(A) Objective: To verify that the pilot properly interprets and responds to cautions. Criteria: The pilot should demonstrate an understanding of the need, without delay:

(a) to initiate action required to correct the condition which has caused the TAWS to issue the caution and to be prepared to respond to a warning, if this should follow; and

(b) if a warning does not follow the caution, to notify the controller of the new position, heading and/or altitude/flight level of the aircraft, and what the commander intends to do next.

(B) The correct response to a caution might require the pilot to:

(a) reduce a rate of descent and/or to initiate a climb;

(b) regain an ILS glide path from below, or to inhibit a glide path signal if an ILS is not being flown;

(c) select more flap, or to inhibit a flap sensor if the landing is being conducted with the intent that the normal flap setting will not be used;

(d) select gear down; and/or

(e) initiate a turn away from the terrain or obstacle ahead and towards an area free of such obstructions if a forward-looking terrain display indicates that this would be a good
solution and the entire manoeuvre can be carried out in clear visual conditions.

(ii) Response to warnings. Objective: To verify that the pilot properly interprets and responds to warnings. Criteria: The pilot should demonstrate an understanding of the following:

(A) The need, without delay, to initiate a climb in the manner specified by the operator.

(B) The need, without delay, to maintain the climb until visual verification can be made that the aircraft will clear the terrain or obstacle ahead or until above the appropriate sector safe altitude (if certain about the location of the aircraft with respect to terrain) even if the TAWS warning stops. If, subsequently, the aircraft climbs up through the sector safe altitude, but the visibility does not allow the flight crew to confirm that the terrain hazard has ended, checks should be made to verify the location of the aircraft and to confirm that the altimeter subscale settings are correct.

(C) When the workload permits, that the flight crew should notify the air traffic controller of the new position and altitude/flight level, and what the commander intends to do next.

(D) That the manner in which the climb is made should reflect the type of aircraft and the method specified by the aircraft manufacturer (which should be reflected in the operations manual) for performing the escape manoeuvre. Essential aspects will include the need for an increase in pitch attitude, selection of maximum thrust, confirmation that external sources of drag (e.g. spoilers/speed brakes) are retracted, and respect of the stick shaker or other indication of eroded stall margin.

(E) That TAWS warnings should never be ignored. However, the pilot’s response may be limited to that which is appropriate for a caution, only if:

(a) the aircraft is being operated by day in clear, visual conditions; and
(b) it is immediately clear to the pilot that the aircraft is in no danger in respect of its configuration, proximity to terrain or current flight path.

(4) TAWS initial evaluation:

(i) The flight crew member’s understanding of the academic training items should be assessed by means of a written test.

(ii) The flight crew member’s understanding of the manoeuvre training items should be assessed in a FSTD equipped with TAWS visual and aural displays and inhibit selectors similar in appearance and operation to those in the aircraft which the pilot will fly. The results should be assessed by a synthetic flight instructor, synthetic flight examiner, type rating instructor or type rating examiner.

(iii) The range of scenarios should be designed to give confidence that proper and timely responses to TAWS cautions and warnings will result in the aircraft avoiding a CFIT accident. To achieve this objective, the pilot should demonstrate taking the correct action to prevent a caution developing into a warning and, separately, the escape manoeuvre needed in response to a warning. These demonstrations should take place when the external visibility is zero, though there is much to be learnt if, initially, the training is given in “mountainous” or “hilly” terrain with clear visibility. This training should comprise a sequence of scenarios, rather than be included in line oriented flight training (LOFT).

(iv) A record should be made, after the pilot has demonstrated competence, of the scenarios that were practised.

(5) TAWS recurrent training:

(i) TAWS recurrent training ensures that pilots maintain the appropriate TAWS knowledge and skills. In particular, it reminds pilots of the need to act promptly in response to cautions and warnings, and of the unusual attitude associated with flying the escape manoeuvre.

(ii) An essential item of recurrent training is the discussion of any significant issues and operational concerns that have
been identified by the operator. Recurrent training should also address changes to TAWS logic, parameters or procedures and to any unique TAWS characteristics of which pilots should be aware.

(6) Reporting procedures:

(i) Verbal reports. Verbal reports should be made promptly to the appropriate air traffic control unit:

(A) whenever any manoeuvre has caused the aircraft to deviate from an air traffic clearance;

(B) when, following a manoeuvre which has caused the aircraft to deviate from an air traffic clearance, the aircraft has returned to a flight path which complies with the clearance; and/or

(C) when an air traffic control unit issues instructions which, if followed, would cause the pilot to manoeuvre the aircraft towards terrain or obstacle or it would appear from the display that a potential CFIT occurrence is likely to result.

(ii) Written reports. Written reports should be submitted in accordance with the operator’s occurrence reporting scheme and they also should be recorded in the aircraft technical log:

(A) whenever the aircraft flight path has been modified in response to a TAWS alert (false, nuisance or genuine);

(B) whenever a TAWS alert has been issued and is believed to have been false; and/or

(C) if it is believed that a TAWS alert should have been issued, but was not.

(iii) Within this GM and with regard to reports:

(A) the term “false” means that the TAWS issued an alert which could not possibly be justified by the position of the aircraft in respect to terrain and it is probable that a fault or failure in the system (equipment and/or input data) was the cause;
(B) the term “nuisance” means that the TAWS issued an alert which was appropriate, but was not needed because the flight crew could determine by independent means that the flight path was, at that time, safe;

(C) the term “genuine” means that the TAWS issued an alert which was both appropriate and necessary; and

(D) the report terms described in (c) (6) (iii) are only meant to be assessed after the occurrence is over, to facilitate subsequent analysis, the adequacy of the equipment and the programmes it contains. The intention is not for the flight crew to attempt to classify an alert into any of these three categories when visual and/or aural cautions or warnings are annunciated.

AOCR.OP.MPA.295 Use of airborne collision avoidance system (ACAS)

The operator shall establish operational procedures and training programmes when ACAS is installed and serviceable.

GM1 AOCR.OP.MPA.295 Use of airborne collision avoidance system (ACAS)

GENERAL

(a) The ACAS operational procedures and training programmes established by the operator should take into account this GM. It incorporates advice contained in:

(1) ICAO Annex 10, Volume IV;

(2) ICAO PANS-OPS, Volume 1;

(3) ICAO PANS-ATM; and

(4) ICAO guidance material “ACAS Performance-Based Training Objectives” (published under Attachment E of State Letter AN 7/1.3.7.2-97/77).
(b) Additional guidance material on ACAS may be referred to, including information available from such sources as EUROCONTROL.

ACAS FLIGHT CREW TRAINING PROGRAMMES

(c) During the implementation of ACAS, several operational issues were identified which had been attributed to deficiencies in flight crew training programmes. As a result, the issue of flight crew training has been discussed within the ICAO, which has developed guidelines for operators to use when designing training programmes.

(d) This GM contains performance-based training objectives for ACAS II flight crew training. Information contained in this paper related to traffic advisories (TAs) is also applicable to ACAS I and ACAS II users. The training objectives cover five areas: theory of operation; pre-flight operations; general in-flight operations; response to TAs; and response to resolution advisories (RAs).

(e) The information provided is valid for version 7 and 7.1 (ACAS II). Where differences arise, these are identified.

(f) The performance-based training objectives are further divided into the areas of: academic training; manoeuvre training; initial evaluation and recurrent qualification. Under each of these four areas, the training material has been separated into those items which are considered essential training items and those which are considered desirable. In each area, objectives and acceptable performance criteria are defined.

(g) ACAS academic training

(1) This training is typically conducted in a classroom environment. The knowledge demonstrations specified in this section may be completed through the successful completion of written tests or through providing correct responses to non-real-time computer-based training (CBT) questions.

(2) Essential items

(i) Theory of operation. The flight crew member should demonstrate an understanding of ACAS II operation and the criteria used for issuing TAs and RAs. This training should address the following topics:

(A) System operation
Objective: to demonstrate knowledge of how ACAS functions.

Criteria: the flight crew member should demonstrate an understanding of the following functions:

(a) Surveillance

(1) ACAS interrogates other transponder-equipped aircraft within a nominal range of 14 NM.

(2) ACAS surveillance range can be reduced in geographic areas with a large number of ground interrogators and/or ACAS II-equipped aircraft.

(3) If the operator’s ACAS implementation provides for the use of the Mode S extended squitter, the normal surveillance range may be increased beyond the nominal 14 NM. However, this information is not used for collision avoidance purposes.

(b) Collision avoidance

(1) TAs can be issued against any transponder-equipped aircraft which responds to the ICAO Mode C interrogations, even if the aircraft does not have altitude reporting capability.

(2) RAs can be issued only against aircraft that are reporting altitude and in the vertical plane only.

(3) RAs issued against an ACAS-equipped intruder are coordinated to ensure complementary RAs are issued.

(4) Failure to respond to an RA deprives own aircraft of the collision protection provided by own ACAS.
(5) Additionally, in ACAS-ACAS encounters, failure to respond to an RA also restricts the choices available to the other aircraft’s ACAS and thus renders the other aircraft’s ACAS less effective than if own aircraft were not ACAS equipped.

(B) Advisory thresholds

Objective: to demonstrate knowledge of the criteria for issuing TAs and RAs.

Criteria: the flight crew member should demonstrate an understanding of the methodology used by ACAS to issue TAs and RAs and the general criteria for the issuance of these advisories, including the following:

(a) ACAS advisories are based on time to closest point of approach (CPA) rather than distance. The time should be short and vertical separation should be small, or projected to be small, before an advisory can be issued. The separation standards provided by ATS are different from the miss distances against which ACAS issues alerts.

(b) Thresholds for issuing a TA or an RA vary with altitude. The thresholds are larger at higher altitudes.

(c) A TA occurs from 15 to 48 seconds and an RA from 15 to 35 seconds before the projected CPA.

(d) RAs are chosen to provide the desired vertical miss distance at CPA. As a result, RAs can instruct a climb or descent through the intruder aircraft’s altitude.

(C) ACAS limitations

Objective: to verify that the flight crew member is aware of the limitations of ACAS.
Criteria: the flight crew member should demonstrate knowledge and understanding of ACAS limitations, including the following:

(a) ACAS will neither track nor display non-transponder-equipped aircraft, nor aircraft not responding to ACAS Mode C interrogations.

(b) ACAS will automatically fail if the input from the aircraft’s barometric altimeter, radio altimeter or transponder is lost.

(1) In some installations, the loss of information from other on board systems such as an inertial reference system (IRS) or attitude heading reference system (AHRS) may result in an ACAS failure. Individual operators should ensure that their flight crews are aware of the types of failure that will result in an ACAS failure.

(2) ACAS may react in an improper manner when false altitude information is provided to own ACAS or transmitted by another aircraft. Individual operators should ensure that their flight crew are aware of the types of unsafe conditions that can arise. Flight crew members should ensure that when they are advised, if their own aircraft is transmitting false altitude reports, an alternative altitude reporting source is selected, or altitude reporting is switched off.

(c) Some aeroplanes within 380 ft above ground level (AGL) (nominal value) are deemed to be “on ground” and will not be displayed. If ACAS is able to determine an aircraft below this altitude is airborne, it will be displayed.

(d) ACAS may not display all proximate transponder-equipped aircraft in areas of high density traffic.
(e) The bearing displayed by ACAS is not sufficiently accurate to support the initiation of horizontal manoeuvres based solely on the traffic display.

(f) ACAS will neither track nor display intruders with a vertical speed in excess of 10 000 ft/min. In addition, the design implementation may result in some short-term errors in the tracked vertical speed of an intruder during periods of high vertical acceleration by the intruder.

(g) Ground proximity warning systems/ground collision avoidance systems (GPWSs/GCASs) warnings and wind shear warnings take precedence over ACAS advisories. When either a GPWS/GCAS or wind shear warning is active, ACAS aural annunciations will be inhibited and ACAS will automatically switch to the “TA only” mode of operation.

(D) ACAS inhibits

Objective: to verify that the flight crew member is aware of the conditions under which certain functions of ACAS are inhibited.

Criteria: the flight crew member should demonstrate knowledge and understanding of the various ACAS inhibits, including the following:

(a) “Increase Descent” RAs are inhibited below 1 450 ft AGL;

(b) “Descend” RAs are inhibited below 1 100 ft AGL;

(c) all RAs are inhibited below 1 000 ft AGL;

(d) all TA aural annunciations are inhibited below 500 ft AGL; and

(e) altitude and configuration under which “Climb” and “Increase Climb” RAs are inhibited. ACAS can still issue “Climb” and
“Increase Climb” RAs when operating at the airplane’s certified ceiling. (In some aircraft types, “Climb” or “Increase Climb” RAs are never inhibited.)

(ii) Operating procedures The flight crew member should demonstrate the knowledge required to operate the ACAS avionics and interpret the information presented by ACAS. This training should address the following:

(A) Use of controls

Objective: to verify that the pilot can properly operate all ACAS and display controls.

Criteria: demonstrate the proper use of controls including:

(a) aircraft configuration required to initiate a self-test;

(b) steps required to initiate a self-test;

(c) recognising when the self-test was successful and when it was unsuccessful. When the self-test is unsuccessful, recognising the reason for the failure and, if possible, correcting the problem;

(d) recommended usage of range selection. Low ranges are used in the terminal area and the higher display ranges are used in the en-route environment and in the transition between the terminal and en-route environment;

(e) recognising that the configuration of the display does not affect the ACAS surveillance volume;

(f) selection of lower ranges when an advisory is issued, to increase display resolution;

(g) proper configuration to display the appropriate ACAS information without eliminating the display of other needed information;
(h) if available, recommended usage of the above/below mode selector. The above mode should be used during climb and the below mode should be used during descent; and

(i) if available, proper selection of the display of absolute or relative altitude and the limitations of using this display if a barometric correction is not provided to ACAS.

(B) Display interpretation

Objective: to verify that the flight crew member understands the meaning of all information that can be displayed by ACAS. The wide variety of display implementations require the tailoring of some criteria. When the training programme is developed, these criteria should be expanded to cover details for the operator’s specific display implementation.

Criteria: the flight crew member should demonstrate the ability to properly interpret information displayed by ACAS, including the following:

(a) other traffic, i.e. traffic within the selected display range that is not proximate traffic, or causing a TA or RA to be issued;

(b) proximate traffic, i.e. traffic that is within 6 NM and ±1 200 ft;

(c) non-altitude reporting traffic;

(d) no bearing TAs and RAs;

(e) off-scale TAs and RAs: the selected range should be changed to ensure that all available information on the intruder is displayed;

(f) As: the minimum available display range which allows the traffic to be displayed should be selected, to provide the maximum display resolution;
(g) **RAs (traffic display):** the minimum available display range of the traffic display which allows the traffic to be displayed should be selected, to provide the maximum display resolution;

(h) **RAs (RA display):** flight crew members should demonstrate knowledge of the meaning of the red and green areas or the meaning of pitch or flight path angle cues displayed on the RA display. Flight crew members should also demonstrate an understanding of the RA display limitations, i.e. if a vertical speed tape is used and the range of the tape is less than 2 500 ft/min, an increase rate RA cannot be properly displayed; and

(i) if appropriate, awareness that navigation displays oriented on “Track-Up” may require a flight crew member to make a mental adjustment for drift angle when assessing the bearing of proximate traffic.

(C) **Use of the TA only mode**

Objective: to verify that a flight crew member understands the appropriate times to select the TA only mode of operation and the limitations associated with using this mode.

Criteria: the flight crew member should demonstrate the following:

(a) Knowledge of the operator’s guidance for the use of TA only.

(b) Reasons for using this mode. If TA only is not selected when an airport is conducting simultaneous operations from parallel runways separated by less than 1 200 ft, and to some intersecting runways, RAs can be expected. If for any reason TA only is not selected and an RA is received in these situations, the response should comply with the operator’s approved procedures.
(c) All TA aural annunciations are inhibited below 500 ft AGL. As a result, TAs issued below 500 ft AGL may not be noticed unless the TA display is included in the routine instrument scan.

(D) Crew coordination

Objective: to verify that the flight crew member understands how ACAS advisories will be handled.

Criteria: the flight crew member should demonstrate knowledge of the crew procedures that should be used when responding to TAs and RAs, including the following:

(a) task sharing between the pilot flying and the pilot monitoring;

(b) expected call-outs; and

(c) communications with ATC.

(E) Phraseology rules

Objective: to verify that the flight crew member is aware of the rules for reporting RAs to the controller.

Criteria: the flight crew member should demonstrate the following:

(a) the use of the phraseology contained in ICAO PANS-OPS;

(b) an understanding of the procedures contained in ICAO PANS-ATM and ICAO Annex 2; and

(c) the understanding that verbal reports should be made promptly to the appropriate ATC unit:

(1) whenever any manoeuvre has caused the aeroplane to deviate from an air traffic clearance;

(2) when, subsequent to a manoeuvre that has caused the aeroplane to deviate from
an air traffic clearance, the aeroplane
has returned to a flight path that
complies with the clearance; and/or

(3) when air traffic issue instructions that, if
followed, would cause the crew to
manoeuvre the aircraft contrary to an RA
with which they are complying.

(F) Reporting rules Objective: to verify that the flight
crew member is aware of the rules for reporting RAs
to the operator.

Criteria: the flight crew member should demonstrate
knowledge of where information can be obtained regarding
the need for making written reports to various states when
an RA is issued. Various States have different reporting
rules and the material available to the flight crew member
should be tailored to the operator’s operating environment.
For operators involved in commercial operations, this
responsibility is satisfied by the flight crew member
reporting to the operator according to the applicable
reporting rules.

(3) Non-essential items: advisory thresholds

Objective: to demonstrate knowledge of the criteria for issuing
TAs and RAs.

Criteria: the flight crew member should demonstrate an
understanding of the methodology used by ACAS to issue TAs
and RAs and the general criteria for the issuance of these
advisories, including the following:

(i) the minimum and maximum altitudes below/above which
TAs will not be issued;

(ii) when the vertical separation at CPA is projected to be less
than the ACAS-desired separation, a corrective RA which
requires a change to the existing vertical speed will be
issued. This separation varies from 300 ft at low altitude to
a maximum of 700 ft at high altitude;

(iii) when the vertical separation at CPA is projected to be just
outside the ACAS-desired separation, a preventive RA that
does not require a change to the existing vertical speed will be issued. This separation varies from 600 to 800 ft; and

(iv) RA fixed range thresholds vary between 0.2 and 1.1 NM.

(h) **ACAS manoeuvre training**

(1) Demonstration of the flight crew member’s ability to use ACAS displayed information to properly respond to TAs and RAs should be carried out in a full flight simulator equipped with an ACAS display and controls similar in appearance and operation to those in the aircraft. If a full flight simulator is utilised, CRM should be practised during this training.

(2) Alternatively, the required demonstrations can be carried out by means of an interactive CBT with an ACAS display and controls similar in appearance and operation to those in the aircraft. This interactive CBT should depict scenarios in which real-time responses should be made. The flight crew member should be informed whether or not the responses made were correct. If the response was incorrect or inappropriate, the CBT should show what the correct response should be.

(3) The scenarios included in the manoeuvre training should include: corrective RAs; initial preventive RAs; maintain rate RAs; altitude crossing RAs; increase rate RAs; RA reversals; weakening RAs; and multi-aircraft encounters. The consequences of failure to respond correctly should be demonstrated by reference to actual incidents such as those publicised in EUROCONTROL ACAS II Bulletins (available on the EUROCONTROL website).

(i) **TA responses**

Objective: to verify that the pilot properly interprets and responds to TAs.

Criteria: the pilot should demonstrate the following:

(A) Proper division of responsibilities between the pilot flying and the pilot monitoring. The pilot flying should fly the aircraft using any type-specific procedures and be prepared to respond to any RA that might follow. For aircraft without an RA pitch display, the pilot flying should consider the likely magnitude of an appropriate pitch change. The pilot monitoring should provide updates on the traffic location shown on the ACAS display, using this information to help visually acquire the intruder.
(B) Proper interpretation of the displayed information. Flight crew members should confirm that the aircraft they have visually acquired is that which has caused the TA to be issued. Use should be made of all information shown on the display, note being taken of the bearing and range of the intruder (amber circle), whether it is above or below (data tag) and its vertical speed direction (trend arrow).

(C) Other available information should be used to assist in visual acquisition, including ATC “party-line” information, traffic flow in use, etc.

(D) Because of the limitations described, the pilot flying should not manoeuvre the aircraft based solely on the information shown on the ACAS display. No attempt should be made to adjust the current flight path in anticipation of what an RA would advise, except that if own aircraft is approaching its cleared level at a high vertical rate with a TA present, vertical rate should be reduced to less than 1 500 ft/min.

(E) When visual acquisition is attained, and as long as no RA is received, normal right of way rules should be used to maintain or attain safe separation. No unnecessary manoeuvres should be initiated. The limitations of making manoeuvres based solely on visual acquisition, especially at high altitude or at night, or without a definite horizon should be demonstrated as being understood.

(ii) RA responses

Objective: to verify that the pilot properly interprets and responds to RAs.

Criteria: the pilot should demonstrate the following:

(A) Proper response to the RA, even if it is in conflict with an ATC instruction and even if the pilot believes that there is no threat present.

(B) Proper task sharing between the pilot flying and the pilot monitoring. The pilot flying should respond to a corrective RA with appropriate control inputs. The pilot monitoring should monitor the response to the RA and should provide updates on the traffic location by checking the traffic
display. Proper crew resource management (CRM) should be used.

(C) Proper interpretation of the displayed information. The pilot should recognise the intruder causing the RA to be issued (red square on display). The pilot should respond appropriately.

(D) For corrective RAs, the response should be initiated in the proper direction within five seconds of the RA being displayed. The change in vertical speed should be accomplished with an acceleration of approximately $\frac{1}{4} \ g$ (gravitational acceleration of $9.81 \text{ m/ sec}^2$).

(E) Recognition of the initially displayed RA being modified. Response to the modified RA should be properly accomplished, as follows:

(a) For increase rate RAs, the vertical speed change should be started within two and a half seconds of the RA being displayed. The change in vertical speed should be accomplished with an acceleration of approximately $\frac{1}{3} \ g$.

(b) For RA reversals, the vertical speed reversal should be started within two and a half seconds of the RA being displayed. The change in vertical speed should be accomplished with an acceleration of approximately $\frac{1}{3} \ g$.

(c) For RA weakenings, the vertical speed should be modified to initiate a return towards the original clearance.

(d) An acceleration of approximately $\frac{1}{4} \ g$ will be achieved if the change in pitch attitude corresponding to a change in vertical speed of 1 500 ft/min is accomplished in approximately 5 seconds, and of $\frac{1}{5} \ g$ if the change is accomplished in approximately three seconds. The change in pitch attitude required to establish a rate of climb or descent of 1 500 ft/min from level flight will be approximately 6° when the true airspeed (TAS) is 150 kt, 4° at 250 kt, and 2° at 500 kt. (These angles are derived from the formula: $\frac{1000}{\text{TAS}}$).
(F) Recognition of altitude crossing encounters and the proper response to these RAs.

(G) For preventive RAs, the vertical speed needle or pitch attitude indication should remain outside the red area on the RA display.

(H) For maintain rate RAs, the vertical speed should not be reduced. Pilots should recognise that a maintain rate RA may result in crossing through the intruder’s altitude.

(I) When the RA weakens, or when the green “fly to” indicator changes position, the pilot should initiate a return towards the original clearance and when “clear of conflict” is annunciated, the pilot should complete the return to the original clearance.

(J) The controller should be informed of the RA as soon as time and workload permit, using the standard phraseology.

(K) When possible, an ATC clearance should be complied with while responding to an RA. For example, if the aircraft can level at the assigned altitude while responding to RA (an “adjust vertical speed” RA (version 7) or “level off” (version 7.1)) it should be done; the horizontal (turn) element of an ATC instruction should be followed.

(L) Knowledge of the ACAS multi-aircraft logic and its limitations, and that ACAS can optimise separations from two aircraft by climbing or descending towards one of them. For example, ACAS only considers intruders that it considers to be a threat when selecting an RA. As such, it is possible for ACAS to issue an RA against one intruder that results in a manoeuvre towards another intruder which is not classified as a threat. If the second intruder becomes a threat, the RA will be modified to provide separation from that intruder.

(i) ACAS initial evaluation

(1) The flight crew member’s understanding of the academic training items should be assessed by means of a written test or interactive CBT that records correct and incorrect responses to phrased questions.
(2) The flight crew member’s understanding of the manoeuvre training items should be assessed in a full flight simulator equipped with an ACAS display and controls similar in appearance and operation to those in the aircraft the flight crew member will fly, and the results assessed by a qualified instructor, inspector, or check airman. The range of scenarios should include: corrective RAs; initial preventive RAs; maintain rate RAs; altitude crossing RAs; increase rate RAs; RA reversals; weakening RAs; and multi-threat encounters. The scenarios should also include demonstrations of the consequences of not responding to RAs, slow or late responses, and manoeuvring opposite to the direction called for by the displayed RA.

(3) Alternatively, exposure to these scenarios can be conducted by means of an interactive CBT with an ACAS display and controls similar in appearance and operation to those in the aircraft the pilot will fly. This interactive CBT should depict scenarios in which real-time responses should be made and a record made of whether or not each response was correct.

(j) ACAS recurrent training

(1) ACAS recurrent training ensures that flight crew members maintain the appropriate ACAS knowledge and skills. ACAS recurrent training should be integrated into and/or conducted in conjunction with other established recurrent training programmes. An essential item of recurrent training is the discussion of any significant issues and operational concerns that have been identified by the operator. Recurrent training should also address changes to ACAS logic, parameters or procedures and to any unique ACAS characteristics which flight crew members should be made aware of.

(2) It is recommended that the operator’s recurrent training programmes using full flight simulators include encounters with conflicting traffic when these simulators are equipped with ACAS. The full range of likely scenarios may be spread over a 2-year period. If a full flight simulator, as described above, is not available, use should be made of interactive CBT that is capable of presenting scenarios to which pilot responses should be made in real-time.

AOCR.OP.MPA.300 Approach and landing conditions

Before commencing an approach to land, the commander shall be satisfied that, according to the information available to him/her, the weather at the
aerodrome and the condition of the runway or FATO intended to be used should not prevent a safe approach, landing or missed approach, having regard to the performance information contained in the operations manual.

**AMC1 AOCR.OP.MPA.300 Approach and landing conditions**

**IN-FLIGHT DETERMINATION OF THE LANDING DISTANCE**

The in-flight determination of the landing distance should be based on the latest available meteorological or runway state report, preferably not more than 30 minutes before the expected landing time.

**AOCR.OP.MPA.305 Commencement and continuation of approach**

(a) The commander or the pilot to whom conduct of the flight has been delegated may commence an instrument approach regardless of the reported RVR/VIS.

(b) If the reported RVR/VIS is less than the applicable minimum the approach shall not be continued:

   (1) below 1 000 ft above the aerodrome; or

   (2) into the final approach segment in the case where the DA/H or MDA/H is more than 1 000 ft above the aerodrome.

(c) Where the RVR is not available, RVR values may be derived by converting the reported visibility.

(d) If, after passing 1 000 ft above the aerodrome, the reported RVR/VIS falls below the applicable minimum, the approach may be continued to DA/H or MDA/H.

(e) The approach may be continued below DA/H or MDA/H and the landing may be completed provided that the visual reference adequate for the type of approach operation and for the intended runway is established at the DA/H or MDA/H and is maintained.

(f) The touchdown zone RVR shall always be controlling. If reported and relevant, the midpoint and stop end RVR shall also be controlling. The minimum RVR value for the midpoint shall be 125 m or the RVR required for the touchdown zone if less, and 75 m for the stop end. For aircraft equipped with a rollout guidance or control system, the minimum RVR value for the midpoint shall be 75 m.
AMC1 AOCR.OP.MPA.305 (e) Commencement and continuation of approach

VISUAL REFERENCES FOR INSTRUMENT APPROACH OPERATIONS

(a) NPA, APV and CAT I operations

At DH or MDH, at least one of the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) elements of the approach lighting system;
(2) the threshold;
(3) the threshold markings;
(4) the threshold lights;
(5) the threshold identification lights;
(6) the visual glide slope indicator;
(7) the touchdown zone or touchdown zone markings;
(8) the touchdown zone lights;
(9) FATO/runway edge lights; or
(10) other visual references specified in the operations manual.

(b) Lower than standard category I (LTS CAT I) operations

At DH, the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three 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;

(2) this visual reference should include a lateral element of the ground pattern, such as an approach light crossbar or the landing threshold or a barrette of the touchdown zone light unless the operation is conducted utilising an approved HUDLS usable to at least 150 ft.

(c) CAT II or OTS CAT II operations
At DH, the visual references specified below should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three 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;

(2) this visual reference should include a lateral element of the ground pattern, such as an approach light crossbar or the landing threshold or a barrette of the touchdown zone light unless the operation is conducted utilising an approved HUDLS to touchdown.

(d) CAT III operations

(1) For CAT IIIA operations and for CAT IIIB operations conducted either with fail-passive flight control systems or with the use of an approved HUDLS: at DH, a segment of at least three 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 by the pilot.

(2) For CAT IIIB operations conducted either with fail-operational flight control systems or with a fail-operational hybrid landing system using a DH: at DH, at least one centreline light is attained and can be maintained by the pilot.

(3) For CAT IIIB operations with no DH there is no specification for visual reference with the runway prior to touchdown.

(e) Approach operations utilising EVS – CAT I operations

(1) At DH, the following visual references should be displayed and identifiable to the pilot on the EVS image:

(i) elements of the approach light; or

(ii) the runway threshold, identified by at least one of the following:

(A) the beginning of the runway landing surface,

(B) the threshold lights, the threshold identification lights; or
(C) 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.

(2) At 100 ft above runway threshold elevation at least one of the visual references specified below should be distinctly visible and identifiable to the pilot without reliance on the EVS:

(i) the lights or markings of the threshold; or

(ii) the lights or markings of the touchdown zone.

(f) Approach operations utilising EVS – APV and NPA operations flown with the CDFA technique

(1) At DH/MDH, visual references should be displayed and identifiable to the pilot on the EVS image as specified under (a).

(2) At 200 ft above runway threshold elevation, at least one of the visual references specified under (a) should be distinctly visible and identifiable to the pilot without reliance on the EVS.

GM1 AOCR.OP.MPA.305 (f) Commencement and continuation of approach

EXPLANATION OF THE TERM “RELEVANT”

“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 kt.

AOCR.OP.MPA.310 Operating procedures — threshold crossing height — aeroplanes

The operator shall establish operational procedures designed to ensure that an aeroplane conducting precision approaches crosses the threshold of the runway by a safe margin, with the aeroplane in the landing configuration and attitude.

AOCR.OP.MPA.320 Aircraft categories

(a) Aircraft categories shall be based on the indicated airspeed at threshold (VAT) which is equal to the stalling speed (VSO) multiplied by 1.3 or one-g (gravity) stall speed (VS1g) multiplied by 1.23 in the landing configuration at the maximum certified landing mass. If both VSO and VS1g are available, the higher resulting VAT shall be used.
(b) The aircraft categories specified in the table below shall be used.

Table 1

<table>
<thead>
<tr>
<th>Aircraft category</th>
<th>VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Less than 91 kt</td>
</tr>
<tr>
<td>B</td>
<td>From 91 to 120 kt</td>
</tr>
<tr>
<td>C</td>
<td>From 121 to 140 kt</td>
</tr>
<tr>
<td>D</td>
<td>From 141 to 165 kt</td>
</tr>
<tr>
<td>E</td>
<td>From 166 to 210 kt</td>
</tr>
</tbody>
</table>

(c) The landing configuration that is to be taken into consideration shall be specified in the operations manual.

(d) The operator may apply a lower landing mass for determining the VAT if approved by the Authority. Such a lower landing mass shall be a permanent value, independent of the changing conditions of day-to-day operations.
C. MOTOR POWERED AIRCRAFT – PERFORMANCE AND OPERATING LIMITATIONS

General Requirements

AOCR.POL.A.100 Performance classes

(a) The aeroplane shall be operated in accordance with the applicable performance class requirements.

(b) Where full compliance with the applicable requirements of this Section cannot be shown due to specific design characteristics, the operator shall apply approved performance standards that ensure a level of safety equivalent to that of the appropriate chapter.

AOCR.POL.A.105 General

(a) The mass of the aeroplane:

(1) at the start of the take-off; or

(2) in the event of in-flight replanning, at the point from which the revised operational flight plan applies, shall not be greater than the mass at which the requirements of the appropriate chapter can be complied with for the flight to be undertaken. Allowance may be made for expected reductions in mass as the flight proceeds and for fuel jettisoning.

(b) The approved performance data contained in the AFM shall be used to determine compliance with the requirements of the appropriate chapter, supplemented as necessary with other data as prescribed in the relevant chapter. The operator shall specify other data in the operations manual. When applying the factors prescribed in the appropriate chapter, account may be taken of any operational factors already incorporated in the AFM performance data to avoid double application of factors.

(c) Due account shall be taken of aeroplane configuration, environmental conditions and the operation of systems that 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) The operator shall take account of charting accuracy when assessing the take-off requirements of the applicable chapters.
Performance Class A

AOCR.POL.A.200 General

(a) The approved performance data in the AFM shall be supplemented as necessary with other data if the approved performance data in the AFM 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) For wet and contaminated runways, performance data determined in accordance with applicable standards on certification of large aeroplanes or equivalent shall be used.

(c) The use of other data referred to in (a) and equivalent requirements referred to in (b) shall be specified in the operations manual.

AMC1 AOCR.POL.A.200 General

WET AND CONTAMINATED RUNWAY DATA

*If the performance data have been determined on the basis of a measured runway friction coefficient, the operator should use a procedure correlating the measured runway friction coefficient and the effective braking coefficient of friction of the aeroplane type over the required speed range for the existing runway conditions.*

AOCR.POL.A.205 Take-off

(a) The take-off mass shall not exceed the maximum take-off mass specified in the AFM for the pressure altitude and the ambient temperature at the aerodrome of departure.

(b) The following requirements shall be met when determining the maximum permitted take-off mass:

(1) the accelerate-stop distance shall not exceed the accelerate-stop distance available (ASDA);

(2) the take-off distance shall not exceed the take-off distance available, with a clearway distance not exceeding half of the take-off run available (TORA);
(3) the take-off run shall not exceed the TORA;

(4) a single value of V1 shall be used for the rejected and continued take-off; and

(5) on a wet or contaminated runway, the take-off mass shall not exceed that permitted for a take-off on a dry runway under the same conditions.

(c) When showing compliance with (b), the following shall be taken into account:

(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;

(4) the runway slope in the direction of take-off;

(5) not more than 50 % of the reported headwind 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.

**AMC1 AOCR.POL.A.205 Take-off**

**LOSS OF RUNWAY LENGTH DUE TO ALIGNMENT**

(a) The length of the runway that is declared for the calculation of take-off distance available (TODA), accelerate-stop distance available (ASDA) and take-off run available (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:

(1) the minimum distance of the main wheels from the start of the runway for determining TODA and TORA, ”L”; and

(2) the minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA, ”N”.

**Figure 1: Line-up of the aeroplane in the direction of take-off - L and N**
Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in (b) should be used to determine the alignment distance.

(b) Alignment distance calculation

The distances mentioned in (a) (1) and (a) (2) are:

<table>
<thead>
<tr>
<th></th>
<th>90° entry</th>
<th>180° turnaround</th>
</tr>
</thead>
<tbody>
<tr>
<td>L=</td>
<td>RM + X</td>
<td>RN + Y</td>
</tr>
<tr>
<td>N=</td>
<td>RM + X + WB</td>
<td>RN + Y + WB</td>
</tr>
</tbody>
</table>

where:

\[ RN = A + WN = WB / \cos (90°-a) + WN \]

\[ RM = B + WM = WB \tan (90°-a) + WM \]

\[ X = \text{safety distance of outer main wheel during turn to the edge of the runway} \]

\[ Y = \text{safety distance of outer nose wheel during turn to the edge of the runway} \]
Note: Minimum edge safety distances for X and Y are specified in FAA AC 150/5300-13 and ICAO Annex 14, 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
a = steering angle.

GM1 AOCR.POL.A.205 Take-off

RUNWAY SURFACE CONDITION

(a) 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/she may consider a take-off, provided that he/she has applied the applicable performance adjustments, and any further safety measures he/she considers justified under the prevailing conditions.

(b) An adequate overall level of safety will only be maintained if operations in accordance with AMC 25.1591 or equivalent are limited to rare occasions. Where the frequency of such operations on contaminated runways is not limited to rare occasions, the operator 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.

AOCR.POL.A.210 Take-off obstacle clearance

(a) The net take-off flight path shall be determined in such a way that the aeroplane 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 × D, where D is
the horizontal distance the aeroplane has travelled from the end of the take-off distance available (TODA) or the end of the take-off distance if a turn is scheduled before the end of the TODA. 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 × D may be used.

(b) When showing compliance with (a):

(1) The following items shall be taken into account:

   (i) the mass of the aeroplane at the commencement of the take-off run;

   (ii) the pressure altitude at the aerodrome;

   (iii) the ambient temperature at the aerodrome; and

   (iv) not more than 50% of the reported headwind component or not less than 150% of the reported tailwind component.

(2) 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 TORA. 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.

(3) Any part of the net take-off flight path in which the aeroplane is banked by more than 15° shall clear all obstacles within the horizontal distances specified in (a), (b)(6) and (b)(7) by a vertical distance of at least 50 ft.

(4) Operations that apply increased bank angles of not more than 20° between 200 ft and 400 ft, or not more than 30° above 400 ft, shall be carried out in accordance with AOCR.POL.A.240.

(5) Adequate allowance shall be made for the effect of bank angle on operating speeds and flight path including the distance increments resulting from increased operating speeds.

(6) For cases where the intended flight path does not require track changes of more than 15°, the operator does not need to consider those obstacles that have a lateral distance greater than:
300 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area; or

600 m, for flights under all other conditions.

(7) For cases where the intended flight path requires track changes of more than 15°, the operator does not need to consider those obstacles that have a lateral distance greater than:

(i) 600 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area; or

(ii) 900 m, for flights under all other conditions.

(c) The operator shall establish contingency procedures to satisfy the requirements in (a) and (b) and to provide a safe route, avoiding obstacles, to enable the aeroplane to either comply with the en-route requirements of AOCR.POL.A.215, or land at either the aerodrome of departure or at a take-off alternate aerodrome.

**AMC1 AOCR.POL.A.210 Take-off obstacle clearance**

**TAKE-OFF OBSTACLE CLEARANCE**

(a) In accordance with the definitions used in preparing the take-off distance and take-off flight path data provided in the AFM:

(1) 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 (b) below.

(2) 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;

(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.

(b) The net take-off flight path, determined from the data provided in the AFM in accordance with (a) (1) and (a) (2), should 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 (a) 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.

**AMC2 AOCR.POL.A.210 Take-off obstacle clearance**

**EFFECT OF BANK ANGLES**

(a) The AFM 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 AFM has provided other data.

(b) Unless otherwise specified in the AFM or other performance or operating manuals from the manufacturer, acceptable adjustments to assure adequate stall margins and gradient corrections are provided by the following table:

<table>
<thead>
<tr>
<th>Bank</th>
<th>Speed</th>
<th>Gradient correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>15°</td>
<td>V2</td>
<td>1 x AFM 15° gradient loss</td>
</tr>
<tr>
<td>20°</td>
<td>V2 + 5 kt</td>
<td>2 x AFM 15° gradient loss</td>
</tr>
<tr>
<td>25°</td>
<td>V2 + 10 kt</td>
<td>3 x AFM 15° gradient loss</td>
</tr>
</tbody>
</table>
AMC3 AOCR.POL.A.210 Take-off obstacle clearance

REQUIRED NAVIGATIONAL ACCURACY

(a) Navigation systems

The obstacle accountability semi-widths of 300 m and 600 m may be used if the navigation system under OEI conditions provides a two standard deviation accuracy of 150 m and 300 m respectively.

(b) Visual course guidance

(1) The obstacle accountability semi-widths of 300 m and 600 m 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 crew compartment 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.

(2) For visual course guidance navigation, the 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; and

(iv) the limiting environmental conditions (such as wind, the lowest cloud base, ceiling, visibility, day/night, ambient lighting, obstruction lighting) should be specified.
GM1 AOCR.POLA.210 Take-off obstacle clearance

CONTINGENCY PROCEDURES FOR OBSTACLES CLEARANCES

If compliance with AOCR.POLA.210 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 route 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 route.

AOCR.POLA.215 En-route — one-engine-inoperative (OEI)

(a) The OEI en-route net flight path data shown in the AFM, appropriate to the meteorological conditions expected for the flight, shall allow demonstration of compliance with (b) or (c) at all points along the route. The net flight path shall 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 shall be taken into account.

(b) The gradient of the net flight path shall 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 shall permit the aeroplane to continue flight from the cruising altitude to an aerodrome where a landing can be made in accordance with AOCR.POLA.225 or AOCR.POLA.230, as appropriate. The net flight path shall 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 in accordance with the following:

(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 shall meet the following criteria:

   (i) the performance requirements at the expected landing mass are met; and

   (ii) weather reports and/or forecasts and field condition reports indicate that a safe landing can be accomplished at the estimated time of landing.

(d) The operator shall increase the width margins of (b) and (c) to 18, 5 km (10 NM) if the navigational accuracy does not meet at least required navigation performance 5 (RNP5).

**AMC1 AOCR.POL.A.215 En-route – one-engine-inoperative (OEI)**

**ROUTE ANALYSIS**

(a) The high terrain or obstacle analysis required should be carried out by a detailed analysis of the route.

(b) 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 OEI 1 000 ft above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a driftdown procedure should be worked out, based on engine failure at the most critical point and clearing critical obstacles during the driftdown by at least 2 000 ft. The minimum cruise altitude is determined by the intersection of the two driftdown paths, taking into account allowances for decision making (see Figure 1). This method is time-consuming and requires the availability of detailed terrain maps.

(c) Alternatively, the published minimum flight altitudes (MEA or minimum off-route altitude (MORA)) should be used for determining whether OEI 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 driftdown construction (see Figure 1). This procedure avoids a detailed high terrain contour analysis, but could be more penalising than taking the actual terrain profile into account as in (b).

(d) In order to comply with AOCR.POL.A.215 (c), one means of compliance is the use of MORA and, with AOCR.POL.A.215 (d), MEA provided that the aeroplane meets the navigational equipment standard assumed in the definition of MEA.
Note: MEA or MORA normally provide the required 2 000 ft obstacle clearance for driftdown. However, at and below 6 000 ft altitude, MEA and MORA cannot be used directly as only 1 000 ft clearance is ensured.

**AOCR.POL.A.220 En-route — aeroplanes with three or more engines, two engines inoperative**

(a) At no point along the intended track shall 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 (b) to (f).

(b) The two-engines-inoperative en-route net flight path data shall allow 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 shall 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 shall be taken into account. If the navigational accuracy does not meet at least RNP5, the operator shall increase the width margin given above to 18, 5 km (10 NM).
(c) The two engines shall be 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 shall 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 shall be 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 shall 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.

**AOCR.POL.A.225 Landing — destination and alternate aerodromes**

(a) The landing mass of the aeroplane determined in accordance with AOCR.POL.A.105 (a) shall not exceed the maximum landing mass specified for the altitude and the ambient temperature expected for the estimated time of landing at the destination aerodrome and alternate aerodrome.

**AMC1  AOCR.POL.A.225  Landing – destination and alternate aerodromes**

**ALTITUDE MEASURING**

The operator should use either pressure altitude or geometric altitude for its operation and this should be reflected in the operations manual.

**AMC2  AOCR.POL.A.225  Landing – destination and alternate aerodromes**

**MISSED APPROACH**

(a) For instrument approaches with a missed approach climb gradient greater than 2.5 %, the operator should verify that the expected landing mass of the aeroplane allows for a missed approach with a climb gradient equal to or greater than the applicable missed approach
gradient in the OEI missed approach configuration and at the associated speed.

(b) For instrument approaches with DH below 200 ft, the operator should 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 a missed approach of at least 2.5 %, or the published gradient, whichever is greater.

**GM1 AOCR.POL.A.225 Landing – destination and alternate aerodromes**

**MISSED APPROACH GRADIENT**

(a) Where an aeroplane cannot achieve the missed approach gradient specified in AMC2 AOCR.POL.A.225, when operating at or near maximum certificated landing mass and in engine-out conditions, the operator has the opportunity to propose an alternative means of compliance to the Authority demonstrating that a missed approach can be executed safely taking into account appropriate mitigating measures.

(b) The proposal for an alternative means of compliance may involve the following:

1. considerations to mass, altitude and temperature limitations and wind for the missed approach;

2. a proposal to increase the DA/H or MDA/H; and

3. a contingency procedure ensuring a safe route and avoiding obstacles.

**AOCR.POL.A.230 Landing — dry runways**

(a) The landing mass of the aeroplane determined in accordance with AOCR.POL.A.105 (a) for the estimated time of landing at the destination aerodrome and at any alternate aerodrome shall allow a full stop landing from 50 ft above the threshold:

1. for turbo-jet powered aeroplanes, within 60 % of the landing distance available (LDA); and

2. for turbo-propeller powered aeroplanes, within 70 % of the LDA.

(b) For steep approach operations, the operator shall use the landing distance data factored in accordance with (a), based on a screen
height of less than 60 ft, but not less than 35 ft, and shall comply with AOCR.POL.A.245.

(c) For short landing operations, the operator shall use the landing distance data factored in accordance with (a) and shall comply with AOCR.POL.A.250.

(d) When determining the landing mass, the operator shall take the following into account:

(1) the altitude at the aerodrome;

(2) not more than 50 % of the headwind component or not less than 150 % of the tailwind component; and

(3) the runway slope in the direction of landing if greater than ± 2%

(e) For dispatching the aeroplane it shall 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, the ground handling characteristics of the aeroplane and other conditions such as landing aids and terrain.

(f) If the operator is unable to comply with (e) (1) for a destination aerodrome having a single runway where a landing depends upon a specified wind component, the aeroplane may be dispatched if two alternate aerodromes are designated that permit full compliance with (a) to (e). Before commencing an approach to land at the destination aerodrome, the commander shall check that a landing can be made in full compliance with (a) to (d) and AOCR.POL.A.225.

(g) If the operator is unable to comply with (e) (2) for the destination aerodrome, the aeroplane shall be only dispatched if an alternate aerodrome is designated that allows full compliance with (a) to (e).

**AMC1 AOCR.POL.A.230 Landing – dry runways**

**FACTORING OF AUTOMATIC LANDING DISTANCE PERFORMANCE DATA**

_In those cases where the landing requires the use of an automatic landing system, and the distance published in the AFM includes safety margins_
equivalent to those contained in AOCR.POLA.230 (a)(1) and AOCR.POLA.235, the landing mass of the aeroplane should be the lesser of:

(a) the landing mass determined in accordance with AOCR.POLA.230 (a)(1) or AOCR.POLA.235 as appropriate; or

(b) 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.

**GM1 AOCR.POLA.230 Landing – dry runways**

**LANDING MASS**

AOCR.POLA.230 establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes:

(a) 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 (LDA) 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.

(b) 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 (a), in which case dispatch should be based on this lesser mass.

c) The expected wind referred to in (b) is the wind expected to exist at the time of arrival.

**AOCR.POLA.235 Landing — wet and contaminated runways**

(a) When the appropriate weather reports and/or forecasts indicate that the runway at the estimated time of arrival may be wet, the LDA shall be at least 115 % of the required landing distance, determined in accordance with AOCR.POLA.230.

(b) When the appropriate weather reports and/or forecasts indicate that the runway at the estimated time of arrival may be contaminated, the LDA shall be at least the landing distance determined in accordance with (a), or at least 115 % of the landing distance determined in
accordance with approved contaminated landing distance data or equivalent, whichever is greater. The operator shall specify in the operations manual if equivalent landing distance data are to be applied.

(c) A landing distance on a wet runway shorter than that required by (a), but not less than that required by AOCR.POL.A.230(a), may be used if the AFM 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 (b), but not less than that required by AOCR.POL.A.230(a), may be used if the AFM includes specific additional information about landing distances on contaminated runways.

(e) For (b), (c) and (d), the criteria of AOCR.POL.A.230 shall be applied accordingly, except that AOCR.POL.A.230 (a) shall not be applied to (b) above.

**AOCR.POL.A.240 Approval of operations with increased bank angles**

(a) Operations with increased bank angles require prior approval by the Authority.

(b) To obtain the approval, the operator shall provide evidence that the following conditions are met:

1. the AFM contains 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 is available for navigation accuracy;

3. weather minima and wind limitations are specified for each runway; and

4. the flight crew has obtained adequate knowledge of the route to be flown and of the procedures to be used in accordance with AOCR.FC.

**AOCR.POL.A.245 Approval of steep approach operations**

(a) Steep approach operations using glideslope angles of 4, 5° or more and with screen heights of less than 60 ft, but not less than 35 ft, require prior approval by the Authority.
(b) To obtain the approval, the operator shall provide evidence that the following conditions are met:

(1) the AFM states 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) for each aerodrome at which steep approach operations are to be conducted:

(i) a suitable glide path reference system comprising at least a visual glide path indicating system shall be available;

(ii) weather minima shall be specified; and

(iii) the following items shall be taken into consideration:

(A) the obstacle situation;

(B) the type of glide path reference and runway guidance;

(C) the minimum visual reference to be required at decision height (DH) and MDA;

(D) available airborne equipment;

(E) pilot qualification and special aerodrome familiarisation;

(F) AFM limitations and procedures; and

(G) missed approach criteria.

**AOCR.POL.A.250 Approval of short landing operations**

(a) Short landing operations require prior approval by the Authority.

(b) To obtain the approval, the operator shall provide evidence that the following conditions are met:

(1) 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 LDA;
(2) the State of the aerodrome has determined a public interest and operational necessity for the operation, either due to the remoteness of the aerodrome or to physical limitations relating to extending the runway;

(3) 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 m;

(4) RVR/VIS minimum shall not be less than 1 500 m and wind limitations are specified in the operations manual;

(5) minimum pilot experience, training and special aerodrome familiarisation requirements are specified and met;

(6) the crossing height over the beginning of the usable length of the declared safe area is 50 ft;

(7) the use of the declared safe area is approved by the State of the aerodrome;

(8) the usable length of the declared safe area does not exceed 90 m;

(9) the width of the declared safe area is not less than twice the runway width or twice the wing span, whichever is greater, centred on the extended runway centre line;

(10) the declared safe area is clear of obstructions or depressions that would endanger an aeroplane undershooting the runway and no mobile object is permitted on the declared safe area while the runway is being used for short landing operations;

(11) the slope of the declared safe area does not exceed 5 % upward nor 2 % downward in the direction of landing; and

(12) additional conditions, if specified by the Authority, taking into account aeroplane type characteristics, orographic characteristics in the approach area, available approach aids and missed approach/balked landing considerations.
Performance Class B

AOCR.POL.A.300 General

(a) The operator shall not operate a single-engined aeroplane:

(1) at night; or

(2) in IMC except under special VFR.

(b) The operator shall treat two-engined aeroplanes that do not meet the climb requirements of AOCR.POL.A.340 as single-engined aeroplanes.

AOCR.POL.A.305 Take-off

(a) The take-off mass shall not exceed the maximum take-off mass specified in the AFM for the pressure altitude and the ambient temperature at the aerodrome of departure.

(b) The unfactored take-off distance, specified in the AFM, shall not exceed:

(1) when multiplied by a factor of 1, 25, the take-off run available (TORA); or

(2) when stop way and/or clearway is available, the following:

   (i) the TORA;

   (ii) when multiplied by a factor of 1, 15, the take-off distance available (TODA); or

   (iii) when multiplied by a factor of 1, 3, the ASDA.

(c) When showing compliance with (b), the following shall be taken into account:

(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;

(5) the runway slope in the direction of take-off; and
(6) not more than 50 % of the reported headwind component or not less than 150 % of the reported tailwind component.

**AMC1 AOCR.POL.A.305 Take-off**

**RUNWAY SURFACE CONDITION**

(a) Unless otherwise specified in the AFM or other performance or operating manuals from the manufacturer, the variables affecting the take-off performance and the associated factors that should be applied to the AFM data are shown in Table 1 below. They should be applied in addition to the operational factors as prescribed in AOCR.POL.A.305.

<table>
<thead>
<tr>
<th>Surface type</th>
<th>Condition</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (on firm soil)</td>
<td>Dry</td>
<td>1.2</td>
</tr>
<tr>
<td>up to 20 cm long</td>
<td>Wet</td>
<td>1.3</td>
</tr>
<tr>
<td>Paved</td>
<td>Wet</td>
<td>1.0</td>
</tr>
</tbody>
</table>

(b) The soil should be considered firm when there are wheel impressions but no rutting.

(c) When taking off on grass with a single-engined aeroplane, care should be taken to assess the rate of acceleration and consequent distance increase.

(d) When making a rejected take-off on very short grass that is wet and with a firm subsoil, the surface may be slippery, in which case the distances may increase significantly.

**AMC2 AOCR.POL.A.305 Take-off**

**RUNWAY SLOPE**

Unless otherwise specified in the AFM, or other performance or operating manuals from the manufacturer, 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 % should only be applied when the operator has demonstrated to the Authority that the necessary data in the AFM or the operations manual contain the appropriated procedures and the crew is trained to take-off in runway with slopes in excess of 2 %.
**GM1 AOCR.POL.A.305 Take-off**

**RUNWAY SURFACE CONDITION**

(a) 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.

(b) Where this is impracticable, the commander should also consider the excess runway length available including the criticality of the overrun area.

**AOCR.POL.A.310 Take-off obstacle clearance — multi-engined aeroplanes**

(a) The take-off flight path of aeroplanes with two or more engines shall be determined in such a way that the aeroplane clears all obstacles by a vertical distance of at least 50 ft, or by a horizontal distance of at least 90 m plus 0,125 × D, where D is the horizontal distance travelled by the aeroplane from the end of the TODA or the end of the take-off distance if a turn is scheduled before the end of the TODA, except as provided in (b) and (c). 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 × D may be used. It shall 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 AOCR.POL.A.305(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 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-engines 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 (a)(4) to the end of the take-off flight path is equal to the OEI en-route climb gradient shown in the AFM.
(b) For cases where the intended flight path does not require track changes of more than 15°, the operator does not need to consider those obstacles that 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; or

2. 600 m, for flights under all other conditions.

(c) For cases where the intended flight path requires track changes of more than 15°, the operator does not need to consider those obstacles that have a lateral distance greater than:

1. 600 m, for flights under conditions allowing visual course guidance navigation; or

2. 900 m, for flights under all other conditions.

(d) When showing compliance with (a) to (c), the following shall be taken into account:

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 headwind component or not less than 150 % of the reported tailwind component.

(e) The requirements in (a) (3), (a) (4), (a) (5), (b) (2) and (c) (2) shall not be applicable to VFR operations by day.

**AMC1 AOCR.POL.A.310 Take-off obstacle clearance – multi-engined aeroplanes**

**TAKE-OFF FLIGHT PATH – VISUAL COURSE GUIDANCE NAVIGATION**

(a) In order to allow visual course guidance navigation, the weather conditions prevailing at the time of operation, including ceiling and visibility, should be such that the obstacle and/or ground reference points can be seen and identified.
(b) The operations manual should specify, for the aerodrome(s) concerned, the minimum weather conditions that 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:

1. 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;

2. the procedure should be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;

3. a written and/or pictorial description of the procedure should be provided for crew use; and

4. the limiting environmental conditions should be specified (e.g. wind, cloud, visibility, day/night, ambient lighting, obstruction lighting).

AMC2 AOCR.POL.A.310 Take-off obstacle clearance – multi-engined aeroplanes

TAKE-OFF FLIGHT PATH CONSTRUCTION

(a) For demonstrating that the aeroplane clears all obstacles vertically, a flight path should be constructed consisting of an all-engines segment to the assumed engine failure height, followed by an engine-out segment. Where the AFM does not contain the appropriate data, the approximation given in (b) may be used for the all-engines segment for an assumed engine failure height of 200 ft, 300 ft, or higher.

(b) Flight path construction

1. 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:

\[
\frac{0.57(YERC)}{Y300} = 1 + \left(\frac{VERC^2 - V2^2}{5647}\right)
\]
The factor of 0.77 as required by AOCA.POLA.310 is already included where:

\[ Y_{300} = \text{average all-engines gradient from 50 ft to 300 ft}; \]
\[ Y_{ERC} = \text{scheduled all engines en-route gross climb gradient}; \]
\[ V_{ERC} = \text{en-route climb speed, all engines knots true airspeed (TAS)}; \]
\[ V_2 = \text{take-off speed at 50 ft, knots TAS}; \]

\( (2) \) All-engines segment (50 ft to 200 ft)

This may be used as an alternative to (b) (1) where weather minima permit. 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 200 ft point is given by the following formula:

\[ Y_{200} = \frac{0.51(Y_{ERC})}{1+ (V_{ERC}^2 - V_2^2)/3388} \]

The factor of 0.77 as required by AOCA.POLA.310 is already included where:

\[ Y_{200} = \text{average all-engines gradient from 50 ft to 200 ft}; \]
\[ Y_{ERC} = \text{scheduled all engines en-route gross climb gradient}; \]
\[ V_{ERC} = \text{en-route climb speed, all engines, knots TAS}; \]
\[ V_2 = \text{take-off speed at 50 ft, knots TAS}. \]

\( (3) \) 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.

\( (4) \) The OEI flight path

The OEI flight path is given by the OEI gradient chart contained in the AFM.
GM1 AOCR.POL.A.310 Take-off obstacle clearance – multi-engined aeroplanes

OBSTACLE CLEARANCE IN LIMITED VISIBILITY

(a) Unlike the airworthiness codes applicable for performance class A aeroplanes, those for performance class B aeroplanes 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.

(b) The weather minima given up to and including 300 ft imply that if a take-off is undertaken with minima below 300 ft an OEI flight path should be plotted starting on the all-engines take-off flight path at the assumed engine failure height. This path should meet the vertical and lateral obstacle clearance specified in AOCR.POL.A.310. Should engine failure occur below this height, the associated visibility is taken as being the minimum that 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. The weather minima provisions specify that, if the assumed engine failure height is more than 300 ft, the visibility should 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.

GM2 AOCR.POL.A.310 Take-off obstacle clearance – multi-engined aeroplanes

TAKE-OFF FLIGHT PATH CONSTRUCTION

(a) This GM provides examples to illustrate the method of take-off flight path construction given in AMC2 AOCR.POL.A.310. The examples are based on an aeroplane for which the AFM shows, at a given mass, altitude, temperature and wind component the following performance data:

- factored take-off distance – 1000 m;
- take-off speed, \( V_2 \) – 90 kt;
- en-route climb speed, \( V_{ERC} \) – 120 kt;
- en-route all-engines climb gradient, \( Y_{ERC} \) – 0.2;
- en-route OEI climb gradient, \( Y_{ERC,1} \) – 0.032.
(1) Assumed engine failure height 300 ft

The average all-engines gradient from 50 ft to 300 ft may be read from Figure 1 or calculated with the following formula:

$$0.57(Y_{ERC})
Y_{300} = 1 + (V_{ERC}^2 - V_2^2)/5647$$

The factor of 0.77 as required by AOCR.POLA.310 is already included where:

- $Y_{300} =$ average all-engines gradient from 50 ft to 300 ft;
- $Y_{ERC} =$ scheduled all engines en-route gross climb gradient;
- $V_{ERC} =$ en-route climb speed, all engines knots true airspeed (TAS);
- $V_2 =$ take-off speed at 50 ft, knots TAS;

*Figure 1: Assumed engine failure height 300 ft*

(2) Assumed engine failure height 200 ft

The average all-engines gradient from 50 ft to 200 ft may be read from Figure 2 or calculated with the following formula:

$$0.51(Y_{ERC})
Y_{200} = 1 + (V_{ERC}^2 - V_2^2)/3388$$

The factor of 0.77 as required by AOCR.POLA.310 is already included where:

- $Y_{200} =$ average all-engines gradient from 50 ft to 200 ft;
Y_{ERC} = \text{scheduled all engines en-route gross climb gradient;}

V_{ERC} = \text{en-route climb speed, all engines, knots TAS;}

V_2 = \text{take-off speed at 50 ft, knots TAS.}

**Figure 2: Assumed engine failure height 200 ft**

(3) 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.

(4) 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 3: Assumed engine failure height less than 200 ft**

AOCR.POL.A.315 En-route — multi-engined aeroplanes

(a) 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, shall be capable of continuing flight at or above the relevant minimum altitudes for safe flight stated in the operations manual to a point of 1000 ft above an aerodrome at which the performance requirements can be met.

(b) It shall be assumed that, at the point of engine failure:

(1) the aeroplane is not 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 en-route gradient with OEI 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 %.

**GM1 AOCR.POLA.315 En-route – multi-engined aeroplanes**

**CRUISING ALTITUDE**

(a) 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 driftdown procedure can be planned to start.

(b) Aeroplanes may be planned to clear en-route obstacles assuming a driftdown procedure, having first increased the scheduled en-route OEI descent data by 0.5 % gradient.

**AOCR.POLA.320 En-route — single-engined aeroplanes**

(a) In the meteorological conditions expected for the flight, and in the event of engine failure, the aeroplane shall be capable of reaching a place at which a safe forced landing can be made.

(b) It shall be assumed that, at the point of engine failure:

(1) the aeroplane is not flying at an altitude exceeding that at which the rate of climb equals 300 ft per minute, with the engine operating within the maximum continuous power conditions specified; and

(2) the en-route gradient is the gross gradient of descent increased by a gradient of 0.5 %.
AMC1 AOCR.POL.A.320 En-route - single-engined aeroplanes

ENGINE FAILURE

AOCR.POL.A.320 (a) requires the operator to ensure that in the event of an engine failure, the aeroplane should be capable of reaching a point from which a safe forced landing can be made. Unless otherwise specified by the Authority, this point should be 1 000 ft above the intended landing area.

GM1 AOCR.POL.A.320 En-route – single-engined aeroplanes

ENGINE FAILURE

(a) In the event of an engine failure, single-engined 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 that extends below the relevant minimum safe altitude.

(b) The operator 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.

(c) 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.

AOCR.POL.A.325 Landing — destination and alternate aerodromes

The landing mass of the aeroplane determined in accordance with AOCR.POL.A.105(a) shall not exceed the maximum landing mass specified for the altitude and the ambient temperature expected at the estimated time of landing at the destination aerodrome and alternate aerodrome.

AMC1 AOCR.POL.A.325 Landing – destination and alternate aerodromes

ALTITUDE MEASURING

The operator should use either pressure altitude or geometric altitude for its operation and this should be reflected in the operations manual.
AOCR.POL.A.330 Landing — dry runways

(a) The landing mass of the aeroplane determined in accordance with AOCR.POL.A.105(a) for the estimated time of landing at the destination aerodrome and at any alternate aerodrome shall allow a full stop landing from 50 ft above the threshold within 70% of the LDA taking into account:

(1) the altitude at the aerodrome;

(2) not more than 50% of the headwind component or not less than 150% of the tailwind component;

(3) the runway surface condition and the type of runway surface; and

(4) the runway slope in the direction of landing.

(b) For steep approach operations, the operator shall use landing distance data factored in accordance with (a) based on a screen height of less than 60 ft, but not less than 35 ft, and comply with AOCR.POL.A.345.

(c) For short landing operations, the operator shall use landing distance data factored in accordance with (a) and comply with AOCR.POL.A.350.

(d) For dispatching the aeroplane in accordance with (a) to (c), it shall 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, the ground handling characteristics of the aeroplane and other conditions such as landing aids and terrain.

(e) If the operator is unable to comply with (d)(2) for the destination aerodrome, the aeroplane shall only be dispatched if an alternate aerodrome is designated that permits full compliance with (a) to (d).

AMC1 AOCR.POL.A.330 Landing — dry runways

LANDING DISTANCE CORRECTION FACTORS

(a) Unless otherwise specified in the AFM, 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 AFM data is shown in the table below. It should be applied in addition to the operational factors as prescribed in AOCR.POL.A.330 (a).

**Table 1: Landing distance correction factors**

<table>
<thead>
<tr>
<th>Surface type</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (on firm soil up to 20 cm long)</td>
<td>1.15</td>
</tr>
</tbody>
</table>

(b) The soil should be considered firm when there are wheel impressions but no rutting.

**AMC2 AOCR.POL.A.330 Landing – dry runways**

**RUNWAY SLOPE**

Unless otherwise specified in the AFM, or other performance or operating manuals from the manufacturer, the landing distances required should be increased by 5 % for each 1 % of downslope.

**GM1 AOCR.POL.A.330 Landing – dry runways**

**LANDING MASS**

AOCR.POL.A.330 establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

(a) Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 70 % of the LDA 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.

(b) 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 (a), in which case dispatch should be based on this lesser mass.

(c) The expected wind referred to in (b) is the wind expected to exist at the time of arrival.
AOCR.POL.A.335 Landing — wet and contaminated runways

(a) When the appropriate weather reports and/or forecasts indicate that the runway at the estimated time of arrival may be wet, the LDA shall be equal to or exceed the required landing distance, determined in accordance with AOCR.POL.A.330, multiplied by a factor of 1,15.

(b) When the appropriate weather reports and/or forecasts indicate that the runway at the estimated time of arrival may be contaminated, the landing distance shall not exceed the LDA. The operator shall specify in the operations manual the landing distance data to be applied.

(c) A landing distance on a wet runway shorter than that required by (a), but not less than that required by AOCR.POL.A.330(a), may be used if the AFM includes specific additional information about landing distances on wet runways.

GM1 AOCR.POL.A.335 Landing - wet and contaminated runways

LANDING ON WET GRASS RUNWAYS

(a) When landing on very short grass that 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).

(b) 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.

AOCR.POL.A.340 Take-off and landing climb requirements

The operator of a two-engined aeroplane shall fulfil the following take-off and landing climb requirements.

(a) Take-off climb

(1) All engines operating

   (i) The steady gradient of climb after take-off shall 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 seven 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 VMC (minimum control speed on or near ground) and 1,2 VS1 (stall speed or minimum steady flight speed in the landing configuration).

(2) OEI

(i) The steady gradient of climb at an altitude of 400 ft above the take-off surface shall 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 shall 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 VS1.

(b) Landing climb

(1) All engines operating
(i) The steady gradient of climb shall be at least 2.5% with:
   (A) not more than the power or thrust that is available eight 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 VREF (reference landing speed).

(2) OEI

(i) The steady gradient of climb shall be not less than 0.75% at an altitude of 1500 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 VS1.

AOCR.POL.A.345 Approval of steep approach operations

(a) Steep approach operations using glideslope angles of 4.5° or more and with screen heights of less than 60 ft, but not less than 35 ft, require prior approval by the Authority.

(b) To obtain the approval, the operator shall provide evidence that the following conditions are met:

(1) the AFM states 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; and
(2) for each aerodrome at which steep approach operations are to be conducted:

(i) a suitable glide path reference system, comprising at least a visual glide path indicating system, is available;

(ii) weather minima are specified; and

(iii) the following items are taken into consideration:

(A) the obstacle situation;

(B) the type of glide path reference and runway guidance;

(C) the minimum visual reference to be required at DH and MDA;

(D) available airborne equipment;

(E) pilot qualification and special aerodrome familiarisation;

(F) AFM limitations and procedures; and

(G) missed approach criteria.

**AOCR.POL.A.350 Approval of short landing operations**

(a) Short landing operations require prior approval by the Authority.

(b) To obtain the approval, the operator shall provide evidence that the following conditions are met:

(1) 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 LDA;

(2) the use of the declared safe area is approved by the State of the aerodrome;

(3) the declared safe area is clear of obstructions or depressions that would endanger an aeroplane undershooting the runway and no mobile object is permitted on the declared safe area while the runway is being used for short landing operations;
(4) the slope of the declared safe area does not exceed 5% upward nor 2% downward slope in the direction of landing;

(5) the usable length of the declared safe area does not exceed 90 m;

(6) the width of the declared safe area is not less than twice the runway width, centred on the extended runway centreline;

(7) the crossing height over the beginning of the usable length of the declared safe area is not less than 50 ft;

(8) weather minima are specified for each runway to be used and are not less than the greater of VFR or NPA minima;

(9) pilot experience, training and special aerodrome familiarisation requirements are specified and met;

(10) additional conditions, if specified by the Authority, taking into account the aeroplane type characteristics, orographic characteristics in the approach area, available approach aids and missed approach/balked landing considerations.
Performance Class C

AOCR.POL.A.400 Take-off

(a) The take-off mass shall not exceed the maximum take-off mass specified in the AFM for the pressure altitude and the ambient temperature at the aerodrome of departure.

(b) For aeroplanes that have take-off field length data contained in their AFM 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;
2. 1,25 for aeroplanes having three engines; or
3. 1,18 for aeroplanes having four engines,

shall not exceed the take-off run available (TORA) at the aerodrome at which the take-off is to be made.

(c) For aeroplanes that have take-off field length data contained in their AFM which accounts for engine failure, the following requirements shall be met in accordance with the specifications in the AFM:

1. the accelerate-stop distance shall not exceed the ASDA;
2. the take-off distance shall not exceed the take-off distance available (TODA), with a clearway distance not exceeding half of the TORA;
3. the take-off run shall not exceed the TORA;
4. a single value of V 1 for the rejected and continued take-off shall be used; and
5. on a wet or contaminated runway the take-off mass shall not exceed that permitted for a take-off on a dry runway under the same conditions.

(d) The following shall be taken into account:

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;

(4) the runway slope in the direction of take-off;

(5) not more that 50 % of the reported headwind 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.

AMC1 AOCR.POL.A.400 Take-off

LOSS OF RUNWAY LENGTH DUE TO ALIGNMENT

(a) The length of the runway that 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:

(1) the minimum distance of the main wheels from the start of the runway for determining TODA and TORA, “L”; and

(2) the minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA, “N”.

Figure 1: Line-up of the aeroplane in the direction of take-off – L and N

Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in (b) may be used to determine the alignment distance.
(b) Alignment distance calculation

The distances mentioned in (a)(1) and (a)(2) above are:

<table>
<thead>
<tr>
<th></th>
<th>90° entry</th>
<th>180° turnaround</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>RM + X</td>
<td>RN + Y</td>
</tr>
<tr>
<td>N</td>
<td>RM + X + WB</td>
<td>RN + Y + WB</td>
</tr>
</tbody>
</table>

where:

\[ RN = A + WN = \frac{WB}{\cos(90°-\alpha)} \]

\[ RM = B + WM = WB \tan(90°-\alpha) + WM \]

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, 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

WM = wheel base

a = steering angle.

**AMC2 AOCR.POL.A.400 Take-off**

**RUNWAY SLOPE**

Unless otherwise specified in the AFM, or other performance or operating manuals from the manufacturers, the take-off distance should be increased by 5% for each 1% of upslope. However, correction factors for runways with slopes in excess of 2% should only be applied when:

(a) the operator has demonstrated to the Authority that the necessary data in the AFM or the operations manual contain the appropriated procedures; and

(b) the crew is trained to take-off on runways with slopes in excess of 2%.

**GM1 AOCR.POL.A.400 Take-off**

**RUNWAY SURFACE CONDITION**

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/she may consider a take-off, provided that he/she has applied the applicable performance adjustments, and any further safety measures he/she considers justified under the prevailing conditions.

**AOCR.POL.A.405 Take-off obstacle clearance**

(a) The take-off flight path with OEI shall be determined such that the aeroplane clears all obstacles by a vertical distance of at least 50 ft
plus 0,01 \times D, or by a horizontal distance of at least 90 m plus 0,125 \times D, where D is the horizontal distance the aeroplane has travelled from the end of the TODA. 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 \times D may be used.

(b) The take-off flight path shall begin at a height of 50 ft above the surface at the end of the take-off distance required by AO.CR.POL.A.405(b) or (c), as applicable, and end at a height of 1 500 ft above the surface.

(c) When showing compliance with (a), the following shall be taken into account:

(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 headwind component or not less than 150 % of the reported tailwind component.

(d) Track changes shall not be allowed up to that point of the take-off flight path where a height of 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 shall be made for the effect of bank angle on operating speeds and flight path, including the distance increments resulting from increased operating speeds.

(e) For cases that do not require track changes of more than 15°, the operator does not need to consider those obstacles that 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; or

(2) 600 m, for flights under all other conditions.

(f) For cases that do require track changes of more than 15°, the operator does not need to consider those obstacles that 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; or

(2) 900 m, for flights under all other conditions.

(g) The operator shall establish contingency procedures to satisfy (a) to (f) and to provide a safe route, avoiding obstacles, to enable the aeroplane to either comply with the en-route requirements of AOCR.POL.A.410, or land at either the aerodrome of departure or at a take-off alternate aerodrome.

**AMC1 AOCR.POL.A.405 Take-off obstacle clearance**

**EFFECT OF BANK ANGLES**

(a) The AFM generally provides a climb gradient decrement for a 15° bank turn. Unless otherwise specified in the AFM or other performance or operating manuals from the manufacturer, acceptable adjustments to assure adequate stall margins and gradient corrections are provided by the following:

<table>
<thead>
<tr>
<th>Bank</th>
<th>Speed</th>
<th>Gradient correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>15°</td>
<td>V2</td>
<td>1 x AFM 15° gradient loss</td>
</tr>
<tr>
<td>20°</td>
<td>V2 + 5 kt</td>
<td>2 x AFM 15° gradient loss</td>
</tr>
<tr>
<td>25°</td>
<td>V2 + 10 kt</td>
<td>3 x AFM 15° gradient loss</td>
</tr>
</tbody>
</table>

(b) For bank angles of less than 15°, a proportionate amount may be applied, unless the manufacturer or AFM has provided other data.

**AMC2 AOCR.POL.A.405 Take-off obstacle clearance**

**REQUIRED NAVIGATIONAL ACCURACY**

(a) Navigation systems
The obstacle accountability semi-widths of 300 m and 600 m may be used if the navigation system under OEI conditions provides a two standard deviation accuracy of 150 m and 300 m respectively.

(b) Visual course guidance

(1) The obstacle accountability semi-widths of 300 m and 600 m 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 crew compartment 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.

(2) For visual course guidance navigation, the 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 that 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; and

(iv) the limiting environmental conditions (such as wind, the lowest cloud base, ceiling, visibility, day/night, ambient lighting, obstruction lighting) should be specified.

AOCR.POL.A.410 En-route — all engines operating

(a) In the meteorological conditions expected for the flight, at any point on its route or on any planned diversion therefrom, the aeroplane shall 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 therefrom, 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 AOCR.POL.A.415 and 420, as appropriate.

**AOCR.POL.A.415 En-route — OEI**

(a) 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 therefrom and with the other engine(s) operating within the maximum continuous power conditions specified, the aeroplane shall be capable of continuing the flight from the cruising altitude to an aerodrome where a landing can be made in accordance with AOCR.POL.A.430 or AOCR.POL.A.435, as appropriate. The aeroplane shall clear 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) 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) The width margins of (a) shall be increased to 18,5 km (10 NM) if the navigational accuracy does not meet at least RNP5.

(e) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.
**AOCR.POL.A.415 En-route – OEI**

**ROUTE ANALYSIS**

The high terrain or obstacle analysis should 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 OEI 1 000 ft above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a driftdown procedure must be evaluated, based on engine failure at the most critical point, and must show obstacle clearance during the driftdown by at least 2 000 ft. The minimum cruise altitude is determined from the driftdown path, taking into account allowances for decision making, and the reduction in the scheduled rate of climb (See Figure 1).

![Figure 1: Intersection of the driftdown paths](image)

**AOCR.POL.A.420 En-route — aeroplanes with three or more engines, two engines inoperative**

(a) At no point along the intended track shall 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 (b) to (e).

(b) The two-engines-inoperative flight path shall 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 2 000 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 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 shall 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) The available rate of climb of the aeroplane shall be taken to be 150 ft per minute less than that specified.

(f) The width margins of (b) shall be increased to 18.5 km (10 NM) if the navigational accuracy does not meet at least RNP5.

(g) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.

**AOCR.POL.A.425 Landing — destination and alternate aerodromes**

The landing mass of the aeroplane determined in accordance with AOCR.POL.A.105(a) shall not exceed the maximum landing mass specified in the AFM for the altitude and, if accounted for in the AFM, the ambient temperature expected for the estimated time of landing at the destination aerodrome and alternate aerodrome.

**AMC1 AOCR.POL.A.425 Landing — destination and alternate aerodromes**

### ALTITUDE MEASURING

The operator should use either pressure altitude or geometric altitude for its operation and this should be reflected in the operations manual.

**AOCR.POL.A.430 Landing — dry runways**

(a) The landing mass of the aeroplane determined in accordance with AOCR.POL.A.105(a) for the estimated time of landing at the destination aerodrome and any alternate aerodrome shall allow a full stop landing from 50 ft above the threshold within 70% of the LDA taking into account:
(1) the altitude at the aerodrome;

(2) not more than 50% of the headwind component or not less than 150% of the tailwind component;

(3) the type of runway surface; and

(4) the slope of the runway in the direction of landing.

(b) For dispatching the aeroplane it shall 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, the ground handling characteristics of the aeroplane and other conditions such as landing aids and terrain.

(c) If the operator is unable to comply with (b)(2) for the destination aerodrome, the aeroplane shall only be dispatched if an alternate aerodrome is designated that permits full compliance with (a) and (b).

**AMC1 AOCR.POL.A.430 Landing – dry runways**

**LANDING DISTANCE CORRECTION FACTORS**

(a) Unless otherwise specified in the AFM or other performance or operating manuals from the manufacturers, the variables affecting the landing performance and the associated factors to be applied to the AFM data are shown in the table below. It should be applied in addition to the factor specified in AOCR.POL.A.430.

<table>
<thead>
<tr>
<th>Surface type</th>
<th>factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (on firm soil up to 20 cm long)</td>
<td>1.2</td>
</tr>
</tbody>
</table>

(b) The soil should be considered firm when there are wheel impressions but no rutting.

**AMC2 AOCR.POL.A.430 Landing – dry runways**

**RUNWAY SLOPE**
Unless otherwise specified in the AFM, or other performance or operating manuals from the manufacturer, the landing distances required should be increased by 5% for each 1% of downslope.

**GM1 AOCR.POL.A.430 Landing - dry runways**

**LANDING MASS**

AOCR.POL.A.430 establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

(a) Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 70% of the LDA 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.

(b) 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 (a), in which case dispatch should be based on this lesser mass.

(c) The expected wind referred to in (b) is the wind expected to exist at the time of arrival.

**AOCR.POL.A.435 Landing — wet and contaminated runways**

(a) When the appropriate weather reports and/or forecasts indicate that the runway at the estimated time of arrival may be wet, the LDA shall be equal to or exceed the required landing distance, determined in accordance with AOCR.POL.A.430, multiplied by a factor of 1.15.

(b) When the appropriate weather reports and/or forecasts indicate that the runway at the estimated time of arrival may be contaminated, the landing distance shall not exceed the LDA. The operator shall specify in the operations manual the landing distance data to be applied.
D. MOTOR POWERED AIRCRAFT – MASS AND BALANCE

AOCR.POL.MAB.100 Mass and balance, loading

(a) During any phase of operation, the loading, mass and centre of gravity (CG) of the aircraft shall comply with the limitations specified in the AFM, or the operations manual if more restrictive.

(b) The operator shall establish the mass and the CG of any aircraft by actual weighing prior to initial entry into service and thereafter at intervals of four years if individual aircraft masses are used, or nine years if fleet masses are used. The accumulated effects of modifications and repairs on the mass and balance shall be accounted for and properly documented. Aircraft shall be reweighed if the effect of modifications on the mass and balance is not accurately known.

(c) The weighing shall be accomplished by the manufacturer of the aircraft or by an approved maintenance organisation.

(d) The operator shall determine the mass of all operating items and crew members included in the aircraft dry operating mass by weighing or by using standard masses. The influence of their position on the aircraft’s CG shall be determined.

(e) The operator shall establish the mass of the traffic load, including any ballast, by actual weighing or by determining the mass of the traffic load in accordance with standard passenger and baggage masses.

(f) In addition to standard masses for passengers and checked baggage, the operator can use standard masses for other load items, if it demonstrates to the Authority that these items have the same mass or that their masses are within specified tolerances.

(g) The operator shall 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.

(h) The operator shall ensure that the loading of:

(1) its aircraft is performed under the supervision of qualified personnel; and

(2) traffic load is consistent with the data used for the calculation of the aircraft mass and balance.
(i) The operator shall comply with additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment and the maximum seating limit. For helicopters, in addition, the operator shall take account of in-flight changes in loading.

(j) The 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 contained in (a) to (i). This system shall cover all types of intended operations.

**AMC1 AOCR.POL.MAB.100(a) Mass and balance, loading**

**CENTRE OF GRAVITY LIMITS – OPERATIONAL CG ENVELOPE AND IN-FLIGHT CG**

In the Certificate Limitations section of the AFM, forward and aft 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. The operator should ensure that these limits are respected by:

(a) Defining and applying operational margins to the certified CG envelope in order to compensate for the following deviations and errors:

(1) Deviations of actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations.

(2) Deviations in fuel distribution in tanks from the applicable schedule.

(3) Deviations in the distribution of baggage and cargo in the various compartments as compared with the assumed load distribution as well as inaccuracies in the actual mass of baggage and cargo.

(4) Deviations in actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation. Large CG errors may occur when “free seating”, i.e. freedom of passengers to select any seat when entering the aircraft, 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 aircraft.

(5) Deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position.

(6) Deviations of the CG caused by gear and flap positions and by application of the prescribed fuel usage procedure, unless already covered by the certified limits.

(7) Deviations caused by in-flight movement of cabin crew, galley equipment and passengers.

(8) On small aeroplanes, deviations caused by the difference between actual passenger masses and standard passenger masses when such masses are used.

(b) Defining and applying operational procedures in order to:

(1) ensure an even distribution of passengers in the cabin;

(2) take into account any significant CG travel during flight caused by passenger/crew movement; and

(3) take into account any significant CG travel during flight caused by fuel consumption/transfer.

**AMC1 AOCR.POL.MAB.100(b) Mass and balance, loading**

**WEIGHING OF AN AIRCRAFT**

(a) New aircraft that have been weighed at the factory may be placed into operation without reweighing if the mass and balance records have been adjusted for alterations or modifications to the aircraft. Aircraft transferred from one EU operator to another EU operator do not have to be weighed prior to use by the receiving operator, unless more than 4 years have elapsed since the last weighing.

(b) The mass and centre of gravity (CG) position of an aircraft should be revised whenever the cumulative changes to the dry operating mass exceed ±0.5 % of the maximum landing mass or for aeroplanes the cumulative change in CG position exceeds 0.5 % of the mean aerodynamic chord. This may be done by weighing the aircraft or by calculation.
(c) When weighing an aircraft, normal precautions should be taken consistent with good practices such as:

(1) checking for completeness of the aircraft and equipment;
(2) determining that fluids are properly accounted for;
(3) ensuring that the aircraft is clean; and
(4) ensuring that weighing is accomplished in an enclosed building.

(d) Any equipment used for weighing should be properly calibrated, zeroed, and used in accordance with the manufacturer’s instructions. Each scale should be calibrated either by the manufacturer, by a civil department of weights and measures or by an appropriately authorized organisation within two years or within a time period defined by the manufacturer of the weighing equipment, whichever is less. The equipment should enable the mass of the aircraft to be established accurately. One single accuracy criterion for weighing equipment cannot be given. However, the weighing accuracy is considered satisfactory if the accuracy criteria in Table 1 are met by the individual scales/cells of the weighing equipment used:

<table>
<thead>
<tr>
<th>For a scale/cell load</th>
<th>An accuracy of</th>
</tr>
</thead>
<tbody>
<tr>
<td>below 2 000 kg</td>
<td>±1 %</td>
</tr>
<tr>
<td>from 2 000 kg to 20 000 kg</td>
<td>±20 kg</td>
</tr>
<tr>
<td>Above 20 000 kg</td>
<td>±0·1 %</td>
</tr>
</tbody>
</table>

**AMC2 AOCR.POL.MAB.100(b) Mass and balance, loading**

**FLEET MASS AND CG POSITION – AEROPLANES**

(a) For a 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:

(1) the dry operating mass of an individual aeroplane does not differ by more than ±0·5 % of the maximum structural landing mass from the established dry operating fleet mass; or
(2) the CG position of an individual aeroplane does not differ by more than $\pm 0.5\%$ of the mean aerodynamic chord from the established fleet CG.

(b) The operator should verify that, after an equipment or configuration change or after weighing, the aeroplane falls within the tolerances above.

(c) To add an aeroplane to a fleet operated with fleet values, the operator should verify by weighing or calculation that its actual values fall within the tolerances specified in (a)(1) and (2).

(d) To obtain fleet values, the operator should weigh, in the period between two fleet mass evaluations, a certain number of aeroplanes as specified in Table 1, where “$n$” is the number of aeroplanes in the fleet using fleet values. Those aeroplanes in the fleet that have not been weighed for the longest time should be selected first.

**Table 1: Minimum number of weighing to obtain fleet values**

<table>
<thead>
<tr>
<th>Number of aeroplanes in the fleet</th>
<th>Minimum number of weighing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or 3</td>
<td>$n$</td>
</tr>
<tr>
<td>4 to 9</td>
<td>$(n + 3)/2$</td>
</tr>
<tr>
<td>10 or more</td>
<td>$(n + 51)/10$</td>
</tr>
</tbody>
</table>

(e) The interval between two fleet mass evaluations should not exceed 48 months.

(f) The fleet values should be updated at least at the end of each fleet mass evaluation.

(g) Aeroplanes that have not been weighed since the last fleet mass evaluation may be kept in a fleet operated with fleet values, provided that the individual values are revised by calculation and stay within the tolerances above. If these individual values no longer fall within the tolerances, the operator should determine new fleet values or operate aeroplanes not falling within the limits with their individual values.

(h) If an individual aeroplane mass is within the dry operating fleet mass tolerance but its CG position exceeds the tolerance, the aeroplane may be operated under the applicable dry operating fleet mass but with an individual CG position.

(i) Aeroplanes for which no mean aerodynamic chord has been published should be operated with their individual mass and CG position values.
They may be operated under the dry operating fleet mass and CG position, provided that a risk assessment has been completed.

**AMC3 AOCR.POL.MAB.100(b) Mass and balance, loading**

**CENTRE OF GRAVITY LIMITS — OPERATIONAL CG ENVELOPE AND IN-FLIGHT CG**

In the Certificate Limitations section of the AFM, forward and aft 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. The operator should ensure that these limits are respected by:

(a) Defining and applying operational margins to the certified CG envelope in order to compensate for the following deviations and errors:

(1) Deviations of actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations.

(2) Deviations in fuel distribution in tanks from the applicable schedule.

(3) Deviations in the distribution of baggage and cargo in the various compartments as compared with the assumed load distribution as well as inaccuracies in the actual mass of baggage and cargo.

(4) Deviations in actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation. Large CG errors may occur when ‘free seating’, i.e. freedom of passengers to select any seat when entering the aircraft, 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 aircraft.

(5) Deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position.
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.

Deviations caused by in-flight movement of cabin crew, galley equipment and passengers.

On small aeroplanes, deviations caused by the difference between actual passenger masses and standard passenger masses when such masses are used.

Defining and applying operational procedures in order to:

1. ensure an even distribution of passengers in the cabin;
2. take into account any significant CG travel during flight caused by passenger/crew movement; and
3. take into account any significant CG travel during flight caused by fuel consumption/transfer.

AMC1 CAT.POL.MAB.100(d) Mass and balance, loading

Dry Operating Mass

The dry operating mass includes:

(a) crew and crew baggage;
(b) catering and removable passenger service equipment; and
(c) tank water and lavatory chemicals.

AMC2 CAT.POL.MAB.100(d) Mass and balance, loading

Mass Values for Crew Members

(a) The operator should use the following mass values for crew 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 crew/technical crew members and 75 kg for cabin crew members.
(b) The operator should correct the dry operating mass to account for any additional baggage. The position of this additional baggage should be accounted for when establishing the centre of gravity of the aeroplane.

AMC1 AOCPOL.MAB.100(e) Mass and balance, loading

MASS VALUES FOR PASSENGERS AND BAGGAGE

(a) When the number of passenger seats available is:

(1) less than 10 for aeroplanes; or

(2) less than 6 for helicopters,

passenger mass may be calculated on the basis of a statement by, or on behalf of, each passenger, adding to it a predetermined mass to account for hand baggage and clothing.

The predetermined mass for hand baggage and clothing should be established by the operator on the basis of studies relevant to his particular operation. In any case, it should not be less than:

(1) 4 kg for clothing; and

(2) 6 kg for hand baggage.

The passengers stated mass and the mass of passengers clothing and hand baggage should be checked prior to boarding and adjusted, if necessary. The operator should establish a procedure in the operations manual when to select actual or standard masses and the procedure to be followed when using verbal statements.

(b) When determining the actual mass by weighing, passengers personal belongings and hand baggage should be included. Such weighing should be conducted immediately prior to boarding the aircraft.

(c) When determining the mass of passengers by using standard mass values, the standard mass values in Tables 1 and 2 below should be used. The standard masses include hand baggage and the mass of any infant carried by an adult on one passenger seat. Infants occupying separate passenger seats should be considered as children for the purpose of this AMC. When the total number of passenger seats available on an aircraft is 20 or more, the standard masses for males and females in Table 1 should be used. 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 may be used.
Table 1: Standard masses for passengers – aircraft with a total number of passenger seats of 20 or more

<table>
<thead>
<tr>
<th>Passenger seat:</th>
<th>20 and more</th>
<th>30 and more</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>All flights except holiday charters</td>
<td>88 kg</td>
<td>70 kg</td>
</tr>
<tr>
<td>Holiday charters*</td>
<td>83 kg</td>
<td>69 kg</td>
</tr>
<tr>
<td>Children</td>
<td>35 kg</td>
<td>35 kg</td>
</tr>
</tbody>
</table>

* Holiday charter means a charter flight that is part of a holiday travel package. On such flights 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. The holiday charter mass values apply provided that not more than 5% of passenger seats installed in the aircraft are used for the non-revenue carriage of certain categories of passengers. Categories of passengers such as company personnel, tour operators” staff, representatives of the press, authority officials etc. can be included within the 5% without negating the use of holiday charter mass values.

Table 2: Standard masses for passengers – aircraft with a total number of passenger seats of 19 or less

<table>
<thead>
<tr>
<th>Passenger seats:</th>
<th>1-5</th>
<th>6-9</th>
<th>10-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1104 kg</td>
<td>96 kg</td>
<td>92 kg</td>
</tr>
<tr>
<td>Female</td>
<td>86 kg</td>
<td>78 kg</td>
<td>74 kg</td>
</tr>
<tr>
<td>Children</td>
<td>35 kg</td>
<td>35 kg</td>
<td>35 kg</td>
</tr>
</tbody>
</table>

(1) On aeroplane flights with 19 passenger seats or less and all helicopter flights where no hand baggage is carried in the cabin or where hand baggage is accounted for separately, 6 kg may be deducted from male and female masses in Table 2. Articles such as an overcoat, an umbrella, a small handbag or purse, reading material or a small camera are not considered as hand baggage.

(2) For helicopter operations in which a survival suit is provided to passengers, 3 kg should be added to the passenger mass value.

(d) Mass values for baggage
Aeroplanes. When the total number of passenger seats available on the aeroplane is 20 or more, the standard mass values for checked baggage of Table 3 should be used.

Helicopters. When the total number of passenger seats available on the helicopters is 20 or more, the standard mass value for checked baggage should be 13 kg.

For aircraft with 19 passenger seats or less, the actual mass of checked baggage should be determined by weighing.

Table 3: Standard masses for baggage – aeroplanes with a total number of passenger seats of 20 or more

<table>
<thead>
<tr>
<th>Type of flight</th>
<th>Baggage standard mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>11 kg</td>
</tr>
<tr>
<td>Intercontinental</td>
<td>15 kg</td>
</tr>
<tr>
<td>Regional</td>
<td>13 kg</td>
</tr>
</tbody>
</table>

Other standard masses may be used provided they are calculated on the basis of a detailed weighing survey plan and a reliable statistical analysis method is applied. The operator should advise the Authority about the intent of the passenger weighing survey and explain the survey plan in general terms. The revised standard mass values should only be used in circumstances comparable with those under which the survey was conducted. Where the revised standard masses exceed those in Tables 1, 2 and 3 of, then such higher values should be used.

On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to significantly deviate from the standard passenger mass, the operator should determine the actual mass of such passengers by weighing or by adding an adequate mass increment.

If standard mass values for checked baggage are used and a significant number of passengers checked baggage is expected to significantly deviate from the standard baggage mass, the operator should determine the actual mass of such baggage by weighing or by adding an adequate mass increment.

**AMC2 AOCR.POL.MAB.100(e) Mass and balance, loading**

**PROCEDURE FOR ESTABLISHING REVISED STANDARD MASS VALUES FOR PASSENGERS AND BAGGAGE**

(a) Passengers
(1) Weight sampling method. The average mass of passengers and their hand baggage should be determined by weighing, taking random samples. The selection of random samples should 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 aircraft.

(2) Sample size. The survey plan should cover the weighing of at least the greatest of:

(i) a number of passengers calculated from a pilot sample, using normal statistical procedures and based on a relative confidence range (accuracy) of 1 % for all adult and 2 % for separate male and female average masses; and

(ii) for aircraft:

(A) with a passenger seating capacity of 40 or more, a total of 2 000 passengers; or

(B) with a passenger seating capacity of less than 40, a total number of 50 multiplied by the passenger seating capacity.

(3) Passenger masses. Passenger masses should include the mass of the passengers’ belongings that are carried when entering the aircraft. When taking random samples of passenger masses, infants should be weighted together with the accompanying adult.

(4) Weighing location. The location for the weighing of passengers should be selected as close as possible to the aircraft, at a point where a change in the passenger mass by disposing of or by acquiring more personal belongings is unlikely to occur before the passengers board the aircraft.

(5) Weighing machine. The weighing machine used for passenger weighing should have a capacity of at least 150 kg. The mass should be displayed at minimum graduations of 500 g. The weighing machine should have an accuracy of at least 0.5 % or 200 g, whichever is 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 should 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 should comply with (a)(1) and (a)(2). For baggage, the relative confidence range (accuracy) should amount to 1 %. A minimum of 2000 pieces of checked baggage should 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 should be carried out. Such an analysis should generate average mass values for passengers and baggage as well as other data.

(2) On aircraft with 20 or more passenger seats, these averages apply as revised standard male and female mass values.

(3) On aircraft with 19 passenger seats or less, the increments in Table 1 should be added to the average passenger mass to obtain the revised standard mass values:

<table>
<thead>
<tr>
<th>Number of passenger seats</th>
<th>Required mass increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 incl.</td>
<td>16 kg</td>
</tr>
<tr>
<td>6-9 incl.</td>
<td>8 kg</td>
</tr>
<tr>
<td>10-19 incl.</td>
<td>4 kg</td>
</tr>
</tbody>
</table>

Alternatively, all adult revised standard (average) mass values may be applied on aircraft with 30 or more passenger seats. Revised standard (average) checked baggage mass values are applicable to aircraft with 20 or more passenger seats.

(4) The revised standard masses should be reviewed at intervals not exceeding 5 years.

(5) All adult revised standard mass values should be based on a male/female ratio of 80/20 in respect of all flights except holiday charters that are 50/50. A different ratio on specific routes or
flights may be used, provided supporting data shows that the alternative male/female ratio is conservative and covers at least 84% of the actual male/female ratios on a sample of at least 100 representative flights.

(6) The resulting average mass values should be rounded to the nearest whole number in kg. Checked baggage mass values should be rounded to the nearest 0.5 kg figure, as appropriate.

(7) When operating on similar routes or networks, operators may pool their weighing surveys provided that in addition to the joint weighing survey results, results from individual operators participating in the joint survey are separately indicated in order to validate the joint survey results.

GM1 AOCR.POL.MAB.100(e) Mass and balance, loading

ADJUSTMENT OF STANDARD MASSES

When standard mass values are used, AMC1 AOCR.POL.MAB.100(d) item (g) states that the operator should identify and adjust the passenger and checked baggage masses in cases where significant numbers of passengers or quantities of baggage are suspected of significantly deviating from the standard values. Therefore the operations manual should contain instructions 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 significantly deviate from the standard passenger mass, and/or groups of passengers carrying exceptionally heavy baggage (e.g. military personnel or sports teams); and

(b) on small aircraft, where the risks of overload and/or CG errors are the greatest, pilots pay special attention to the load and its distribution and make proper adjustments.

GM2 AOCR.POL.MAB.100(e) Mass and Balance, Loading

STATISTICAL EVALUATION OF PASSENGERS AND BAGGAGE DATA

(a) Sample size.

(1) For calculating the required sample size it is necessary to make an estimate of the standard deviation on the basis of standard deviations calculated for similar populations or for preliminary
surveys. The precision of a sample estimate is calculated for 95 % reliability or “significance”, i.e. there is a 95 % probability that the true value falls within the specified confidence interval around the estimated value. This standard deviation value is also used for calculating the standard passenger mass.

(2) As a consequence, for the parameters of mass distribution, i.e. mean and standard deviation, three cases have to be distinguished:

(i) \( \mu, \sigma = \) 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) \( \mu', \sigma' = \) the “a priori” 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:

\[
n \geq \frac{(1.96 + \sigma' \times 100)^2}{(e_r + \mu)^2}
\]

where:

\( n = \) number of passengers to be weighed (sample size)

\( e_r = \) allowed relative confidence range (accuracy) for the estimate of \( \mu \) by (see also equation in (c)). 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 \( \pm 1 \% \), then \( e_r \) will be \( 1 \) in the above formula.

1.96 = value from the Gaussian distribution for 95 % significance level of the resulting confidence interval.

(b) Calculation of average mass and standard deviation If the sample of passengers weighed is drawn at random, then the arithmetic mean of the sample (\( x \)) is an unbiased estimate of the true average mass (\( \mu \)) of the population.
(1) Arithmetic mean of sample where:

\[ \bar{x} = \frac{\sum_{j=1}^{n} x_j}{n} \]

where \( x_j \) = mass values of individual passengers (sampling units).

(2) Standard deviation where:

\[ s = \sqrt{\frac{\sum_{j=1}^{n} (x_j - \bar{x})^2}{n-1}} \]

\( x_j - \bar{x} \) = deviation of the individual value from the sample mean.

(c) Checking the accuracy of the sample mean. The accuracy (confidence range) which can be ascribed to the sample mean as an indicator of the true mean is a function of the standard deviation of the sample which has to be checked after the sample has been evaluated. This is done using the formula:

\[ e_r = \frac{1.96 \times s \times 100}{\sqrt{n} \times \bar{x}} \text{ } \% \]

whereby \( e_r \) should not exceed 1% for an all adult average mass and 2% for an average male and/or female mass. The result of this calculation gives the relative accuracy of the estimate of \( \mu \) at the 95% significance level. This means that with 95% probability, the true average mass \( \mu \) lies within the interval:

\[ \bar{x} \pm \frac{1.96 \times s}{\sqrt{n}} \]

(d) Example of determination of the required sample size and average passenger mass

(1) 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.

(2) Determination of required sample size. For calculating the required sample size, estimates of the standard (average) passenger mass and the standard deviation are needed. The “a priori” 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 should be weighed so that the required values can be calculated. The latter has been assumed for the example.

Step 1: Estimated average passenger mass.

\[
\bar{x} = \frac{\sum x_j}{n}
\]

\[
\mu' = \bar{x} = \frac{\sum x_j}{n} = \frac{6071.6}{86}
\]

\[
\mu' = \bar{x} = \frac{\sum x_j}{n} = \frac{6071.6}{86}
\]

\[
\mu' = \bar{x} = \frac{\sum x_j}{n} = \frac{6071.6}{86}
\]
Step 2: Estimated standard deviation.

\[
\begin{array}{cccc}
 n & x_j & (x_j - \bar{x}) & (x_j - \bar{x})^2 \\
1 & 79.9 & +9.3 & 86.49 \\
2 & 68.1 & -2.5 & 6.25 \\
3 & 77.9 & +7.3 & 53.29 \\
4 & 74.5 & +3.9 & 15.21 \\
5 & 54.1 & -16.5 & 272.25 \\
6 & 62.2 & -8.4 & 70.56 \\
7 & 89.3 & +18.7 & 349.69 \\
8 & 108.7 & +38.1 & 1451.61 \\
\vdots & \vdots & \vdots & \vdots \\
85 & 63.2 & -7.4 & 54.76 \\
86 & 75.4 & -4.8 & 23.04 \\
\hline
\sum_{j=1}^{86} & 6071.6 & 34683.40 \\
\end{array}
\]

\[
\sigma' = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}
\]

\[
\sigma' = \sqrt{\frac{34683.40}{86-1}}
\]

\[
\sigma' = 20.20 \text{ kg}
\]

Step 3: Required sample size.

The required number of passengers to be weighed should be such that the confidence range, er, does not exceed 1% as specified in (c).
The result shows that at least 3,145 passengers should be weighed to achieve the required accuracy. If \( \varepsilon_r \) is chosen as 2\% the result would be \( n \geq 786 \).

Step 4: After having established the required sample size a plan for weighing the passengers is to be worked out.

(3) Determination of the passenger average mass

Step 1: Having collected the required number of passenger mass values, the average passenger mass can be calculated. For the purpose of this example it has been assumed that 3,180 passengers were weighed. The sum of the individual masses amounts to 231,186.2 kg.

\[
3180 \sum_{i=1}^{3180} \chi_j = 231186.2 \text{ kg}
\]

\[
\bar{x} = \frac{\sum \chi_j}{n} = \frac{231186.2}{3180} \text{ kg}
\]

\[
\bar{x} = 72.7 \text{ kg}
\]

Step 2: Calculation of the standard deviation. For calculating the standard deviation the method shown in paragraph (2) step 2 should be applied.
\[ \sum (x_j - \bar{x})^2 = 745145.20 \]

\[ s = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}} \]

\[ s = \sqrt{\frac{745145.20}{3180 - 1}} \]

\[ s = 15.31 \text{ kg} \]

**Step 3:** Calculation of the accuracy of the sample mean.

\[ e_r = \frac{1.96 \times s \times 100}{\sqrt{n} \times \bar{x}} \% \]

\[ e_r = \frac{1.96 \times 15.31 \times 100}{\sqrt{3180} \times 72.7} \% \]

\[ e_r = 0.73 \% \]

**Step 4:** Calculation of the confidence range of the sample mean.

\[ \bar{x} \pm \frac{1.96 \times s}{\sqrt{n}} \]

\[ \bar{x} \pm \frac{1.96 \times 15.31}{\sqrt{3180}} \text{ kg} \]

\[ 72.7 \pm 0.5 \text{ kg} \]
The result of this calculation shows that there is a 95% probability of the actual mean for all passengers lying within the range 72.2 kg to 73.2 kg.

**GM3 AOCR.POL.MAB.100(e) Mass and balance, loading**

**GUIDANCE ON PASSENGER WEIGHING SURVEYS**

(a) **Detailed survey plan.**

(1) The operator should establish and submit 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.

(2) A representative survey plan means a weighing plan specified in terms of weighing locations, dates and flight numbers giving a reasonable reflection of the operator’s timetable and/or area of operation.

(3) The minimum number of passengers to be weighed is the highest of the following:

   (i) The number that follows from the means of compliance 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.

   (ii) The number that follows from the statistical requirement specifying the accuracy of the resulting mean values, which should be at least 2% for male and female standard masses and 1% for all adult standard masses, where applicable. The required sample size can be estimated on the basis of a pilot sample (at least 100 passengers) or from a previous survey. If analysis of the results of the survey indicates that the requirements on the accuracy of the mean values for male or female standard masses or all adult standard masses, as applicable, are not met, an additional number of representative passengers should be weighed in order to satisfy the statistical requirements.

(4) To avoid unrealistically small samples a minimum sample size of 2 000 passengers (males + females) is also required, except for small aircraft 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.

(b) Execution of weighing programme.

(1) At the beginning of the weighing programme it is important to note, and to account for, the data requirements of the weighing survey report (see (e)).

(2) As far as is practicable, the weighing programme should be conducted in accordance with the specified survey plan.

(3) Passengers and all their personal belongings should be weighed as close as possible to the boarding point and the mass, as well as the associated passenger category (male/female/child), should be recorded.

(c) Analysis of results of weighing survey. The data of the weighing survey should be analysed as explained in this GM. 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.

(d) Results of the weighing survey

(1) The results of the weighing survey should be summarised. Conclusions and any proposed deviations from published standard mass values should be justified. The results of a passenger weighing survey are average masses for passengers, including hand baggage, which may lead to proposals to adjust the standard mass values given in AMC1 AOCR.POL.MAB.100(e) Tables 1 and 2. These averages, rounded to the nearest whole number may, in principle, be applied as standard mass values for males and females on aircraft with 20 or 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 aircraft with less than 20 seats. This is the reason for passenger mass increments on small aircraft.

(2) The average masses of males and females differ by some 15 kg or more. 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 aircraft with 30 passenger seats or more.

(3) 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. The operator may, based on the data from his weighing programme, or by proving a different male/female ratio, apply for approval of a different ratio on specific routes or flights.

(e) Weighing survey report:

The weighing survey report, reflecting the content of (d)(1) (3), should be prepared in a standard format as follows:

<table>
<thead>
<tr>
<th>WEIGHING SURVEY REPORT</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 Introduction</strong></td>
<td>Objective and brief description of the weighing survey.</td>
</tr>
<tr>
<td><strong>2 Weighing survey plan</strong></td>
<td>Discussion of the selected flight number, airports, dates, etc. Determination of the minimum number of passengers to be weighed. Survey plan.</td>
</tr>
<tr>
<td><strong>3 Analysis and discussion of weighing survey results</strong></td>
<td>Significant deviations from survey plan (if any). Variations in means and standard deviations in the network. Discussion of the (summary of) results.</td>
</tr>
<tr>
<td><strong>4 Summary of results and conclusions</strong></td>
<td>Main results and conclusions. Proposed deviations from published standard mass values.</td>
</tr>
<tr>
<td><strong>Attachment 1</strong></td>
<td>Applicable summer and/or winter timetables or flight programmes.</td>
</tr>
<tr>
<td><strong>Attachment 2</strong></td>
<td>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.</td>
</tr>
</tbody>
</table>
GM1 AOCR.POL.MAB.100(g) Mass and balance, loading

FUEL DENSITY

(a) If the actual fuel density is not known, the operator may use standard fuel density values 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.

(b) Typical fuel density values are:

(1) Gasoline (piston engine fuel) – 0.71
(2) JET A1 (Jet fuel JP 1) – 0.79
(3) JET B (Jet fuel JP 4) – 0.76
(4) Oil – 0.88

GM1 AOCR.POL.MAB.100(i) Mass and balance, loading

IN-FLIGHT CHANGES IN LOADING - HELICOPTERS

In-flight changes in loading may occur in hoist operations.

AOCR.POL.MAB.105 Mass and balance data and documentation

(a) The operator shall establish mass and balance data and produce mass and balance documentation prior to each flight specifying the load and its distribution. The mass and balance documentation shall enable the commander to determine that the load and its distribution is such that the mass and balance limits of the aircraft are not exceeded. The mass and balance documentation shall contain the following information:

(1) Aircraft registration and type;
(2) Flight identification, number and date;
(3) Name of the commander;
(4) Name of the person who prepared the document;
(5) Dry operating mass and the corresponding CG of the aircraft:
(i) for performance class B aeroplanes and for helicopters the CG position may not need to be 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;

(6) Mass of the fuel at take-off and the mass of trip fuel;

(7) Mass of consumables other than fuel, if applicable;

(8) Load components including passengers, baggage, freight and ballast;

(9) Take-off mass, landing mass and zero fuel mass;

(10) Applicable aircraft CG positions; and

(11) The limiting mass and CG values.

The information above shall be available in flight planning documents or mass and balance systems. Some of this information may be contained in other documents readily available for use.

(b) Where mass and balance data and documentation is generated by a computerised mass and balance system, the operator shall verify the integrity of the output data.

(c) The person supervising the loading of the aircraft shall confirm by hand signature or equivalent that the load and its distribution are in accordance with the mass and balance documentation given to the commander. The commander shall indicate his/her acceptance by hand signature or equivalent.

(d) The operator shall specify procedures for last minute changes to the load to ensure that:

(1) any last minute change after the completion of the mass and balance documentation is brought to the attention of the commander and entered in the flight planning documents containing the mass and balance documentation;

(2) the maximum last minute change allowed in passenger numbers or hold load is specified; and
(3) new mass and balance documentation is prepared if this
maximum number is exceeded.

e) The operator shall obtain approval by the Authority if he/she wishes
to use an onboard integrated mass and balance computer system or a
stand-alone computerised mass and balance system as a primary
source for dispatch. The operator shall demonstrate the accuracy and
reliability of that system.

AMC1 AOCR.POL.MAB.105(a) Mass and balance data and
documentation

CONTENTS

The mass and balance documentation should include advice to the
commander whenever a non-standard method has been used for determining
the mass of the load.

AMC1 AOCR.POL.MAB.105(b) Mass and balance data and
documentation

INTEGRITY

The operator should verify the integrity of mass and balance data and
documentation generated by a computerised mass and balance system, at
intervals not exceeding 6 months. The operator should establish a system to
check that amendments of its input data are incorporated properly in the
system and that the system is operating correctly on a continuous basis.

AMC1 AOCR.POL.MAB.105(c) Mass and balance data and
documentation

SIGNATURE OR EQUIVALENT

Where a signature by hand is impracticable or it is desirable to arrange the
equivalent verification by electronic means, the following conditions should be
applied in order to make an electronic signature the equivalent of a
conventional hand-written signature:

(a) electronic “signing” by entering a personal identification number (PIN)
code with appropriate security etc.;

(b) entering the PIN code generates 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 logs 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 are made aware of the conditions associated with electronic signature and this is documented.

**AMC2 AOCR.POL.MAB.105(c) Mass and balance data and documentation**

**MASS AND BALANCE DOCUMENTATION SENT VIA DATA LINK**

Whenever the mass and balance documentation is sent to the aircraft via data link, a copy of the final mass and balance documentation as accepted by the commander should be available on the ground.

**GM1 AOCR.POL.MAB.105(e) Mass and balance data and documentation**

**ON-BOARD INTEGRATED MASS AND BALANCE COMPUTER SYSTEM.**

An on-board integrated mass and balance computer system may be an aircraft installed system capable of receiving input data either from other aircraft systems or from a mass and balance system on ground, in order to generate mass and balance data as an output.

**GM2 AOCR.POL.MAB.105(e) Mass and balance data and documentation**

**STAND-ALONE COMPUTERISED MASS AND BALANCE SYSTEM**

A stand-alone computerised mass and balance system may be a computer, either as a part of an electronic flight bag (EFB) system or solely dedicated to mass and balance purposes, requiring input from the user, in order to generate mass and balance data as an output.
Chapter Four

INSTRUMENTS, DATA and EQUIPMENT

Aeroplanes

AOCR.IDE.A.100 Instruments and equipment — general

(a) Instruments and equipment required by this Chapter shall be approved in accordance with the Civil Aviation Regulations, except for the following items:

(1) Spare fuses;
(2) Independent portable lights;
(3) An accurate time piece;
(4) Chart holder;
(5) First-aid kits;
(6) Emergency medical kit;
(7) Megaphones;
(8) Survival and signaling equipment;
(9) Sea anchors and equipment for mooring; and
(10) Child restraint devices.

(b) Instruments and equipment not required by this Subpart that do not need to be approved in accordance with the Civil Aviation Regulations, but are carried on a flight, shall comply with the following:

(1) the information provided by these instruments, equipment or accessories shall not be used by the flight crew to comply with AOCR.IDE.A.330, AOCR.IDE.A.335, AOCR.IDE.A.340 and AOCR.IDE.A.345; and
(2) the instruments and equipment shall not affect the airworthiness of the aeroplane, even in the case of failures or malfunction.
(c) If equipment is to be used by one flight crew member at his/her station during flight, it must be readily operable from that 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.

(d) Those instruments that are used by any flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his/her station, with the minimum practicable deviation from the position and line of vision that he/she normally assumes when looking forward along the flight path.

(e) All required emergency equipment shall be easily accessible for immediate use.

**GM1 CAT.IDE.A.100(a) Instruments and equipment — general**

**Required Instruments and equipment that do not need to be approved in accordance with Civil Aviation Regulations**

The functionality of non-installed instruments and equipment required by this Subpart and that do not need an equipment approval, as listed in CAT.IDE.A.100(a), should be checked against recognised industry standards appropriate to the intended purpose. The operator is responsible for ensuring the maintenance of these instruments and equipment.

**GM1 AOCCR.IDE.A.100(b) Instruments and equipment – general**

**INSTRUMENTS AND EQUIPMENT THAT DO NOT NEED TO BE APPROVED IN ACCORDANCE WITH THE CIVIL AVIATION REGULATIONS, BUT ARE CARRIED ON A FLIGHT**

(a) The provision of this paragraph does not exempt the item of equipment from complying with Civil Aviation Regulations if the instrument or equipment is installed in the aeroplane. In this case, the installation should be approved as required in Civil Aviation Regulation and should comply with the applicable airworthiness codes as required under the same Regulation.

(b) The functionality of non-installed instruments and equipment required by this Subpart and that do not need an equipment approval should be checked against recognised industry standards appropriate to the intended purpose. The operator is responsible for ensuring the maintenance of these instruments and equipment.
(c) The failure of additional non-installed instruments or equipment not required by this Part or by Civil Aviation Regulations or any applicable airspace requirements should not adversely affect the airworthiness and/or the safe operation of the aeroplane. Examples are the following:

(1) instruments supplying additional flight information (e.g. stand-alone global positioning system (GPS));

(2) mission dedicated equipment (e.g. radios); and

(3) non-installed passenger entertainment equipment.

**GM1 AOCR.IDE.A.100(d) Instruments and equipment - general**

**POSITIONING OF INSTRUMENTS**

This requirement implies that whenever a single instrument is required to be installed in an aeroplane operated in a multi-crew environment, the instrument needs to be visible from each flight crew station.

**AOCR.IDE.A.105 Minimum equipment for flight**

A flight shall not be commenced when any of the airplane’s instruments, items of equipment or functions required for the intended flight are inoperative or missing, unless:

(a) the aeroplane is operated in accordance with the operator’s MEL; or

(b) the operator is approved by the Authority to operate the aeroplane within the constraints of the master minimum equipment list (MMEL).

**AOCR.IDE.A.110 Spare electrical fuses**

(a) Aeroplanes shall be equipped with spare electrical fuses, of the ratings required for complete circuit protection, for replacement of those fuses that are allowed to be replaced in flight.

(b) The number of spare fuses that are required to be carried shall be the higher of:

(1) 10% of the number of fuses of each rating; or

(2) three fuses for each rating.

**GM1 AOCR.IDE.A.110 Spare electrical fuses**
FUSES

A “spare electrical fuse” means a replaceable fuse in the flight crew compartment, not an automatic circuit breaker, or circuit breakers in the electric compartments.

AOCR.IDE.A.115 Operating lights

(a) Aeroplanes operated by day shall be equipped with:

(1) an anti-collision light system;

(2) lighting supplied from the airplane’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 airplane’s electrical system to provide illumination in all passenger compartments; and

(4) an independent portable light for each required crew member readily accessible to crew members when seated at their designated stations.

(b) Aeroplanes operated at night shall in addition be equipped with:

(1) navigation/position lights;

(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 operated as a seaplane.

AOCR.IDE.A.120 Equipment to clear windshield

Aeroplanes with an MCTOM of more than 5 700 kg shall be equipped at each pilot station with a means to maintain a clear portion of the windshield during precipitation.

AMC1 AOCR.IDE.A.120 Equipment to clear windshield

MEANS TO MAINTAIN A CLEAR PORTION OF THE WINDSHIELD DURING PRECIPITATION
The means used to maintain a clear portion of the windshield during precipitation should be windshield wipers or an equivalent.
AOCR.IDE.A.125 Operations under VFR by day — flight and navigational instruments and associated equipment

(a) Aeroplanes operated under VFR by day shall be equipped with the following equipment, available at the pilot’s station:

(1) A means of measuring and displaying:

   (i) Magnetic heading;
   (ii) Time in hours, minutes, and seconds;
   (iii) Pressure altitude;
   (iv) Indicated airspeed;
   (v) Vertical speed;
   (vi) Turn and slip;
   (vii) Attitude;
   (viii) Heading;
   (ix) Outside air temperature; and
   (x) Mach number whenever speed limitations are expressed in terms of Mach number.

(2) A means of indicating when the supply of power to the required flight instruments is not adequate.

(b) Whenever two pilots are required for the operation, an additional separate means of displaying the following shall be available for the second pilot:

(1) Pressure altitude;
(2) Indicated airspeed;
(3) Vertical speed;
(4) Turn and slip;
(5) Attitude; and
(6) Heading.

(c) A means for preventing malfunction of the airspeed indicating systems due to condensation or icing shall be available for:

(1) aeroplanes with an MCTOM of more than 5700 kg or an MOPSC of more than nine; and

(2) aeroplanes first issued with an individual C of A on or after 1 April 1999.

(d) Single engine aeroplanes first issued with an individual C of A before 22 May 1995 are exempted from the requirements of (a)(1)(vi), (a)(1)(vii), (a)(1)(viii) and (a)(1)(ix) if the compliance would require retrofitting.

AMC1 AOCR.IDE.A.125 & AOCR.IDE.A.130 Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment

INTEGRATED INSTRUMENTS

(a) Individual equipment requirements may be met by combinations of instruments, 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 required in the applicable operational requirements, and the equivalent safety of the installation has been shown during type certification approval of the aeroplane for the intended type of operation.

(b) The means of measuring and indicating turn and slip, aeroplane attitude and stabilised aeroplane heading may be met by combinations of instruments or by integrated flight director systems, provided that the safeguards against total failure, inherent in the three separate instruments, are retained.

AMC2 AOCR.IDE.A.125 Operations under VFR by day – flight and navigational instruments and associated equipment

LOCAL FLIGHTS

For flights that do not exceed 60 minutes” duration, that take off and land at the same aerodrome and that remain within 50 NM of that aerodrome, an equivalent means of complying with AOCR.IDE.A.125 (a)(1)(vi) may be:

(a) a turn and slip indicator;
(b) a turn coordinator; or

(c) both an attitude indicator and a slip indicator.

AMC1 AOCR.IDE.A.125(a)(1)(i) & AOCR.IDE.A.130(a)(1) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment

MEANS OF MEASURING AND DISPLAYING MAGNETIC HEADING

The means of measuring and displaying magnetic direction should be a magnetic compass or equivalent.

AMC1 AOCR.IDE.A.125(a)(1)(ii) & AOCR.IDE.A.130(a)(2) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment

MEANS OF MEASURING AND DISPLAYING THE TIME

An acceptable means of compliance is a clock displaying hours, minutes and seconds, with a sweep-second pointer or digital presentation, or a crew member with a suitable chronograph.

AMC1 AOCR.IDE.A.125(a)(1)(iii) & AOCR.IDE.A.130(b) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment

CALIBRATION OF THE MEANS OF MEASURING AND DISPLAYING PRESSURE ALTITUDE

The instrument measuring and displaying pressure altitude should be of a sensitive type calibrated in feet (ft), with a sub-scale setting, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight.

AMC1 AOCR.IDE.A.125(a)(1)(iv) & AOCR.IDE.A.130(a)(3) Operations under VFR by day & Operations under IFR or at night – flight and navigational instruments and associated equipment

CALIBRATION OF THE INSTRUMENT INDICATING AIRSPEED

The instrument indicating airspeed should be calibrated in knots (kt).
MEANS OF DISPLAYING OUTSIDE AIR TEMPERATURE

(a) The means of displaying outside air temperature should be calibrated in degrees Celsius.

(b) The means of displaying outside air temperature may be an air temperature indicator that provides indications that are convertible to outside air temperature.

MULTI-PILOT OPERATIONS - DUPLICATE INSTRUMENTS

Duplicate instruments should include separate displays for each pilot and separate selectors or other associated equipment where appropriate.

MEANS OF PREVENTING MALFUNCTION DUE TO CONDENSATION OR ICING

The means of preventing malfunction due to either condensation or icing of the airspeed indicating system should be a heated pitot tube or equivalent.

SUMMARY TABLE

Table 1: Flight and navigational instruments and associated equipment

<table>
<thead>
<tr>
<th>SERIAL</th>
<th>FLIGHTS UNDER VFR</th>
<th>FLIGHTS UNDER IFR OR AT NIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTRUMENT</td>
<td>SINGLE PILOT</td>
<td>TWO PILOTS REQUIRED</td>
</tr>
<tr>
<td>(a)</td>
<td>(b)</td>
<td>(c)</td>
</tr>
</tbody>
</table>

Issue 2 –Rev 0 Dated 04 March 2015
Page 559 of 737
<table>
<thead>
<tr>
<th>No</th>
<th>Instrument</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<td>2</td>
<td>Time</td>
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<td>1</td>
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<td>Vertical speed</td>
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<td>2</td>
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<td>2 Note (1) &amp; Note (2)</td>
<td>1 Note (4)</td>
<td>2 Note (4)</td>
</tr>
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<td>2 Note (1) &amp; Note (2)</td>
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<td>Standby attitude indicator</td>
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<td>1 Note (8)</td>
<td>1 Note (8)</td>
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</tr>
<tr>
<td>15</td>
<td>Chart holder</td>
<td></td>
<td>1 Note (6)</td>
<td>1 Note (6)</td>
<td></td>
</tr>
</tbody>
</table>

**Note (1)** For local flights (A to A, 50 NM radius, not more than 60 minutes’ duration) the instruments at serials (a)(6) and (a)(8) 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) above should be provided at each pilot’s station.

Note (3) 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 certified according to CS 25.1303 (b)(4) or equivalent, is required.

Note (5) Except for unpressurised aeroplanes operating below 10 000 ft, neither three pointers, nor drum-pointer altimeters satisfy the requirement.

Note (6) Applicable only to aeroplanes with a maximum certified take-off mass (MCTOM) of more than 5 700 kg, or with an MOPSC of more than nine. It also applies to all aeroplanes first issued with an individual certificate of airworthiness (CofA) on or after 1 April 1999.

Note (7) The pitot heater failure annunciation applies to any aeroplane issued with an individual CofA on or after 1 April 1998. It also applies before that date when: the aeroplane has an MCTOM of more than 5700 kg and an MOPSC greater than nine.

Note (8) Applicable only to aeroplanes with an MCTOM of more than 5700 kg, or with an MPSCMOPSC of more than nine.

**AOCR.IDE.A.130 Operations under IFR or at night — flight and navigational instruments and associated equipment**

Aeroplanes operated under VFR at night or under IFR shall be equipped with the following equipment, available at the pilot’s station:

(a) A means of measuring and displaying:

   (1) Magnetic heading;

   (2) Time in hours, minutes and seconds;

   (3) Indicated airspeed;

   (4) Vertical speed;
DEPARTMENT OF CIVIL AVIATION
AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

(5) Turn and slip, or in the case of aeroplanes equipped with a standby means of measuring and displaying attitude, slip;

(6) Attitude;

(7) Stabilised heading;

(8) Outside air temperature; and

(9) Mach number whenever speed limitations are expressed in terms of Mach number.

(b) Two means of measuring and displaying pressure altitude.

(c) A means of indicating when the supply of power to the required flight instruments is not adequate.

(d) A means for preventing malfunction of the airspeed indicating systems required in (a)(3) and (h)(2) due to condensation or icing.

(e) A means of annunciating to the flight crew the failure of the means required in (d) for aeroplanes:

(1) issued with an individual CofA on or after 1 April 1998; or

(2) issued with an individual CofA before 1 April 1998 with an MCTOM of more than 5 700 kg, and with an MOPSC of more than nine.

(f) Except for propeller-driven aeroplanes with an MCTOM of 5 700 kg or less, two independent static pressure systems.

(g) One static pressure system and one alternate source of static pressure for propeller-driven aeroplanes with an MCTOM of 5 700 kg or less.

(h) Whenever two pilots are required for the operation, a separate means of displaying for the second pilot:

(1) Pressure altitude;

(2) Indicated airspeed;

(3) Vertical speed;

(4) Turn and slip;
(5) Attitude; and

(6) Stabilised heading.

(i) A standby means of measuring and displaying attitude capable of being used from either pilot’s station for aeroplanes with an MCTOM of more than 5 700 kg or an MOPSC of more than nine 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 from 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 means of measuring and displaying attitude;

(4) is operative automatically after total failure of the normal electrical generating system;

(5) is appropriately illuminated during all phases of operation, except for aeroplanes with an MCTOM of 5 700 kg or less, already registered in a Member State on 1 April 1995 and equipped with a standby attitude indicator in the left-hand instrument panel;

(6) is clearly evident to the flight crew when the standby attitude indicator is being operated by emergency power; and

(7) where the standby attitude indicator has its own dedicated power supply, has an associated indication, either on the instrument or on the instrument panel, when this supply is in use.

(j) A chart holder in an easily readable position that can be illuminated for night operations.

**AMC1 AOCR.IDE.A.130(a)(5) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**SLIP INDICATOR**
If only slip indication is provided, the means of measuring and displaying standby attitude should be certified according to CS 25.1303 (b)(4) or equivalent.

**AMC2 AOCR.IDE.A.130(b) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**ALTIMETERS – IFR OR NIGHT OPERATIONS**

Except for unpressurised aeroplanes operating below 10 000 feet, the altimeters of aeroplanes operating under IFR or at night should have counter drum-pointer or equivalent presentation.

**AMC1 AOCR.IDE.A.130(e) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**MEANS OF INDICATING FAILURE OF THE AIRSPEED INDICATING SYSTEM’S MEANS OF PREVENTING MALFUNCTION DUE TO EITHER CONDENSATION OR ICING**

A combined means of indicating failure of the airspeed indicating system’s means of preventing malfunction due to either condensation or icing is acceptable provided that it is visible from each flight crew station and that there is a means to identify the failed heater in systems with two or more sensors.

**AMC1 AOCR.IDE.A.130(i)(5) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**ILLUMINATION OF STANDBY MEANS OF MEASURING AND DISPLAYING ATTITUDE**

The standby means of measuring and displaying attitude should be illuminated so as to be clearly visible under all conditions of daylight and artificial lighting.

**AMC1 AOCR.IDE.A.130(j) Operations under IFR or at night – flight and navigational instruments and associated equipment**

**CHART HOLDER**

An acceptable means of compliance with the chart holder requirement is to display a pre-composed chart on an electronic flight bag (EFB).
**AOCR.IDE.A.135 Additional equipment for single-pilot operation under IFR**

Aeroplanes operated under IFR with a single-pilot shall be equipped with an autopilot with at least altitude hold and heading mode.

**AOCR.IDE.A.140 Altitude alerting system**

(a) The following aeroplanes shall be equipped with an altitude alerting system:

(1) turbine propeller powered aeroplanes with an MCTOM of more than 5700 kg or having an MOPSC of more than nine; and

(2) aeroplanes powered by turbo-jet engines.

(b) The altitude alerting system shall be capable of:

(1) alerting the flight crew when approaching a preselected altitude; and

(2) alerting the flight crew by at least an aural signal, when deviating from a preselected altitude.

(c) Notwithstanding (a), aeroplanes with an MCTOM of 5700 kg or less, having an MOPSC of more than nine, first issued with an individual CofA before 1 April 1972 and already registered in a Member State on 1 April 1995 are exempted from being equipped with an altitude alerting system.

**AOCR.IDE.A.150 Terrain awareness warning system (TAWS)**

(a) Turbine-powered aeroplanes having an MCTOM of more than 5700 kg or an MOPSC of more than nine shall be equipped with a TAWS that meets the requirements for Class A equipment as specified in an acceptable standard.

(b) Reciprocating-engine-powered aeroplanes with an MCTOM of more than 5700 kg or an MOPSC of more than nine shall be equipped with a TAWS that meets the requirement for Class B equipment as specified in an acceptable standard.
**AMC1 AOCR.IDE.A.150 Terrain awareness warning system (TAWS)**

**EXCESSIVE DOWNWARDS GLIDE SLOPE DEVIATION WARNING FOR CLASS A TAWS**

The requirement for a Class A TAWS to provide a warning to the flight crew for excessive downwards glide slope deviation should apply to all final approach glide slopes with angular vertical navigation (VNAV) guidance, whether provided by the instrument landing system (ILS), microwave landing system (MLS), satellite based augmentation system approach procedure with vertical guidance (SBAS APV (localiser performance with vertical guidance approach LPV)), ground-based augmentation system (GBAS (GPS landing system, GLS) or any other systems providing similar guidance. The same requirement should not apply to systems providing vertical guidance based on barometric VNAV.

**GM1 AOCR.IDE.A.150 Terrain awareness warning system (TAWS)**

**ACCEPTABLE STANDARD FOR TAWS**

An acceptable standard for Class A and Class B TAWS may be the applicable European technical standards order (ETSO) or equivalent.

**AOCR.IDE.A.155 Airborne collision avoidance system (ACAS)**

Unless otherwise provided for by Civil Aviation Regulations, turbine-powered aeroplanes with an MCTOM of more than 5700 kg or an MOPSC of more than 19 shall be equipped with ACAS II.

**AOCR.IDE.A.160 Airborne weather detecting equipment**

The following shall be equipped with airborne weather detecting equipment when operated at night or in IMC in areas where thunderstorms or other potentially hazardous weather conditions, regarded as detectable with airborne weather detecting equipment, may be expected to exist along the route:

(a) pressurised aeroplanes;

(b) non-pressurised aeroplanes with an MCTOM of more than 5 700 kg; and

(c) non-pressurised aeroplanes with an MOPSC of more than nine.
AMC1 AOCR.IDE.A.160 Airborne weather detecting equipment

GENERAL

The airborne weather detecting equipment should be an airborne weather radar, except for propeller-driven pressurised aeroplanes with an MCTOM not more than 5700 kg and an MOPSC of not more than nine, for which other equipment capable of detecting thunderstorms and other potentially hazardous weather conditions, regarded as detectable with airborne weather radar equipment, are also acceptable.

AOCR.IDE.A.165 Additional equipment for operations in icing conditions at night

(a) Aeroplanes operated in expected or actual icing conditions at night shall be equipped with a means to illuminate or detect the formation of ice.

(b) The means to illuminate the formation of ice shall not cause glare or reflection that would handicap crew members in the performance of their duties.

AOCR.IDE.A.170 Flight crew interphone system

Aeroplanes operated by more than one flight crew member shall be equipped with a flight crew interphone system, including headsets and microphones for use by all flight crew members.

AMC1 AOCR.IDE.A.170 Flight crew interphone system

TYPE OF FLIGHT CREW INTERPHONE

The flight crew interphone system should not be of a handheld type.

AOCR.IDE.A.175 Crew member interphone system

Aeroplanes with an MCTOM of more than 15000 kg, or with an MOPSC of more than 19 shall be equipped with a crew member interphone system, except for aeroplanes first issued with an individual C of A before 1 April 1965 and already registered in a Member State on 1 April 1995.

AMC1 AOCR.IDE.A.175 Crew member interphone system

SPECIFICATIONS

The crew member interphone system should:
(a) operate independently of the public address system except for handsets, headsets, microphones, selector switches and signaling devices;

(b) in the case of aeroplanes where at least one cabin crew member is required, be readily accessible for use at required cabin crew member stations close to each separate or pair of floor level emergency exits;

(c) in the case of aeroplanes where at least one cabin crew member is required, have an alerting system incorporating aural or visual signals for use by flight and cabin crew;

(d) have a means for the recipient of a call to determine whether it is a normal call or an emergency call that uses:

1. lights of different colours;

2. codes defined by the operator (e.g. different number of rings for normal and emergency calls); and

3. any other indicating signal specified in the operations manual;

(e) provide two-way communication between:

1. the flight crew compartment and each passenger compartment, in the case of aeroplanes where at least one cabin crew member is required;

2. the flight crew compartment and each galley located other than on a passenger deck level, in the case of aeroplanes where at least one cabin crew member is required;

3. the flight crew compartment and each remote crew compartment and crew member station that is not on the passenger deck and is not accessible from a passenger compartment; and

4. ground personnel and at least two flight crew members. This interphone system for use by the ground personnel should be, where practicable, so located that the personnel using the system may avoid detection from within the aeroplane; and

(f) be readily accessible for use from each required flight crew station in the flight crew compartment.
AOCR.IDE.A.180 Public address system

Aeroplanes with an MOPSC of more than 19 shall be equipped with a public address system.

AMC1 AOCR.IDE.A.180 Public address system

SPECIFICATIONS

The public address system should:

(a) operate independently of the interphone systems except for handsets, headsets, microphones, selector switches and signaling devices;

(b) be readily accessible for immediate use from each required flight crew station;

(c) have, for each floor level passenger emergency exit that has an adjacent cabin crew seat, a microphone operable by the seated cabin crew member, except that one microphone may serve more than one exit, provided the proximity of exits allows unassisted verbal communication between seated cabin crew members;

(d) be operable within 10 seconds by a cabin crew member at each of those stations; and

(e) be audible at all passenger seats, lavatories, galleys, cabin crew seats and work stations, and other crew remote areas.

AOCR.IDE.A.185 Cockpit voice recorder

(a) The following aeroplanes shall be equipped with a cockpit voice recorder (CVR):

(1) aeroplanes with an MCTOM of more than 5700 kg; and

(2) multi-engined turbine-powered aeroplanes with an MCTOM of 5700 kg or less, with an MOPSC of more than nine and first issued with an individual C of A on or after 1 January 1990.

(b) The CVR shall be capable of retaining the data recorded during at least:

(1) the preceding two hours in the case of aeroplanes referred to in (a)(1) when the individual C of A has been issued on or after 1 April 1998;
(2) the preceding 30 minutes for aeroplanes referred to in (a)(1) when the individual CofA has been issued before 1 April 1998; or

(3) the preceding 30 minutes, in the case of aeroplanes referred to in (a)(2).

(c) The CVR shall record with reference to a timescale:

(1) voice communications transmitted from or received in the flight crew compartment by radio;

(2) flight crew member voice communications using the interphone system and the public address system, if installed;

(3) the aural environment of the flight crew compartment, including without interruption:

(i) for aeroplanes first issued with an individual CofA on or after 1 April 1998, the audio signals received from each boom and mask microphone in use;

(ii) for aeroplanes referred to in (a)(2) and first issued with an individual C of A before 1 April 1998, the audio signals received from each boom and mask microphone, where practicable; and

(4) voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(d) The CVR shall start to record prior to the aeroplane moving under its own power and shall continue to record until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, in the case of aeroplanes issued with an individual CofA on or after 1 April 1998, the CVR shall 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.

(e) In addition to (d), depending on the availability of electrical power, the CVR 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, in the case of:
(1) aeroplanes referred to in (a)(1) and issued with an individual CofA after 1 April 1998; or 
(2) aeroplanes referred to in (a)(2).

(f) The CVR shall have a device to assist in locating it in water.

**AMC1 AOCR.IDE.A.185 Cockpit voice recorder**

**OPERATIONAL PERFORMANCE REQUIREMENTS**

(a) For aeroplanes first issued with an individual C of A on or after 1 April 1998 and before 1 January 2016, the operational performance requirements for cockpit voice recorders (CVRs) should be those laid down in the European Organisation for Civil Aviation Equipment (EUROCAE) Document ED-56A (Minimum Operational Performance Requirements For Cockpit Voice Recorder Systems) dated December 1993, or EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

(b) For aeroplanes first issued with an individual CofA on or after 1 January 2016, the operational performance requirements for CVRs should be those laid down in EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

**AOCR.IDE.A.190 Flight data recorder**

(a) The following aeroplanes shall be equipped with a flight data recorder (FDR) that uses a digital method of recording and storing data and for which a method of readily retrieving that data from the storage medium is available:

(1) aeroplanes with an MCTOM of more than 5700 kg and first issued with an individual C of A on or after 1 June 1990;

(2) turbine-engined aeroplanes with an MCTOM of more than 5700 kg and first issued with an individual C of A before 1 June 1990; and

(3) multi-engined turbine-powered aeroplanes with an MCTOM of 5700 kg or less, with an MOPSC of more than nine and first issued with an individual C of A on or after 1 April 1998.
(b) The FDR shall record:

(1) time, altitude, airspeed, normal acceleration and heading and be capable of retaining the data recorded during at least the preceding 25 hours for aeroplanes referred to in (a)(2) with an MCTOM of less than 27000 kg;

(2) the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices and be capable of retaining the data recorded during at least the preceding 25 hours, for aeroplanes referred to in (a)(1) with an MCTOM of less than 27000 kg and first issued with an individual C of A before 1 January 2016;

(3) the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation and be capable of retaining the data recorded during at least the preceding 25 hours, for aeroplanes referred to in (a)(1) and (a)(2) with an MCTOM of over 27000 kg and first issued with an individual C of A before 1 January 2016;

(4) the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power and configuration of lift and drag devices and be capable of retaining the data recorded during at least the preceding 10 hours, in the case of aeroplanes referred to in (a)(3) and first issued with an individual C of A before 1 January 2016; or

(5) the parameters required to determine accurately the aeroplane flight path, speed, attitude, engine power, configuration and operation and be capable of retaining the data recorded during at least the preceding 25 hours, for aeroplanes referred to in (a)(1) and (a)(3) and first issued with an individual C of A on or after 1 January 2016.

(c) Data shall be obtained from aeroplane sources that enable accurate correlation with information displayed to the flight crew.

(d) The FDR shall start to record the data prior to the aeroplane being capable of moving under its own power and shall stop after the aeroplane is incapable of moving under its own power. In addition, in the case of aeroplanes issued with an individual C of A on or after 1 April 1998, the FDR shall start automatically to record the data prior to the aeroplane being capable of moving under its own power and shall stop automatically after the aeroplane is incapable of moving under its own power.
(e) The FDR shall have a device to assist in locating it in water.

**AMC1 AOERIDE.A.190 Flight data recorder**

**OPERATIONAL PERFORMANCE REQUIREMENTS FOR AEROPLANES FIRST ISSUED WITH AN INDIVIDUAL C of A ON OR AFTER 1 JANUARY 2016**

(a) The operational performance requirements for flight data recorders (FDRs) should be those laid down in EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

(b) The FDR should record with reference to a timescale the list of parameters in Table 1 and Table 2, as applicable.

(c) The parameters to be recorded should meet the performance specifications (range, sampling intervals, accuracy limits and resolution in read-out) as defined in the relevant tables of EUROCAE Document ED-112, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

**Table 1: FDR – all aeroplanes**

<table>
<thead>
<tr>
<th>No*</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Time; or</td>
</tr>
<tr>
<td>1b</td>
<td>Relative time count</td>
</tr>
<tr>
<td>1c</td>
<td>Global navigation satellite system (GNSS) time synchronisation</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
</tr>
<tr>
<td>3a</td>
<td>Indicated airspeed; or Calibrated airspeed</td>
</tr>
<tr>
<td>4</td>
<td>Heading (primary flight crew reference) - when true or magnetic heading can be selected, the primary heading reference, a discrete indicating selection, should be recorded</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6</td>
<td><strong>Pitch attitude</strong></td>
</tr>
<tr>
<td>7</td>
<td><strong>Roll attitude</strong></td>
</tr>
<tr>
<td>8</td>
<td><strong>Manual radio transmission keying and CVR/FDR synchronisation reference.</strong></td>
</tr>
<tr>
<td>9</td>
<td><strong>Engine thrust/power</strong></td>
</tr>
<tr>
<td>9a</td>
<td><strong>Parameters required to determine propulsive thrust/power on each engine</strong></td>
</tr>
<tr>
<td>9b</td>
<td><strong>Flight crew compartment thrust/power lever position for aeroplanes with non-mechanically linked flight crew compartment - engine control</strong></td>
</tr>
<tr>
<td>14</td>
<td><strong>Total or outside air temperature</strong></td>
</tr>
<tr>
<td>16</td>
<td><strong>Longitudinal acceleration (body axis)</strong></td>
</tr>
<tr>
<td>17</td>
<td><strong>Lateral acceleration</strong></td>
</tr>
<tr>
<td>18</td>
<td><strong>Primary flight control surface and primary flight control pilot input (for multiple or split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. For aeroplanes that have a flight control break-away capability that allows either pilot to operate the controls independently, record both inputs):</strong></td>
</tr>
<tr>
<td>18a</td>
<td><strong>Pitch axis</strong></td>
</tr>
<tr>
<td>18b</td>
<td><strong>Roll axis</strong></td>
</tr>
<tr>
<td>18c</td>
<td><strong>Yaw axis</strong></td>
</tr>
<tr>
<td>19</td>
<td><strong>Pitch trim surface position</strong></td>
</tr>
</tbody>
</table>
### Table 2: FDR - Aeroplanes for which the data source for the parameter is either used by aeroplane systems or is available on the instrument panel for use by the flight crew to operate the aeroplane

<table>
<thead>
<tr>
<th>No*</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Flaps</td>
</tr>
<tr>
<td>10a</td>
<td>Trailing edge flap position</td>
</tr>
<tr>
<td>10b</td>
<td>Flight crew compartment control selection</td>
</tr>
<tr>
<td>11</td>
<td>Slats</td>
</tr>
</tbody>
</table>

*The number in the left hand column reflects the serial number depicted in EUROCAE ED-112.*
<p>| 11a  | Leading edge flap (slat) position |
| 11b  | Flight crew compartment control selection |
| 12   | Thrust reverse status |
| 13   | Ground spoiler and speed brake |
| 13a  | Ground spoiler position |
| 13b  | Ground spoiler selection |
| 13c  | Speed brake position |
| 13d  | Speed brake selection |
| 15   | Autopilot, autothrottle and AFCS mode and engagement status |
| 20   | Radio altitude. For auto-land/Category III operations, each radio altimeter should be recorded. |
| 21   | Vertical deviation - the approach aid in use should be recorded. For auto-land/Category III operations, each system should be recorded. |
| 21a  | ILS/GPS/GLS glide path |
| 21b  | MLS elevation |
| 21c  | GNSS approach path / IRNAV vertical deviation |
| 22   | Horizontal deviation - the approach aid in use should be recorded. For auto land/Category III operations, each system should be recorded. ILS/GPS/GLS localiser |
| 22a  | MLS azimuth |
| 22b  | GNSS approach path / IRNAV lateral deviation |</p>
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>26</td>
<td>Distance measuring equipment (DME) 1 and 2 distances</td>
</tr>
<tr>
<td>26a</td>
<td>Distance to runway threshold (GLS)</td>
</tr>
<tr>
<td>26b</td>
<td>Distance to missed approach point (IRNAV/IAN)</td>
</tr>
<tr>
<td>28</td>
<td>Ground proximity warning system (GPWS) / terrain awareness warning system (TAWS) / ground collision avoidance system (GCAS) status:</td>
</tr>
<tr>
<td>28a</td>
<td>Selection of terrain display mode, including pop-up display status</td>
</tr>
<tr>
<td>28b</td>
<td>Terrain alerts, including cautions and warnings and advisories</td>
</tr>
<tr>
<td>28c</td>
<td>On/off switch position</td>
</tr>
<tr>
<td>29</td>
<td>Angle of attack</td>
</tr>
<tr>
<td>30</td>
<td>Low pressure warning (each system):</td>
</tr>
<tr>
<td>30a</td>
<td>Hydraulic pressure</td>
</tr>
<tr>
<td>30b</td>
<td>Pneumatic pressure</td>
</tr>
<tr>
<td>31</td>
<td>Ground speed</td>
</tr>
<tr>
<td>32</td>
<td>Landing gear</td>
</tr>
<tr>
<td>32a</td>
<td>Landing gear</td>
</tr>
<tr>
<td>32b</td>
<td>Gear selector position</td>
</tr>
<tr>
<td>33</td>
<td>Navigation data</td>
</tr>
<tr>
<td>33a</td>
<td>Drift angle</td>
</tr>
<tr>
<td>33b</td>
<td>Wind speed</td>
</tr>
<tr>
<td>33c</td>
<td>Wind direction</td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION

### AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>33d</td>
<td>Latitude</td>
</tr>
<tr>
<td>33e</td>
<td>Longitude</td>
</tr>
<tr>
<td>33f</td>
<td>GNSS augmentation in use</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>Brakes:</td>
</tr>
<tr>
<td>34a</td>
<td>Left and right brake pressure</td>
</tr>
<tr>
<td>34b</td>
<td>Left and right brake pedal position</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>Additional engine parameters (if not already recorded in parameter 9 of Table 1 of AMC1 AOCR.IDE.190.A and if the aeroplane is equipped with a suitable data source):</td>
</tr>
<tr>
<td>35a</td>
<td>Engine pressure ratio (EPR)</td>
</tr>
<tr>
<td>35b</td>
<td>$N1$</td>
</tr>
<tr>
<td>35c</td>
<td>Indicated vibration level</td>
</tr>
<tr>
<td>35d</td>
<td>$N2$</td>
</tr>
<tr>
<td>35e</td>
<td>Exhaust gas temperature (EGT)</td>
</tr>
<tr>
<td>35f</td>
<td>Fuel flow</td>
</tr>
<tr>
<td>35g</td>
<td>Fuel cut-off lever position</td>
</tr>
<tr>
<td>35h</td>
<td>$N3$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>36</td>
<td>Traffic alert and collision avoidance system (TCAS) / airborne collision avoidance system (ACAS) a suitable combination of discretes should be recorded to determine the status of the system:</td>
</tr>
<tr>
<td>36a</td>
<td>Combined control</td>
</tr>
<tr>
<td>36b</td>
<td>Vertical control</td>
</tr>
<tr>
<td>36c</td>
<td>Up advisory</td>
</tr>
<tr>
<td>Requirement</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>36d</td>
<td>Down advisory</td>
</tr>
<tr>
<td>36e</td>
<td>Sensitivity level</td>
</tr>
<tr>
<td>37</td>
<td>Wind shear warning</td>
</tr>
<tr>
<td>38</td>
<td>Selected barometric setting</td>
</tr>
<tr>
<td>38a</td>
<td>Pilot selected barometric setting</td>
</tr>
<tr>
<td>38b</td>
<td>Co-pilot selected barometric setting</td>
</tr>
<tr>
<td>39</td>
<td>Selected altitude (all pilot selectable modes of operation) - to be recorded for the aeroplane where the parameter is displayed electronically</td>
</tr>
<tr>
<td>40</td>
<td>Selected speed (all pilot selectable modes of operation) - to be recorded for the aeroplane where the parameter is displayed electronically</td>
</tr>
<tr>
<td>41</td>
<td>Selected Mach (all pilot selectable modes of operation) - to be recorded for the aeroplane where the parameter is displayed electronically</td>
</tr>
<tr>
<td>42</td>
<td>Selected vertical speed (all pilot selectable modes of operation) - to be recorded for the aeroplane where the parameter is displayed electronically</td>
</tr>
<tr>
<td>43</td>
<td>Selected heading (all pilot selectable modes of operation) - to be recorded for the aeroplane where the parameter is displayed electronically</td>
</tr>
<tr>
<td>44</td>
<td>Selected flight path (All pilot selectable modes of operation) - to be recorded for the aeroplane where the parameter is displayed electronically</td>
</tr>
<tr>
<td>44a</td>
<td>Course/desired track (DSTRK)</td>
</tr>
<tr>
<td>44b</td>
<td>Path angle</td>
</tr>
<tr>
<td>44c</td>
<td></td>
</tr>
</tbody>
</table>

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Issue 2 – Rev 0 Dated 04 March 2015

Page 579 of 737
| 45 | **Selected decision height** - to be recorded for the aeroplane where the parameter is displayed electronically |
| 46 | **Electronic flight instrument system (EFIS) display format:** |
| 46a | Pilot |
| 46b | Co-pilot |
| 47 | **Multi-function/engine/alerts display format** |
| 48 | **Alternating current (AC) electrical bus status - each bus** |
| 49 | **Direct current (DC) electrical bus status - each bus** |
| 50 | **Engine bleed valve position** |
| 51 | **Auxiliary power unit (APU) bleed valve position** |
| 52 | **Computer failure – (all critical flight and engine control system)** |
| 53 | **Engine thrust command** |
| 54 | **Engine thrust target** |
| 55 | **Computed centre of gravity (CG)** |
| 56 | **Fuel quantity or fuel quantity in CG trim tank** |
| 57 | **Head up display in use** |
### AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Para visual display on</th>
<th>Operational stall protection, stick shaker and pusher activation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary navigation system reference:</strong></td>
<td></td>
</tr>
<tr>
<td>60a GNSS</td>
<td></td>
</tr>
<tr>
<td>60b Inertial navigational system (INS)</td>
<td></td>
</tr>
<tr>
<td>60c VHF omnidirectional radio range (VOR) / distance measuring equipment (DME)</td>
<td></td>
</tr>
<tr>
<td>60d MLS</td>
<td></td>
</tr>
<tr>
<td>60e Loran C</td>
<td></td>
</tr>
<tr>
<td>60f ILS</td>
<td></td>
</tr>
<tr>
<td><strong>Ice detection</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Engine warning - each engine vibration</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Engine warning - each engine over temperature</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Engine warning - each engine oil pressure low</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Engine warning - each engine over speed</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Yaw trim surface position</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Roll trim surface position</strong></td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Yaw or sideslip angle</td>
</tr>
<tr>
<td>69</td>
<td>De-icing and/or anti-icing systems selection</td>
</tr>
<tr>
<td>70</td>
<td>Hydraulic pressure - each system</td>
</tr>
<tr>
<td>71</td>
<td>Loss of cabin pressure</td>
</tr>
<tr>
<td>72</td>
<td>Flight crew compartment trim control input position pitch - when mechanical means for control inputs are not available, cockpit display trim positions or trim command should be recorded</td>
</tr>
<tr>
<td>73</td>
<td>Flight crew compartment trim control input position roll - when mechanical means for control inputs are not available, flight crew compartment display trim positions or trim command should be recorded</td>
</tr>
<tr>
<td>74</td>
<td>Flight crew compartment trim control input position yaw - when mechanical means for control inputs are not available, flight crew compartment display trim positions or trim command should be recorded</td>
</tr>
<tr>
<td>76</td>
<td>Event marker</td>
</tr>
<tr>
<td>77</td>
<td>Date</td>
</tr>
<tr>
<td>78</td>
<td>Actual navigation performance (ANP) or estimate of position error (EPE) or estimate of position uncertainty (EPU)</td>
</tr>
</tbody>
</table>

* The number in the left hand column reflects the serial number depicted in EUROCAE ED-112.
AMC2 AOCR.IDE.A.190 Flight data recorder

OPERATIONAL PERFORMANCE REQUIREMENTS FOR AEROPLANES FIRST ISSUED WITH AN INDIVIDUAL C OF A ON OR AFTER 1 APRIL 1998 AND BEFORE 1 JANUARY 2016

(a) The operational performance requirements for FDRs should be those laid down in EUROCAE Document ED-55 (Minimum Operational Performance Requirements For Flight Data Recorder Systems) dated May 1990, or EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

(b) The FDR should record, with reference to a timescale:

(1) the parameters listed in Table 1a or Table 1b below, as applicable;

(2) the additional parameters listed in Table 2 below, for those aeroplanes with an MCTOM exceeding 27000 kg;

(3) any dedicated parameters relating to novel or unique design or operational characteristics of the aeroplane as determined by the Authority; and

(4) the additional parameters listed in Table 3 below, for those aeroplanes equipped with electronic display systems.

(c) When determined, the FDR of aeroplanes first issued with an individual CofA before 20 August 2002 and equipped with an electronic display system does not need to record those parameters listed in Table 3 for which:

(1) the sensor is not available;

(2) the aeroplane system or equipment generating the data needs to be modified; or

(3) the signals are incompatible with the recording system;

(d) The FDR of aeroplanes first issued with an individual CofA on or after 1 April 1998 but not later than 1 April 2001 is not required to comply with (b) above if:
(1) compliance with (a) cannot be achieved without extensive modification to the aeroplane system and equipment other than the flight recording system; and

(2) the FDR of the aeroplane can comply with AMC4 AOCR.IDE.A.190(a) except that parameter 15b in Table 1 of AMC4 AOCR.IDE.A.190 need not be recorded.

(e) The parameters to be recorded should meet, as far as practicable, the performance specifications (ranges, sampling intervals, accuracy limits, and resolution in read-out) defined in Table 1 of AMC3 AOCR.IDE.A.190

(f) For aeroplanes with novel or unique design or operational characteristics, the additional parameters should be those required in accordance with applicable Certification Specifications during type or supplemental certification or validation.

(g) If recording capacity is available, as many as possible of the additional parameters specified in table II-A.1 of EUROCAE Document ED 112 dated March 2003 should be recorded.

Table 1a: FDR – Aeroplanes with an MCTOM of more than 5 700 kg

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying</td>
</tr>
<tr>
<td>9</td>
<td>Propulsive thrust/power on each engine and flight crew compartment thrust / power lever position if applicable</td>
</tr>
<tr>
<td>10</td>
<td>Trailing edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>11</td>
<td>Leading edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverse status</td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler position and/or speed brake selection</td>
</tr>
<tr>
<td>14</td>
<td>Total or outside air temperature</td>
</tr>
<tr>
<td>15</td>
<td>Autopilot, autothrottle and AFCS mode and engagement status</td>
</tr>
<tr>
<td>16</td>
<td>Longitudinal acceleration (body axis)</td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
</tr>
</tbody>
</table>
### Table 1b: FDR – Aeroplanes with an MCTOM 5 700 kg or below

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying</td>
</tr>
<tr>
<td>9</td>
<td>Propulsive thrust/power on each engine and flight crew compartment thrust / power lever position if applicable</td>
</tr>
<tr>
<td>10</td>
<td>Trailing edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>11</td>
<td>Leading edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverse status</td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler position and/or speed brake selection</td>
</tr>
<tr>
<td>14</td>
<td>Total or outside air temperature</td>
</tr>
<tr>
<td>15</td>
<td>Autopilot, autothrottle and AFCS mode and engagement status</td>
</tr>
<tr>
<td>16</td>
<td>Longitudinal acceleration (body axis)</td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
</tr>
</tbody>
</table>

### Table 2: FDR – Additional parameters for aeroplanes with an MCTOM of more than 27 000 kg

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>Primary flight controls - control surface position and/or pilot input (pitch, roll, yaw)</td>
</tr>
<tr>
<td>19</td>
<td>Pitch trim position</td>
</tr>
<tr>
<td>20</td>
<td>Radio altitude</td>
</tr>
<tr>
<td>21</td>
<td>Vertical beam deviation (ILS glide path or MLS elevation)</td>
</tr>
<tr>
<td>22</td>
<td>Horizontal beam deviation (ILS localiser or MLS azimuth)</td>
</tr>
<tr>
<td>23</td>
<td>Marker beacon passage</td>
</tr>
<tr>
<td>24</td>
<td>Warnings</td>
</tr>
<tr>
<td>25</td>
<td>Reserved (navigation receiver frequency selection is recommended)</td>
</tr>
<tr>
<td>26</td>
<td>Reserved (DME distance is recommended)</td>
</tr>
<tr>
<td>27</td>
<td>Landing gear squat switch status or air/ground status</td>
</tr>
<tr>
<td>28</td>
<td>Ground proximity warning system</td>
</tr>
<tr>
<td>29</td>
<td>Angle of attack</td>
</tr>
<tr>
<td>30</td>
<td>Low pressure warning (hydraulic and pneumatic power)</td>
</tr>
<tr>
<td>31</td>
<td>Groundspeed</td>
</tr>
<tr>
<td>32</td>
<td>Landing gear or gear selector position</td>
</tr>
</tbody>
</table>
### Table 3: FDR – Aeroplanes equipped with electronic display systems

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>33</td>
<td>Selected barometric setting (each pilot station)</td>
</tr>
<tr>
<td>34</td>
<td>Selected altitude</td>
</tr>
<tr>
<td>35</td>
<td>Selected speed</td>
</tr>
<tr>
<td>36</td>
<td>Selected Mach</td>
</tr>
<tr>
<td>37</td>
<td>Selected vertical speed</td>
</tr>
<tr>
<td>38</td>
<td>Selected heading</td>
</tr>
<tr>
<td>39</td>
<td>Selected flight path</td>
</tr>
<tr>
<td>40</td>
<td>Selected decision height</td>
</tr>
<tr>
<td>41</td>
<td>EFIS display format</td>
</tr>
<tr>
<td>42</td>
<td>Multi-function / engine / alerts display format</td>
</tr>
</tbody>
</table>
AMC3 AOCP.IDE.A.190 Flight data recorder

PERFORMANCE SPECIFICATIONS FOR THE PARAMETERS TO BE RECORDED FOR AEROPLANES FIRST ISSUED WITH AN INDIVIDUAL C OF A ON OR AFTER 1 APRIL 1998 AND BEFORE 1 JANUARY 2016

Table 1: FDR

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Range</th>
<th>Sampling interval in seconds</th>
<th>Accuracy limits (sensor input compared to FDR readout)</th>
<th>Recommended resolution in readout</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>Time</td>
<td>24 hours</td>
<td>4</td>
<td>± 0.125 % per hour</td>
<td>1 second</td>
<td>(a) UTC time preferred where available.</td>
</tr>
<tr>
<td>1b</td>
<td>Relative time count</td>
<td>0 to 4 095</td>
<td>4</td>
<td>± 0.125 % per hour</td>
<td></td>
<td>(b) Counter increments every 4 seconds of system operation.</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
<td>-1 000 ft to maximum certificated altitude of aircraft +5 000 ft</td>
<td>1</td>
<td>±100 ft to ±700 ft</td>
<td>5 ft</td>
<td>Should be obtained from air data computer when installed.</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated</td>
<td>50 kt or minimum value installed pitot static system to Max V\textsubscript{o}</td>
<td>1</td>
<td>±5 %</td>
<td>1 kt (0.5 kt recommended)</td>
<td>Should be obtained from air data computer when installed.</td>
</tr>
<tr>
<td></td>
<td>airspeed</td>
<td>Max V\textsubscript{o} to 1.2 V\textsubscript{D}</td>
<td></td>
<td>±3 %</td>
<td></td>
<td>V\textsubscript{SO}: stalling speed or minimum steady flight speed</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Heading</td>
<td>360 degrees</td>
<td>±2 degrees</td>
<td>0.5 degrees</td>
<td>in the landing configuration V\textsubscript{D} design diving speed.</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
<td>-3 g to +6 g</td>
<td>0.125</td>
<td>1 % of maximum range excluding a datum error of 5 %</td>
<td>0.004 g</td>
<td>The recording resolution may be rounded from 0.004 g to 0.01 g provided that one sample is recorded at full resolution at least every 4 seconds.</td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
<td>±75 degrees</td>
<td>0.25</td>
<td>±2 degrees</td>
<td>0.5 degrees</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
<td>±180 degrees</td>
<td>0.5</td>
<td>±2 degrees</td>
<td>0.5 degrees</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manual radio transmission keying</td>
<td>Discrete</td>
<td>1</td>
<td>-</td>
<td>Preferably each crew member but one discrete acceptable for all transmissions provided that the replay of a recording made by any required recorder can be synchronised in time with any other required recording to within 1 second.</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------</td>
<td>----------</td>
<td>---</td>
<td>---</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>9a</td>
<td>Propulsive thrust / power on each engine</td>
<td>Full range</td>
<td>Each engine each second</td>
<td>±2 %</td>
<td>0.2 % of full range</td>
<td>Sufficient parameters e.g. EPR/N, or Torque/NP as appropriate to the particular engine must be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.</td>
</tr>
<tr>
<td>9b</td>
<td>Flight crew compartment thrust / power lever</td>
<td>Full range</td>
<td>Each lever each second</td>
<td>±2 % or sufficient to determine any gated position</td>
<td>2 % of full range</td>
<td>Parameter 9b must be recorded for aeroplanes with non-mechanically linked cockpit-engine controls, otherwise recommended.</td>
</tr>
<tr>
<td>10</td>
<td>Trailing edge flap or flight crew compartment control selection</td>
<td>Full range or each discrete position</td>
<td>2</td>
<td>±3° or as pilot’s indicator and sufficient to determine each discrete position</td>
<td>0.5 % of full range</td>
<td>Flap position and cockpit control may be sampled at 4 seconds intervals so as to give a data point each 2 seconds.</td>
</tr>
<tr>
<td>11</td>
<td>Leading edge flap or flight crew compartment control selection</td>
<td>Full range or each discrete position</td>
<td>1</td>
<td>±3° or as pilot’s indicator and sufficient to determine each discrete position</td>
<td>0.5 % of full range</td>
<td>Left and right sides, or flap position and cockpit control may be sampled at 2 seconds intervals so as to give a data point each second.</td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverser status</td>
<td>Turbo-jet: stowed, in transit and reverse Turbo-prop: reverse</td>
<td>Each reverser each second</td>
<td>-</td>
<td>-</td>
<td>Turbo-jet: 2 discretes enable the 3 states to be determined Turbo-prop: 1 discrete</td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler and/or speed brake selection</td>
<td>Full range or each discrete position</td>
<td>0.5</td>
<td>±2° unless higher accuracy uniquely required</td>
<td>0.2 % of full range</td>
<td>Sufficient to determine use of the cockpit selector and the activation and positions of the surfaces</td>
</tr>
</tbody>
</table>
### DEPARTMENT OF CIVIL AVIATION

#### AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Description</th>
<th>Range</th>
<th>Resolution</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Outside air temperatures or total air temperature</td>
<td>-50°C to +90°C or available sensor range</td>
<td>±2°C</td>
<td>0.3°C</td>
</tr>
<tr>
<td>15</td>
<td>Autopilot / Autothrottle / AFCS mode and engagement status</td>
<td>A suitable combination of discrete positions</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>Longitudinal acceleration (Body axis)</td>
<td>± 1 g</td>
<td>±1.5 % of maximum range excluding a datum error of ±5 %</td>
<td>0.004 g</td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
<td>±1 g</td>
<td>±1.5 % of maximum range excluding a datum error of ±5 %</td>
<td>0.004 g</td>
</tr>
<tr>
<td>18</td>
<td>Primary flight controls, control surface positions and/or* pilot input</td>
<td>Full range</td>
<td>±2° unless higher accuracy uniquely required</td>
<td>0.2 % of full range</td>
</tr>
<tr>
<td>18a</td>
<td>Pitch axis</td>
<td></td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>18b</td>
<td>Roll axis</td>
<td></td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>18c</td>
<td>Yaw axis</td>
<td></td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Pitch trim position</td>
<td>Full range</td>
<td>±3 % unless higher accuracy uniquely required</td>
<td>0.3 % of full range</td>
</tr>
</tbody>
</table>

*For aeroplanes that can demonstrate the capability of deriving either the control input or control movement (one from the other) for all modes of operation and flight regimes, the 'or' applies. For aeroplanes with non-mechanical control systems the 'and' applies.

Where the input controls for each pilot can be operated independently, both inputs will need to be recorded.

For multiple or split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.

Where dual surfaces are provided, it is permissible to record each surface alternately.

Discretes should show which systems are engaged and which primary modes are controlling the flight path and speed of the aircraft.

The recording resolution may be rounded from 0.004 g to 0.01 g provided that one sample is recorded at full resolution at least every 4 seconds.
<table>
<thead>
<tr>
<th></th>
<th>Requirement</th>
<th>Expected Value</th>
<th>1</th>
<th>20 ft to +2 500 ft</th>
<th>±2 ft or ±3 % whichever is greater below 500 ft and ±5 % above 500 ft</th>
<th>1 ft below 500 ft, 1 ft +0.5 % of full range above 500 ft</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Radio altitude</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>For auto-land/category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second.</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Vertical beam deviation</td>
<td>1</td>
<td></td>
<td></td>
<td>±3 % recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21a</td>
<td>ILS glide path</td>
<td>±0.22 DDM or available sensor range as installed</td>
<td>1</td>
<td></td>
<td>±3 % recommended</td>
<td></td>
<td>Data from both the ILS and MLS systems need not to be recorded at the same time. The approach aid in use should be recorded. For auto-land/ category III operations, each radio altimeter should be recorded, but arranged so that at least one is recorded each second.</td>
</tr>
<tr>
<td>21b</td>
<td>MLS elevation</td>
<td>0.9° to 30°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Horizontal beam deviation</td>
<td>Signal range</td>
<td>1</td>
<td></td>
<td>±3 % recommended</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22a</td>
<td>ILS Localiser</td>
<td>±0.22 DDM or available sensor range as installed</td>
<td>1</td>
<td></td>
<td>±3 % recommended</td>
<td></td>
<td>See parameter 21 remarks.</td>
</tr>
<tr>
<td>22b</td>
<td>MLS azimuth</td>
<td>±62°</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Marker beacon passage</td>
<td>Discrete</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>A single discrete is acceptable for all markers.</td>
</tr>
<tr>
<td>24</td>
<td>Warnings</td>
<td>Discretes</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>A discrete must be recorded for the master warning. Each ‘red’ warning (including lavatory smoke) should be recorded when the warning condition cannot be determined from other parameters or from the cockpit voice recorder.</td>
</tr>
<tr>
<td>25</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Reserved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>Discr(s)</td>
<td>Value</td>
<td>Note</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>----------</td>
<td>-------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Landing gear squat switch status</td>
<td>Discrete(s)</td>
<td>1 (0.25 recommended for main gears)</td>
<td>Discretes should be recorded for the nose and main landing gears.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Ground proximity warning system (GPWS)</td>
<td>Discrete</td>
<td>1</td>
<td>A suitable combination of discretes unless recorder capacity is limited in which case a single discrete for all modes is acceptable.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Angle of attack</td>
<td>As installed</td>
<td>0.5</td>
<td>As installed</td>
<td>0.3% of full range</td>
<td>If left and right sensors are available, each may be recorded at 1 second intervals so as to give a data point each half second.</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Low pressure warning</td>
<td>Discrete(s) or available sensor range</td>
<td>2</td>
<td>0.5% of full range</td>
<td>Each essential system to be recorded.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30a</td>
<td>Hydraulic power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30b</td>
<td>Pneumatic power</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Groundspeed</td>
<td>As installed</td>
<td>1</td>
<td>Data should be obtained from the most accurate</td>
<td>1 kt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Landing gear or gear selector position</td>
<td>Discrete(s)</td>
<td>4</td>
<td>A suitable combination of discretes should be recorded.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Selected barometric setting (each pilot station)</td>
<td>As installed</td>
<td>64</td>
<td>As installed</td>
<td>1 mb</td>
<td>Where practicable, a sampling interval of 4 seconds is recommended</td>
<td></td>
</tr>
<tr>
<td>33a</td>
<td>Pilot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33b</td>
<td>Co-pilot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Selected altitude</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>100 ft</td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34a</td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Selected speed</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>1 kt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Selected Mach</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Selected vertical speed</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>100 ft/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Selected heading</td>
<td>360 degrees</td>
<td>1</td>
<td>As installed</td>
<td>1 degree</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38b</td>
<td>Automatic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Selected flight path</td>
<td></td>
<td>1</td>
<td>As installed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Course/DSTRK</td>
<td>360 degrees</td>
<td></td>
<td></td>
<td>Where capacity is limited a sampling interval of 64 seconds is permissible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39b</td>
<td>Path Angle</td>
<td></td>
<td>As installed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Selected decision height</td>
<td>0-500 ft</td>
<td>64</td>
<td>As installed</td>
<td>1 ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>EFIS display format</td>
<td>Discrete(s)</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41a</td>
<td>Pilot</td>
<td></td>
<td></td>
<td></td>
<td>Discretes should show the display system status e.g. off, normal, fail, composite, sector, plan, rose, nav aids, uwx, range, copy.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41b</td>
<td>Co-pilot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Issue 2 – Rev 0 Dated 04 March 2015
| 42 | Multifunction / Engine / Alerts display format | Discrete(s) | 4 | - | - | Discretes should show the display system status e.g. off, normal, fail, and the identity of display pages for emergency procedures and checklists. Information in checklists and procedures need not be recorded. |
AMC4 AOCR.IDE.A.190 Flight data recorder

LIST OF PARAMETERS TO BE RECORDED FOR AEROPLANES FIRST ISSUED WITH AN INDIVIDUAL C OF A ON OR AFTER 1 JUNE 1990 UP TO AND INCLUDING 31 MARCH 1998

(a) The FDR should, with reference to a timescale, record:

(1) the parameters listed in Table 1 below; and

(2) the additional parameters listed in Table 2 below for those aeroplanes with an MCTOM exceeding 27000 kg.

(b) When determined, the FDR of aeroplanes having an MCTOM of 27000 kg or below does not need to record parameters 14 and 15b of Table 1 below if any of the following conditions are met:

(1) the sensor is not readily available;

(2) sufficient capacity is not available in the flight recorder system; or

(3) a change is required in the equipment that generates the data.

(c) When determined, the FDR of aeroplanes having an MCTOM exceeding 27000 kg does not need to record parameter 15b of Table 1 below, and parameters 23, 24, 25, 26, 27, 28, 29, 30 and 31 of Table 2 below, if any of the following conditions are met:

(1) the sensor is not readily available;

(2) sufficient capacity is not available in the FDR system;

(3) a change is required in the equipment that generates the data; or

(4) for navigational data (NAV frequency selection, DME distance, latitude, longitude, ground speed and drift) the signals are not available in digital form.

(d) When determined, the FDR does not need to record individual parameters that can be derived by calculation from the other recorded parameters.

(e) The parameters to be recorded should meet, as far as practicable, the performance specifications (range, sampling intervals, accuracy limits, and resolution in read-out) defined in Table 1 of AMC5 AOCR.IDE.A.190.
### Table 1: Flight data recorder – Aeroplanes with an MCTOM of more than 5700 kg

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying unless an alternate means to synchronise FDR and CVR recordings is provided</td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine</td>
</tr>
<tr>
<td>10</td>
<td>Trailing edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>11</td>
<td>Leading edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverse position (for turbojet aeroplanes only)</td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler position and/or speed brake selection</td>
</tr>
<tr>
<td>14</td>
<td>Outside air temperature or total air temperature</td>
</tr>
<tr>
<td>15a</td>
<td>Autopilot engagement status</td>
</tr>
<tr>
<td>15b</td>
<td>Autopilot operating modes, autothrottle and AFCS systems engagement status and operating modes.</td>
</tr>
</tbody>
</table>

### Table 2: Flight data recorder - Additional parameters for aeroplanes with an MCTOM of more than 27000 kg

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Longitudinal acceleration</td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
</tr>
<tr>
<td>18</td>
<td>Primary flight controls - control surface position and/or pilot input (pitch, roll and yaw)</td>
</tr>
<tr>
<td>19</td>
<td>Pitch trim position</td>
</tr>
<tr>
<td>20</td>
<td>Radio altitude</td>
</tr>
<tr>
<td>21</td>
<td>Glide path deviation</td>
</tr>
<tr>
<td>22</td>
<td>Localiser deviation</td>
</tr>
<tr>
<td>23</td>
<td>Marker beacon passage</td>
</tr>
<tr>
<td>24</td>
<td>Master warning</td>
</tr>
<tr>
<td>25</td>
<td>NAV 1 and NAV 2 frequency selection</td>
</tr>
<tr>
<td>26</td>
<td>DME 1 and DME 2 distance</td>
</tr>
<tr>
<td>27</td>
<td>Landing gear squat switch status</td>
</tr>
<tr>
<td>28</td>
<td>Ground proximity warning system (GPWS)</td>
</tr>
<tr>
<td>29</td>
<td>Angle of attack</td>
</tr>
<tr>
<td>30</td>
<td>Hydraulics, each system (low pressure)</td>
</tr>
<tr>
<td>31</td>
<td>Navigation data</td>
</tr>
<tr>
<td>32</td>
<td>Landing gear or gear selector position</td>
</tr>
</tbody>
</table>
**AMC5 AOCP.IDE.A.190 Flight data recorder**

**Table 1: Flight Data Recorder**

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>Range</th>
<th>Sampling interval</th>
<th>Accuracy limits (sensor input compared to FDR)</th>
<th>Recommended resolution in readout</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
<td>24 hours</td>
<td>4</td>
<td>±0.125 % per hour</td>
<td>1 second</td>
<td>Coordinated universal time (UTC) preferred where available, otherwise elapsed time</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
<td>-1 000 ft to maximum certificated altitude</td>
<td>1</td>
<td>±100 ft to ±700 ft</td>
<td>5 ft</td>
<td>For altitude record error see EASA ETSO-C124a</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
<td>50 kt to max $V_D$</td>
<td>1</td>
<td>±5 %</td>
<td>1 kt</td>
<td>$V_{SO}$, stalling speed or minimum steady flight speed in the landing configuration $V_D$ design diving speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Max $V_D$ to 1.2 $V_D$</td>
<td></td>
<td>±3 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
<td>360 degrees</td>
<td>1</td>
<td>±2 degrees</td>
<td>0.5 degrees</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
<td>-3 g to +6 g</td>
<td>0.125 ±</td>
<td>±1 % of maximum range excluding a datum error of</td>
<td>0.004 g</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
<td>±75 degrees</td>
<td>1</td>
<td>±2 degrees</td>
<td>0.5 degrees</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
<td>±180 degrees</td>
<td>1</td>
<td>±2 degrees</td>
<td>0.5 degrees</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying</td>
<td>Discrete</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>On-off (one discrete). An FDR/CVR time synchronisation signal complying with 4.2.1 of EUROCAE ED-55 is considered to be an acceptable alternative means of compliance</td>
</tr>
<tr>
<td></td>
<td>Requirement</td>
<td>Setting</td>
<td>Each engine each second</td>
<td>±2 %</td>
<td>0.2 % of full range</td>
<td>Sufficient parameters e.g. EPR/N, or Torque/NP as appropriate to the particular engine should be recorded to determine power</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>-------------------------</td>
<td>------</td>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine</td>
<td>Full range</td>
<td></td>
<td>±2 %</td>
<td>0.2 % of full range</td>
<td>Sufficient parameters e.g. EPR/N, or Torque/NP as appropriate to the particular engine should be recorded to determine power</td>
</tr>
<tr>
<td>10</td>
<td>Trailing edge flap or flight crew compartment control selection</td>
<td>Full range or each discrete position</td>
<td>2</td>
<td>±5 % or as pilot’s indicator</td>
<td>0.5 % of full range</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Leading edge flap or flight crew compartment control selection</td>
<td>Full range or each discrete position</td>
<td>2</td>
<td>-</td>
<td>0.5 % of full range</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverser position</td>
<td>Stowed, in transit and reverse</td>
<td>Each reverser</td>
<td>±2 % unless higher accuracy uniquely</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler and/or speed brake</td>
<td>Full range or each discrete</td>
<td>1</td>
<td>±2 degrees</td>
<td>0.2 % of full range</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Outside air temperatures or total air temperature</td>
<td>Sensor range</td>
<td>2</td>
<td>-</td>
<td>0.3°C</td>
<td></td>
</tr>
<tr>
<td>15a</td>
<td>Autopilot engagement status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15b</td>
<td>Autopilot operating modes, auto-throttle and AFCS systems engagement status and operating modes</td>
<td>A suitable combination of discrete</td>
<td>1</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Longitudinal acceleration</td>
<td>± 1 g</td>
<td>0.25</td>
<td>±1.5 % of maximum range excluding a datum error of</td>
<td>0.004 g</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirement</td>
<td>Range</td>
<td>±2 Degrees unless Higher Accuracy Uniquely Required</td>
<td>±1.5% of Maximum Range Excluding Datum Error of</td>
<td>±1 g</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------</td>
<td>-------------------</td>
<td>---------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
<td>±1 g</td>
<td>0.25</td>
<td>±1.5% of maximum range excluding a datum error of</td>
<td>0.004 g</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Primary flight controls, control surface positions and/or pilot input (pitch, roll, yaw)</td>
<td>Full range</td>
<td>1</td>
<td>±2 degrees unless higher accuracy uniquely required</td>
<td>0.2% of full range</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For aeroplanes with conventional control systems ‘or’ applies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For aeroplanes with non-mechanical control systems ‘and’ applies</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For aeroplanes with split surfaces a suitable combination of inputs is acceptable in lieu of recording each surface separately</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Pitch trim position</td>
<td>Full range</td>
<td>1</td>
<td>±3% unless higher accuracy uniquely</td>
<td>0.3% of full range</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Radio altitude</td>
<td>-20 ft to +2500 ft</td>
<td>1</td>
<td>±2 ft or ±3% whichever is greater below 500 ft and 1 ft below 500 ft, 1 ft +5% of full range</td>
<td>As installed. Accuracy limits are recommended</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Glide path deviation</td>
<td>Signal range</td>
<td>1</td>
<td>±3%</td>
<td>0.3% of full range</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Localiser deviation</td>
<td>Signal range</td>
<td>1</td>
<td>±3%</td>
<td>0.3% of full range</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Marker beacon passage</td>
<td>Discrete</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Master warning</td>
<td>Discrete</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>NAV 1 and 2 frequency</td>
<td>Full range</td>
<td>4</td>
<td>As installed</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Requirement</td>
<td>Level</td>
<td>Status</td>
<td>Notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------</td>
<td>-------</td>
<td>------------</td>
<td>------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>DME 1 and 2 distance</td>
<td>4</td>
<td>As installed</td>
<td>Recording of latitude and longitude from INS or other navigation system is a preferred alternative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Landing gear squat switch</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Ground proximity warning system</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Angle of attack</td>
<td>0.5</td>
<td>As installed</td>
<td>0.3 % of full range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Hydraulics</td>
<td>2</td>
<td>–</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Navigation data</td>
<td>1</td>
<td>As installed</td>
<td>–</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Landing gear or gear selector</td>
<td>4</td>
<td>As installed</td>
<td>–</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AMC6 AOCR.IDE.A.190 Flight data recorder

LIST OF PARAMETERS TO BE RECORDED FOR AEROPLANES FIRST ISSUED WITH AN INDIVIDUAL C OF A BEFORE 1 JUNE 1990

(a) The FDR should, with reference to a timescale, record:

(1) the parameters listed in Table 1 below;

(2) the additional parameters 6 to 15b of Table 2 below, for aeroplanes with an MCTOM exceeding 5700 kg but not exceeding 27000 kg and first issued with an individual CofA on or after 1 January 1989, when the following conditions are met:

   (i) sufficient capacity is available on a flight recorder system;

   (ii) the sensor is readily available; and

   (iii) a change is not required in the equipment that generates the data;

(3) the additional parameters from 6 to 15b of Table 2 below, for aeroplanes with a maximum certificated take-off mass exceeding 27000 kg that are of a type first type certified after 30 September 1969; and

(4) the additional parameters listed in Table 2 below for aeroplanes with an MCTOM exceeding 27000 kg and first issued with an individual CofA on or after 1 January 1987, when the following conditions are met:

   (i) sufficient capacity is available on a flight recorder system;

   (ii) the sensor is readily available; and

   (iii) a change is not required in the equipment that generates the data.

(b) When determined, the FDR of aeroplanes with an MCTOM exceeding 27000 kg that are of a type first type certified after 30 September 1969 does not need to record the parameters 13, 14 and 15b in Table 2 below, when any of the following conditions are met:

(1) sufficient capacity is not available on a flight recorder system;

(2) the sensor is not readily available; and

(3) a change is required in the equipment that generates the data.
(c) The parameters to be recorded should meet, as far as practicable, the performance specifications (range, sampling intervals, accuracy limits, and resolution in read-out) defined in Table 1 of AMC5 AOCR.IDE.A.190).

(d) When so determined, the FDR does not need to record individual parameters that can be derived by calculation from the other recorded parameters.

### Table 1: Flight data recorder - aeroplanes with an MCTOM exceeding 5700 kg

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
</tr>
<tr>
<td>2</td>
<td>Pressure altitude</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed or calibrated airspeed</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
</tr>
</tbody>
</table>

### Table 2: Additional parameters for aeroplanes under conditions of AMC6 AOCR.IDE.A.190, 1 & 2

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Pitch attitude</td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying unless an alternate means to synchronise the FDR and CVR recordings is provided</td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine</td>
</tr>
<tr>
<td>10</td>
<td>Trailing edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>11</td>
<td>Leading edge flap or flight crew compartment control selection</td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverse position (for turbojet aeroplanes only)</td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler position and/or speed brake selection</td>
</tr>
<tr>
<td>14</td>
<td>Outside air temperature (OAT) or total air temperature</td>
</tr>
<tr>
<td>15a</td>
<td>Autopilot engagement status</td>
</tr>
<tr>
<td>15b</td>
<td>Autopilot operating modes, autothrottle and AFCS, system engagement status and operating modes</td>
</tr>
<tr>
<td>16</td>
<td>Longitudinal acceleration</td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
</tr>
<tr>
<td>18</td>
<td>Primary flight controls – control surface position and/or pilot input (pitch, roll and yaw)</td>
</tr>
</tbody>
</table>
### GM1 AOCR.IDE.A.190 Flight data recorder

#### GENERAL

(a) The alleviation of AMC2 AOCR.IDE.A.190(d) affects a small number of aeroplanes first issued with an individual C of A on or after 1 April 1998 that were either constructed prior to this date or to a specification in force just prior to this date. These aeroplanes may not comply fully with AMC2 AOCR.IDE.A.190 (b), but are able to comply with AMC4 AOCR.IDE.A.190. In addition, this alleviation applies only if compliance with AMC2 AOCR.IDE.A.190 (b) would imply significant modifications to the aeroplane with a severe re-certification effort.

(b) Flight data recorder systems installed on board aeroplanes first issued with an individual C of A up to and including 31 March 1998, and for which the recorded parameters do not comply with the performance specifications of Table 1 of AMC5 AOCR.IDE.A.190 (i.e. range, sampling intervals, accuracy limits and recommended resolution readout) may be acceptable.

(c) The alleviations of AMC4 AOCR.IDE.A.190(b) and (c), and AMC6 AOCR.IDE.A.190(b), are acceptable only if adding the recording of missing parameters to the existing flight data recorder system would require a major upgrade of the system itself. Account is taken of the following:

1. The extent of the modification required;
2. The downtime period; and

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Pitch trim position</td>
</tr>
<tr>
<td>20</td>
<td>Radio altitude</td>
</tr>
<tr>
<td>21</td>
<td>Glide path deviation</td>
</tr>
<tr>
<td>22</td>
<td>Localiser deviation</td>
</tr>
<tr>
<td>23</td>
<td>Marker beacon passage</td>
</tr>
<tr>
<td>24</td>
<td>Master warning</td>
</tr>
<tr>
<td>25</td>
<td>NAV 1 and NAV 2 frequency selection</td>
</tr>
<tr>
<td>26</td>
<td>DME 1 and DME 2 distance</td>
</tr>
<tr>
<td>27</td>
<td>Landing gear squat switch status</td>
</tr>
<tr>
<td>28</td>
<td>Ground proximity warning system (GPWS)</td>
</tr>
<tr>
<td>29</td>
<td>Angle of attack</td>
</tr>
<tr>
<td>30</td>
<td>Hydraulics, each system (low pressure)</td>
</tr>
<tr>
<td>31</td>
<td>Navigation data (latitude, longitude, ground speed and drift angle)</td>
</tr>
<tr>
<td>32</td>
<td>Landing gear or gear selector position</td>
</tr>
</tbody>
</table>

* The number in the left hand column reflects the serial number depicted in EUROCAE Document ED-112.
(3) Equipment software development.

(d) For the purpose of AMC4 AOCR.IDE.A.190(b) and (c), and AMC6 AOCR.IDE.A.190(a) and (b), “capacity available” refers to the space on both the flight data acquisition unit and the flight data recorder not allocated for recording the required parameters, or the parameters recorded for the purpose of the Flight Data Monitoring programme, as determined.

(e) For the purpose of AMC4 AOCR.IDE.A.190 (b) and (c), and AMC6 AOCR.IDE.A.190 (a) and (b), a sensor is considered “readily available” when it is already available or can be easily incorporated.

(f) For aeroplanes first issued with an individual C of A up to and including 31 March 1998, the recording of the following additional parameters may be considered:

(1) Remaining parameters in Table 2 of AMC4 AOCR.IDE.A.190 or Table 2 of AMC6 AOCR.IDE.A.190 as applicable;

(2) Any dedicated parameter relating to novel or unique design or operational characteristics of the aeroplane;

(3) operational information from electronic display systems, such as EFIS, ECAM or EICAS, with the following order of priority:

(i) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and auto flight system engagement and mode indications if not recorded from another source;

(ii) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, etc;

(iii) warning and alerts;

(iv) the identity of displayed pages from emergency procedures and checklists.

(4) retardation information including brake application for use in the investigation of landing overruns or rejected take offs; and

(5) additional engine parameters (EPR, N1, EGT, fuel flow, etc.).
AOCR.IDE.A.195 Data link recording

(a) Aeroplanes first issued with an individual CofA on or after 8 April 2014 that have the capability to operate data link communications and are required to be equipped with a CVR, shall record on a recorder, where applicable:

(1) data link communication messages related to ATS communications to and from the aeroplane, including messages applying to the following applications:

(i) data link initiation;

(ii) controller-pilot communication;

(iii) addressed surveillance;

(iv) flight information;

(v) as far as is practicable, given the architecture of the system, aircraft broadcast surveillance;

(vi) as far as is practicable, given the architecture of the system, aircraft operational control data; and

(vii) as far as is practicable, given the architecture of the system, graphics;

(2) information that enables correlation to any associated records related to data link communications and stored separately from the aeroplane; and

(3) information on the time and priority of data link communications messages, taking into account the system’s architecture.

(b) The recorder shall use a digital method of recording and storing data and information and a method for retrieving that data. The recording method shall allow the data to match the data recorded on the ground.

(c) The recorder shall be capable of retaining data recorded for at least the same duration as set out for CVRs in AOCR.IDE.A.185.

(d) The recorder shall have a device to assist in locating it in water.

(e) The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR contained in AOCR.IDE.A.185 (d) and (e).
AMC1 AOCR.IDE.A.195 Data link recording

GENERAL

(a) As a means of compliance with AOCR.IDE.A.195 (a), the recorder on which the data link messages are recorded may be:

(1) the CVR;

(2) the FDR;

(3) a combination recorder when AOCR.IDE.A.200 is applicable; or

(4) a dedicated flight recorder. In that case, the operational performance requirements for this recorder should be those laid down in EUROCAE Document ED-112 (Minimum Operational Performance Specification for Crash Protected Airborne Recorder Systems) dated March 2003, including amendments n°1 and n°2, or any later equivalent standard produced by EUROCAE.

(b) As a means of compliance with AOCR.AOCR.A.195 (a)(2), the operator should enable correlation by providing information that allows an accident investigator to understand what data were provided to the aeroplane and, when the provider identification is contained in the message, by which provider.

(c) The timing information associated with the data link communications messages required to be recorded by AOCR.AOCR.A.195 (a) (3) should be capable of being determined from the airborne-based recordings. This timing information should include at least the following:

(1) the time each message was generated;

(2) the time any message was available to be displayed by the crew;

(3) the time each message was actually displayed or recalled from a queue; and

(4) the time of each status change.

(d) The message priority should be recorded when it is defined by the protocol of the data link communication message being recorded.

(e) The expression “taking into account the system architecture”, in AOCR.IDE.A.195 (a) (3), means that the recording of the specified information may be omitted if the existing source systems involved would require a major upgrade. The following should be considered:
(1) the extent of the modification required;

(2) the down-time period; and

(3) equipment software development.

The intention is that new designs of source systems should include this functionality and support the full recording of the required information.

(f) Data link communications messages that support the applications in Table 1 below should be recorded.

(g) Further details on the recording requirements can be found in the recording requirement matrix in Appendix D.2 of EUROCAE Document ED-93 (Minimum Aviation System Performance Specification for CNS/ATM Recorder Systems, dated November 1998).

**Table 1: Applications**

<table>
<thead>
<tr>
<th>Item No</th>
<th>Application Type</th>
<th>Application Description</th>
<th>Required Recording Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data link initiation</td>
<td>This includes any application used to log on to, or initiate, a data link service. In future air navigation system (FANS)-1/A and air traffic navigation (ATN), these are ATS facilities notification (AFN) and context management (CM), respectively.</td>
<td>C</td>
</tr>
<tr>
<td>2</td>
<td>Controller/pilot communication</td>
<td>This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and air traffic controllers. In FANS-1/A and ATN, this includes the controller/pilot data link communications (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.</td>
<td>C</td>
</tr>
<tr>
<td>3</td>
<td>Addressed surveillance</td>
<td>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.</td>
<td>C, F2</td>
</tr>
</tbody>
</table>
GM1 AOCR.IDE.A.195 Data link recording

DEFINITIONS AND ACRONYMS

(a) The letters and expressions in Table 1 of AMC1 AOCR.IDE.A.195 have the following meaning:

C: complete contents recorded

M: information that enables correlation with any associated records stored separately from the aeroplane.

*: Applications that are to be recorded only as far as is practicable, given the architecture of the system.

F1: graphics applications may be considered as AOC messages when they are part of a data link communications application service run on an individual basis by the operator itself in the framework of the operational control.

F2: where parametric data sent by the aeroplane, such as Mode S, is reported within the message, it should be recorded unless data from the same source is recorded on the FDR.

(b) The definitions of the applications type in Table 1 of AMC1 AOCR.IDE.A.195 are described in Table 1 below.
### Table 1: Definitions of applications type

<table>
<thead>
<tr>
<th>Item No</th>
<th>Application Type</th>
<th>Messages</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CN</td>
<td>CM is an ATN service</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>AFN</td>
<td>AFN is a FANS 1/A service</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>CPDLC</td>
<td>All implemented up and downlink messages to be recorded</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>ADS-C</td>
<td>ADS-C reports Position reports</td>
<td>All contract requests and reports recorded Only used within FANS 1/A. Only used in oceanic and remote areas.</td>
</tr>
<tr>
<td>5</td>
<td>ADS-B</td>
<td>Surveillance data</td>
<td>Information that enables correlation with any associated records stored separately from the aeroplane.</td>
</tr>
<tr>
<td>6</td>
<td>D-FIS</td>
<td>D-FIS is an ATN service. All implemented up and downlink messages to be recorded</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>TWIP</td>
<td>TWIP messages</td>
<td>Terminal weather information for pilots</td>
</tr>
<tr>
<td>8</td>
<td>D-ATIS</td>
<td>ATIS messages</td>
<td>Refer to EUROCAE Document ED-85A dated December 2003. Data Link Application System Document (DLASD) for the ‘ATIS Data Link Service’</td>
</tr>
<tr>
<td>10</td>
<td>DCL</td>
<td>DCL messages</td>
<td>Refer to EUROCAE Document ED-85A dated December 2003. Data Link Application System Document (DLASD) for ‘Departure Clearance’ Data Link Service</td>
</tr>
<tr>
<td>11</td>
<td>Graphics</td>
<td>Weather maps &amp; other graphics</td>
<td>Graphics exchanged in the framework of procedures within the operational control, as specified in PART-ORO. Information that enables correlation with any associated records stored separately from the aeroplane.</td>
</tr>
<tr>
<td>12</td>
<td>AOC</td>
<td>Aeronautical operational control messages</td>
<td>Messages exchanged in the framework of procedures within the operational control, as specified in PART-ORO. Information that enables correlation with any associated records stored separately from the aeroplane. Definition in EUROCAE Document ED-112, dated March 2003.</td>
</tr>
<tr>
<td>13</td>
<td>Surveillance</td>
<td>Downlinked aircraft parameters (DAP)</td>
<td>As defined in ICAO Annex 10 Volume IV (Surveillance systems and ACAS).</td>
</tr>
</tbody>
</table>

**Abbreviations:****

- **AAC**: aeronautical administrative communications
- **ADS-B**: automatic dependent surveillance - broadcast
- **ADS-C**: automatic dependent surveillance – contract
- **AFN**: aircraft flight notification
- **AOC**: aeronautical operational control
- **ATIS**: automatic terminal information service
- **ATSC**: air traffic service communication
- **CAP**: controller access parameters
Compliance with CVR and FDR requirements may be achieved by:

(a) one flight data and cockpit voice combination recorder in the case of aeroplanes required to be equipped with a CVR or an FDR;

(b) one flight data and cockpit voice combination recorder in the case of aeroplanes with an MCTOM of 5700 kg or less and required to be equipped with a CVR and an FDR; or

(c) two flight data and cockpit voice combination recorders in the case of aeroplanes with an MCTOM of more than 5700 kg and required to be equipped with a CVR and an FDR.

**AMC1 AOCR.IDE.A.200 Combination recorder**

**GENERAL**

When two flight data and cockpit voice combination recorders are installed, one should be located near the flight crew compartment, in order to minimise the risk of data loss due to a failure of the wiring that gathers data to the recorder. The other should be located at the rear section of the aeroplane, in order to minimise the risk of data loss due to recorder damage in the case of a crash.
GM1 AOCR.IDE.A.200 Combination recorder

GENERAL

(a) A flight data and cockpit voice combination recorder is a flight recorder that records:

(1) all voice communications and aural environment required by AOCR.IDE.A.185 regarding CVRs; and

(2) all parameters required by AOCR.IDE.A.190 regarding FDRs, with the same specifications required by those paragraphs.

(b) In addition a flight data and cockpit voice combination recorder may record data link communication messages and related information required by AOCR.IDE.A.195.

AOCR.IDE.A.205 Seats, seat safety belts, restraint systems and child restraint devices

(a) Aeroplanes shall be equipped with:

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

(2) a seat belt on each passenger seat and restraining belts for each berth except as specified in (3);

(3) a seat belt with upper torso restraint system on each passenger seat and restraining belts on each berth in the case of aeroplanes with an MCTOM of less than 5700 kg and with an MOPSC of less than nine, after 8 April 2015;

(4) a child restraint device (CRD) for each person on board younger than 24 months;

(5) a seat belt with upper torso restraint system incorporating a device that will automatically restrain the occupant’s torso in the event of rapid deceleration:

(i) on each flight crew seat and on any seat alongside a pilot’s seat;

(ii) on each observer seat located in the flight crew compartment;
A seat belt with upper torso restraint system shall:

1. have a single point release;
2. on flight crew seats, on any seat alongside a pilot’s seat and on the seats for the minimum required cabin crew, include two shoulder straps and a seat belt that may be used independently.

**AMC1 AOCR.IDE.A.205 Seats, seat safety belts, restraint systems and child restraint devices**

**CHILD RESTRAINT DEVICES (CRDs)**

(a) A CRD is considered to be acceptable if:

1. it is a “supplementary loop belt” manufactured with the same techniques and the same materials as the approved safety belts; or
2. it complies with (b).

(b) Provided the CRD can be installed properly on the respective aircraft seat, the following CRDs are considered acceptable:

1. CRDs approved for use in aircraft by the Authority on the basis of a technical standard and marked accordingly;
2. CRDs approved for use in motor vehicles according to the UN standard ECE R 44, -03 or later series of amendments;
3. CRDs approved for use in motor vehicles and aircraft according to Canadian CMVSS 213/213.1;
4. CRDs approved for use in motor vehicles and aircraft according to US FMVSS No 213 and manufactured to these standards on or after February 26, 1985. US approved CRDs manufactured after this date must bear the following labels in red letters:
   (i) “THIS CHILD RESTRAINT SYSTEM CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS”; and
   (ii) “THIS RESTRAINT IS CERTIFIED FOR USE IN MOTOR VEHICLES AND AIRCRAFT”;
(5) 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); and

(6) devices approved for use in cars, manufactured and tested to standards equivalent to those listed above. The device should 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. The qualifying organisation should be a competent and independent organisation that is acceptable to the Authority.

(c) Location

(1) 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 they are positioned. Rearward facing CRDs should only be installed on forward facing passenger seats. A CRD should not be installed within the radius of action of an airbag, unless it is obvious that the airbag is deactivated or it can be demonstrated that there is no negative impact from the airbag.

(2) An infant in a CRD should be located as near to a floor level exit as feasible.

(3) An infant in a CRD should not hinder evacuation for any passenger.

(4) An infant in a CRD should neither be located in the row (where rows are existing) 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 that forms part of the evacuation route to exits is not recommended. Other locations may be acceptable provided the access of neighbour passengers to the nearest aisle is not obstructed by the CRD.

(5) In general, only one CRD per row segment is recommended. More than one CRD per row segment is allowed if the infants are from the same family or travelling group provided the infants are accompanied by a responsible adult sitting next to them.

(6) A row segment is the fraction of a row separated by two aisles or by one aisle and the aeroplane fuselage.

(d) Installation
CRDs should only be installed on a suitable aeroplane 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) should not be attached to an aeroplane seat with a lap belt only; a CRD designed to be attached to a vehicle seat only by means of rigid bar lower anchorages (ISO-FIX or US equivalent), should only be used on aeroplane seats that are equipped with such connecting devices and should not be attached by the aeroplane seat lap belt. The method of connecting should be the one shown in the manufacturer’s instructions provided with each CRD.

All safety and installation instructions should be followed carefully by the responsible adult accompanying the infant. Cabin crew should prohibit the use of any inadequately installed CRD or not qualified seat.

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.

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.

Forward facing restraint devices with an integral harness must not be installed such that the adult safety belt is secured over the infant.

Operation

Each CRD should remain secured to a passenger seat during all phases of flight, unless it is properly stowed when not in use.

Where a CRD is adjustable in recline it must be in an upright position for all occasions when passenger restraint devices are required.

AMC2 AOCR.IDE.A.205 Seats, seat safety belts, restraint systems and child restraint devices

UPPER TORSO RESTRAINT SYSTEM

An upper torso restraint system having three straps is deemed to be compliant with the requirement for restraint systems with two shoulder straps.
SAFETY BELT

A safety belt with diagonal shoulder strap (three anchorage points) is deemed to be compliant with the requirement for safety belts (two anchorage points).

AMC3 AOCR.IDE.A.205 Seats, seat safety belts, restraint systems and child restraint devices

SEATS FOR MINIMUM REQUIRED CABIN CREW

(a) Seats for the minimum required cabin crew members should be located near required floor level emergency exits, except if the emergency evacuation of passengers would be enhanced by seating cabin crew members elsewhere. In this case other locations are acceptable.

(b) Such seats should be forward or rearward facing within 15° of the longitudinal axis of the aeroplane

AOCR.IDE.A.210 Fasten seat belt and no smoking signs

Aeroplanes in which not all passenger seats are visible from the flight crew seat(s) shall be equipped with a means of indicating to all passengers and cabin crew when seat belts shall be fastened and when smoking is not allowed.

AOCR.IDE.A.215 Internal doors and curtains

Aeroplanes shall be equipped with:

(a) in the case of aeroplanes with an MOPSC of more than 19, a door between the passenger compartment and the flight crew compartment, with a placard indicating “crew only” and a locking means to prevent passengers from opening it without the permission of a member of the flight crew;

(b) a readily accessible means for opening each door that separates a passenger compartment from another compartment that has emergency exits;

(c) a means for securing in the open position any doorway or curtain separating the passenger compartment from other areas that need to be accessed to reach any required emergency exit from any passenger seat;

(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.

**AOCR.IDE.A.220 First-aid kit**

(a) Aeroplanes shall be equipped with first-aid kits, in accordance with Table 1.

**Table 1**

<table>
<thead>
<tr>
<th>Number of passenger seats installed</th>
<th>Number of first-aid kits required</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100</td>
<td>1</td>
</tr>
<tr>
<td>101-200</td>
<td>2</td>
</tr>
<tr>
<td>201-300</td>
<td>3</td>
</tr>
<tr>
<td>301-400</td>
<td>4</td>
</tr>
<tr>
<td>401-500</td>
<td>5</td>
</tr>
<tr>
<td>More than 500</td>
<td>6</td>
</tr>
</tbody>
</table>

(b) First-aid kits shall be:

(1) readily accessible for use; and

(2) kept up to date.

**AMC1 AOCR.IDE.A.220 First-aid kit**

**CONTENT OF FIRST-AID KITS**

(a) First-aid kits should be equipped with appropriate and sufficient medications and instrumentation. However, these kits should be complemented by the operator according to the characteristics of the operation (scope of operation, flight duration, number and demographics of passengers etc.).

(b) The following should be included in the first-aid kit:

(1) Equipment

   (i) bandages (assorted sizes);

   (ii) burns dressings (unspecified);
(iii) wound dressings (large and small);
(iv) adhesive dressings (assorted sizes);
(v) adhesive tape;
(vi) adhesive wound closures;
(vii) safety pins;
(viii) safety scissors;
(ix) antiseptic wound cleaner;
(x) disposable resuscitation aid;
(xi) disposable gloves;
(xii) tweezers: splinter; and
(xiii) thermometers (non-mercury).

(2) Medications

(i) simple analgesic (may include liquid form);
(ii) antiemetic;
(iii) nasal decongestant;
(iv) gastrointestinal antacid, in the case of aeroplanes carrying more than nine passengers;
(v) anti-diarrhoeal medication, in the case of aeroplanes carrying more than nine passengers; and
(vi) antihistamine.

(3) Other

(i) a list of contents in at least two languages (English and one other). This should include information on the effects and side effects of medications carried;
(ii) first-aid handbook, current edition;
(iii) medical incident report form;
(iv) biohazard disposal bags.

(4) An eye irrigator, whilst not required to be carried in the first-aid kit, should, where possible, be available for use on the ground.

**AMC2 AOCR.IDE.A.220 First-aid kit**

**MAINTENANCE OF FIRST-AID KITS**

To be kept up to date, first-aid kits should be:

(a) inspected periodically to confirm, to the extent possible, that contents are maintained in the condition necessary for their intended use;

(b) replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant; and

(c) replenished after use in-flight at the first opportunity where replacement items are available.

**AOCR.IDE.A.225 Emergency medical kit**

(a) Aeroplanes with an MOPSC of more than 30 shall be equipped with an emergency medical kit when any point on the planned route is more than 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 only administered by appropriately qualified persons.

(c) The emergency medical kit referred to in (a) shall be:

(1) dust and moisture proof;

(2) carried in a way that prevents unauthorised access; and

(3) kept up to date.

**AMC1 AOCR.IDE.A.225 Emergency medical kit**

**CONTENT OF EMERGENCY MEDICAL KIT**

(a) Emergency medical kits should be equipped with appropriate and sufficient medications and instrumentation. However, these kits should be complemented by the operator according to the characteristics of the
operation (scope of operation, flight duration, number and demographics of passengers etc.).

(b) The following should be included in the emergency medical kit:

(1) Equipment

   (i) sphygmomanometer – non mercury;

   (ii) stethoscope;

   (iii) syringes and needles;

   (iv) intravenous cannulae (if intravenous fluids are carried in the first-aid kit a sufficient supply of intravenous cannulae should be stored there as well);

   (v) oropharyngeal airways (three sizes);

   (vi) tourniquet;

   (vii) disposable gloves;

   (viii) needle disposal box;

   (ix) one or more urinary catheter(s), appropriate for either sex, and anaesthetic gel;

   (x) basic delivery kit;

   (xi) bag-valve masks (masks two sizes: one for adults, one for children);

   (xii) intubation set;

   (xiii) aspirator;

   (xiv) blood glucose testing equipment; and

   (xv) scalpel.

(2) Instructions: the instructions should contain a list of contents (medications in trade names and generic names) in at least two languages (English and one other). This should include information on the effects and side effects of medications carried. There should also be basic instructions for use of the medications in the kit and ACLS cards (summarising and depicting the current algorithm for advanced cardiac life support).
(3) Medications

(i) coronary vasodilator e.g. glyceriltrinitrate-oral;

(ii) antispasmodic

(iii) epinephrine/adrenaline 1:1000 (if a cardiac monitor is carried);

(iv) adrenocorticoid - injectable;

(v) major analgesic;

(vi) diuretic - injectable;

(vii) antihistamine - oral and injectable;

(viii) sedative/anticonvulsant – injectable, rectal and oral sedative;

(ix) medication for hypoglycaemia (e.g. hypertonic glucose);

(x) antiemetic;

(xi) atropine - injectable;

(xii) bronchial dilator – injectable or inhaled;

(xiii) IV fluids in appropriate quantity e.g. sodiumchloride 0.9 % (minimum 250 ml);

(xiv) acetylsalicylic acid 300 mg - oral and / or injectable;

(xv) antiarrhythmic - if a cardiac monitor is carried;

(xvi) antihypertensive medication;

(xvii) beta-blocker – oral.

* Epinephrine/Adrenaline 1:10 000 can be a dilution of epinephrine 1:1 000

(4) The carriage of an automated external defibrillator should be determined by the operator on the basis of a risk assessment taking into account the particular needs of the operation.
The automated external defibrillator should be carried on the aircraft, though not necessarily in the emergency medical kit.

**AMC2 AOCR.IDE.A.225 Emergency medical kit**

**CARRIAGE UNDER SECURITY CONDITIONS**

The emergency medical kit should be kept in under secure conditions, either in the flight crew compartment or in another locked compartment.

**AMC3 AOCR.IDE.A.225 Emergency medical kit**

**ACCESS TO EMERGENCY MEDICAL KIT**

(a) When the actual situation on board so requires, the commander should limit access to the emergency medical kit.

(b) Drugs should be administered by medical doctors, qualified nurses, paramedics or emergency medical technicians.

(c) Medical students, student paramedics, student emergency medical technicians or nurses aids should only administer drugs if no person mentioned in (b) is on board the flight and appropriate advice has been received.

(d) Oral drugs should not be denied in medical emergency situations where no medically qualified persons are on board the flight.

**AMC4 AOCR.IDE.A.225 Emergency medical kit**

**MAINTENANCE OF EMERGENCY MEDICAL KIT**

To be kept up to date the emergency medical kit should be:

(a) inspected periodically to confirm, to the extent possible, that the contents are maintained in the condition necessary for their intended use;

(b) replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant; and

(c) replenished after use-in-flight at the first opportunity where replacement items are available.

**AOCR.IDE.A.230 First-aid oxygen**

(a) Pressurised aeroplanes operated at pressure altitudes above 25 000 ft, in the case of operations for which a cabin crew member is required,
shall be equipped with a supply of undiluted oxygen for passengers who, for physiological reasons, might require oxygen following a cabin depressurisation.

(b) The oxygen supply referred to in (a) shall be calculated using an average flow rate of at least 3 litres standard temperature pressure dry (STPD)/minute/person. This oxygen supply shall be sufficient for the remainder of the flight after cabin depressurisation when the cabin altitude exceeds 8000 ft but does not exceed 15000 ft, for at least 2% of the passengers carried, but in no case for less than one person.

(c) There shall be a sufficient number of dispensing units, but in no case less than two, with a means for cabin crew to use the supply.

(d) The first-aid oxygen equipment shall be capable of generating a mass flow to each user of at least 4 litres STPD per minute.

**GM1 AOCR.IDE.A.230 First-aid oxygen**

**GENERAL**

(a) First-aid oxygen is intended for those passengers who still need to breathe oxygen when the amount of supplemental oxygen required under AOCR.IDE.A.235 or AOCR.IDE.A.240 has been exhausted.

(b) When calculating the amount of first-aid oxygen, the operator should take into account the fact that, following a cabin depressurisation, supplemental oxygen as calculated in accordance with Table 1 of AOCR.IDE.A.235 and Table 1 of AOCR.IDE.A.240 should be sufficient to cope with potential effects of hypoxia for:

1. all passengers when the cabin altitude is above 15000 ft;
2. at least 30% of the passengers, for any period when, in the event of loss of pressurisation and taking into account the circumstances of the flight, the pressure altitude in the passenger compartment will be between 14000 ft and 15000 ft; and
3. at least 10% of the passengers for any period in excess of 30 minutes when the pressure altitude in the passenger compartment will be between 10000 ft and 14000 ft.

(c) 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 8000 ft and 15000 ft, when supplemental oxygen may no longer be available.

(d) 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.

(e) The conditions above may reduce the period of time during which the first-aid oxygen may be required and consequently may limit the amount of first-aid oxygen to be carried on board.

(f) Means may be provided to decrease the flow to not less than 2 litres per minute, STPD, at any altitude.

**AOCR.IDE.A.235 Supplemental oxygen — pressurised aeroplanes**

(a) Pressurised aeroplanes operated at pressure altitudes above 10000 ft shall be equipped with supplemental oxygen equipment that is capable of storing and dispensing the oxygen supplies in accordance with Table 1.

(b) Pressurised aeroplanes operated at pressure altitudes above 25000 ft shall be equipped with:

1. quick donning types of masks for flight crew members;
2. sufficient spare outlets and masks or portable oxygen units with masks distributed evenly throughout the passenger compartment, to ensure immediate availability of oxygen for use by each required cabin crew member;
3. an oxygen dispensing unit connected to oxygen supply terminals immediately available to each cabin crew member, additional crew member and occupants of passenger seats, wherever seated; and
4. a device to provide a warning indication to the flight crew of any loss of pressurisation.

(c) In the case of pressurised aeroplanes first issued with an individual CofA after 8 November 1998 and operated at pressure altitudes above 25000 ft, or operated at pressure altitudes at, or below 25000 ft under conditions that would not allow them to descend safely to 13000 ft within four minutes, the individual oxygen dispensing units referred to in (b) (3) shall be automatically deployable.

(d) The total number of dispensing units and outlets referred to in (b) (3) and (c) shall exceed the number of seats by at least 10 %. The extra units shall be evenly distributed throughout the passenger compartment.

(e) Notwithstanding (a), the oxygen supply requirements for cabin crew member(s), additional crew member(s) and passenger(s), in the case of
aeroplanes not certified to fly at altitudes above 25000 ft, may be reduced to the entire flying time between 10000 ft and 13000 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 minutes to a cabin pressure altitude of 13000 ft.

(f) The required minimum supply in Table 1, row 1 item (b)(1) and row 2, shall cover the quantity of oxygen necessary for a constant rate of descent from the airplane’s maximum certified operating altitude to 10000 ft in 10 minutes and followed by 20 minutes at 10000 ft.

(g) The required minimum supply in Table 1, row 1 item 1(b)(2), shall cover the quantity of oxygen necessary for a constant rate of descent from the airplane’s maximum certified operating altitude to 10000 ft in 10 minutes followed by 110 minutes at 10000 ft.

(h) The required minimum supply in Table 1, row 3, shall cover the quantity of oxygen necessary for a constant rate of descent from the airplane’s maximum certified operating altitude to 15 000 ft in 10 minutes.

### Table 1
**Oxygen minimum requirements for pressurised aeroplanes**

<table>
<thead>
<tr>
<th>Supply for</th>
<th>Duration and cabin pressure altitude</th>
</tr>
</thead>
</table>
| 1. Occupants of flight crew compartment seats on flight crew compartment duty | (a) The entire flying time when the cabin pressure altitude exceeds 13000 ft.  
(b) The remainder of the flying time when the cabin pressure altitude exceeds 10000 ft but does not exceed 13000 ft, after the initial 30 minutes at these altitudes, but in no case less than:  
(1) 30 minutes” supply for aeroplanes certified to fly at altitudes not exceeding 25000 ft; and  
(2) 2 hours” supply for aeroplanes certified to fly at altitudes of more than 25000 ft. |
| 2. Required cabin crew members | a) The entire flying time when the cabin pressure altitude exceeds 13000 ft, but not less than 30 minutes” supply.  
(b) The remainder of the flying time when the cabin pressure altitude exceeds 10000 ft but does not exceed |
3. 100% of passengers (*)

The entire flying time when the cabin pressure altitude exceeds 15000 ft, but in no case less than 10 minutes’ supply.

4. 30% of passengers (*)

The entire flying time when the cabin pressure altitude exceeds 14000 ft but does not exceed 15000 ft.

5. 10% of passengers (*)

The remainder of the flying time when the cabin pressure altitude exceeds 10000 ft but does not exceed 14000 ft, after the initial 30 minutes at these altitudes.

(*) Passenger numbers in Table 1 refer to passengers actually carried on board, including persons younger than 24 months.

AMC1 AOCR.IDE.A.235 Supplemental oxygen – pressurised aeroplanes

DETERMINATION OF OXYGEN

(a) In the determination of the amount of supplemental oxygen required 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.).

(b) The amount of supplemental oxygen should be determined on the basis of cabin pressure altitude, flight duration and on 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.

(c) Following a cabin pressurisation failure, the cabin pressure altitude should be considered to be the same as the aeroplane pressure altitude, unless it can be 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.
OXYGEN REQUIREMENTS FOR FLIGHT CREW COMPARTMENT SEAT OCCUPANTS AND CABIN CREW IN ADDITION TO THE REQUIRED MINIMUM NUMBER OF CABIN CREW

(a) For the purpose of supplemental oxygen supply, flight crew compartment seat occupants who are:

(1) supplied with oxygen from the flight crew source of oxygen should be considered as flight crew members; and

(2) not supplied with oxygen by the flight crew source of oxygen should be considered as passengers.

(b) Cabin crew members in addition to the minimum number of cabin crew and additional crew members should be considered as passengers for the purpose of supplemental oxygen supply.

AEROPLANES NOT CERTIFIED TO FLY ABOVE 25 000 FT

(a) With respect to AOCR.IDE.A.235 (e) the maximum altitude up to which an aeroplane can operate without a passenger oxygen system being installed and capable of providing oxygen to each cabin occupant, should be established using an emergency descent profile that takes into account the following conditions:

(1) 17 seconds” time delay for pilot’s recognition and reaction, including mask donning, for trouble shooting and configuring the aeroplane for the emergency descent (emergency descent data/charts established by the aeroplane manufacturer and published in the aircraft flight manual (AFM), and/or the AFM should be used to ensure uniform application of the option); and

(2) maximum operational speed (VMO) or the airspeed approved in the AFM for emergency descent, (emergency descent data/charts established by the aeroplane manufacturer and published in the AFM, and/or AFM should be used to ensure uniform application of the option), whichever is the less;

(b) On routes where oxygen is necessary to be carried for 10 % of the passengers for the flight time between 10000 ft and 13000 ft, the oxygen should be provided either by:
DEPARTMENT OF CIVIL AVIATION

AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

(1) 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/her own discretion when seated on his/her assigned seat; or

(2) portable bottles, when a cabin crew member is required on board such flight.

GM1 AOCR.IDE.A.235 (b) (1) Supplemental oxygen – pressurised aeroplanes

QUICK DONNING MASKS

A quick donning mask is a 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 donned without disturbing eye glasses and without delaying the flight crew member from proceeding with assigned emergency duties;

(c) once donned, does not prevent immediate communication between the flight crew members and other crew members over the aircraft intercommunication system; and

(d) does not inhibit radio communications.

AOCR.IDE.A.240 Supplemental oxygen — non-pressurised aeroplanes

Non-pressurised aeroplanes operated at pressure altitudes above 10 000 ft shall be equipped with supplemental oxygen equipment capable of storing and dispensing the oxygen supplies in accordance with Table 1.

<table>
<thead>
<tr>
<th>Supply for</th>
<th>Duration and cabin pressure altitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Occupants of flight crew compartment seats on flight crew compartment duty and crew members assisting flight crew in their duties</td>
<td>The entire flying time at pressure altitudes above 10000 ft.</td>
</tr>
</tbody>
</table>
2. Required cabin crew members

The entire flying time at pressure altitudes above 13000 ft and for any period exceeding 30 minutes at pressure altitudes above 10000 ft but not exceeding 13000 ft.

3. Additional crew members and 100% of passengers (*)

The entire flying time at pressure altitudes above 13000 ft.

4. 10% of passengers (*)

The entire flying time after 30 minutes at pressure altitudes above 10000 ft but not exceeding 13000 ft.

(*) Passenger numbers in Table 1 refer to passengers actually carried on board, including persons younger than 24 months.

**AMC1 AOCR.IDE.A.240 Supplemental oxygen - non-pressurised aeroplanes**

**AMOUNT OF SUPPLEMENTAL OXYGEN**

The amount of supplemental oxygen for sustenance for a particular operation should be determined on the basis of flight altitudes and flight duration, consistent with the operating procedures, including emergency procedures, established for each operation and the routes to be flown, as specified in the operations manual.

**AOCR.IDE.A.245 Crew protective breathing equipment**

(a) All pressurised aeroplanes and those unpressurised aeroplanes with an MCTOM of more than 5700 kg or having an MOPSC of more than 19 seats shall be equipped with protective breathing equipment (PBE) to protect the eyes, nose and mouth and to provide for a period of at least 15 minutes:

(1) oxygen for each flight crew member on duty in the flight crew compartment;

(2) breathing gas for each required cabin crew member, adjacent to his/her assigned station; and
(3) breathing gas from a portable PBE for one member of the flight crew, adjacent to his/her assigned station, in the case of aeroplanes operated with a flight crew of more than one and no cabin crew member.

(b) A PBE intended for flight crew use shall be installed in the flight crew compartment and be accessible for immediate use by each required flight crew member at his/her assigned station.

(c) A PBE intended for cabin crew use shall be installed adjacent to each required cabin crew member station.

(d) Aeroplanes shall be equipped with an additional portable PBE installed adjacent to the hand fire extinguisher referred to in AOCR.IDE.A.250, or adjacent to the entrance of the cargo compartment, in case the hand fire extinguisher is installed in a cargo compartment.

(e) A PBE while in use shall not prevent the use of the means of communication referred to in AOCR.IDE.A.170, AOCR.IDE.A.175, AOCR.IDE.A.270 and AOCR.IDE.A.330.

**AMC1 AOCR.IDE.A.245 Crew protective breathing equipment**

**PROTECTIVE BREATHING EQUIPMENT (PBE)**

The supply for PBE for the flight crew members may be provided by the supplemental oxygen required in AOCR.IDE.A.235 or AOCR.IDE.A.240.

**AOCR.IDE.A.250 Hand fire extinguishers**

(a) Aeroplanes shall be equipped with at least one hand fire extinguisher in the flight crew compartment.

(b) At least one hand fire extinguisher shall be located in, or readily accessible for use in, each galley not located on the main passenger compartment.

(c) At least one hand fire extinguisher shall 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.

(d) The type and quantity of extinguishing agent for the required fire extinguishers shall be suitable for the type of fire likely to occur in the compartment where the extinguisher is intended to be used and to minimise the hazard of toxic gas concentration in compartments occupied by persons.
(e) Aeroplanes shall be equipped with at least a number of hand fire extinguishers in accordance with Table 1, conveniently located to provide adequate availability for use in each passenger compartment.

### Table 1

**Number of hand fire extinguishers**

<table>
<thead>
<tr>
<th>MOPSC</th>
<th>Number of extinguishers</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-30</td>
<td>1</td>
</tr>
<tr>
<td>31-60</td>
<td>2</td>
</tr>
<tr>
<td>61-200</td>
<td>3</td>
</tr>
<tr>
<td>201-300</td>
<td>4</td>
</tr>
<tr>
<td>301-400</td>
<td>5</td>
</tr>
<tr>
<td>401-500</td>
<td>6</td>
</tr>
<tr>
<td>501-600</td>
<td>7</td>
</tr>
<tr>
<td>More than 600</td>
<td>8</td>
</tr>
</tbody>
</table>

**AMC1 AOCR.IDE.A.250 Hand fire extinguishers**

**NUMBER, LOCATION AND TYPE**

(a) The number and location of hand fire extinguishers should be such as to provide adequate availability for use, account being taken of the number and size of the passenger compartments, the need to minimise the hazard of toxic gas concentrations and the location of lavatories, galleys, etc. These considerations may result in a number of fire extinguishers greater than the minimum required.

(b) There should be at least one hand fire extinguisher installed in the flight crew compartment and this should be suitable for fighting both flammable fluid and electrical equipment fires. Additional hand fire extinguishers may be required for the protection of other compartments accessible to the crew in flight. Dry chemical fire extinguishers should not be used in the flight crew compartment, or in any compartment not separated by a partition from the flight crew compartment, because of the adverse effect on vision during discharge and, if conductive, interference with electrical contacts by the chemical residues.

(c) Where only one hand fire extinguisher is required in the passenger compartments it should be located near the cabin crew member’s station, where provided.

(d) Where two or more hand fire extinguishers are required in the passenger compartments and their location is not otherwise dictated by consideration of AOCR.IDE.A.250 (b), an extinguisher should be located near each end of the cabin with the remainder distributed throughout the cabin as evenly as is practicable.
(e) Unless an extinguisher is clearly visible, its location should be indicated by a placard or sign. Appropriate symbols may also be used to supplement such a placard or sign.

**AOCR.IDE.A.255 Crash axe and crowbar**

(a) Aeroplanes with an MCTOM of more than 5700 kg or with an MOPSC of more than nine shall be equipped with at least one crash axe or crowbar located in the flight crew compartment.

(b) In the case of aeroplanes with an MOPSC of more than 200, an additional crash axe or crowbar shall be installed in or near the rearmost galley area.

(c) Crash axes and crowbars located in the passenger compartment shall not be visible to passengers.

**AMC1 AOCR.IDE.A.255 Crash axe and crowbar**

**STORAGE OF CRASH AXES AND CROWBARS**

 Crash axes and crowbars located in the passenger compartment should be stored in a position not visible to passengers.

**AOCR.IDE.A.260 Marking of break-in points**

If areas of the airplane’s fuselage suitable for break-in by rescue crews in an emergency are marked, such areas shall be marked as shown in Figure 1.

**Figure 1**

Marking of break-in points
AMC1 AOCR.IDE.A.260 Marking of break-in points

MARKINGS – COLOUR AND CORNERS

(a) The colour of the markings should be red or yellow and, if necessary, should be outlined in white to contrast with the background.

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

AOCR.IDE.A.265 Means for emergency evacuation

(a) Aeroplanes with passenger emergency exit sill heights of more than 1.83 m (6 ft) above the ground shall be equipped at each of those exits with a means to enable passengers and crew to reach the ground safely in an emergency.

(b) Notwithstanding (a), such means are not required at overwing exits if the designated place on the aeroplane structure at which the escape route terminates is less than 1.83 m (6 ft) from the ground with the aeroplane on the ground, the landing gear extended, and the flaps in the take-off or landing position, whichever flap position is higher from the ground.

(c) Aeroplanes required to have a separate emergency exit for the flight crew for which the lowest point of the emergency exit is more than 1.83 m (6 ft) above the ground shall have a means to assist all flight crew members in descending to reach the ground safely in an emergency.

(d) The heights referred to in (a) and (c) shall be measured:

(1) with the landing gear extended; and

(2) after the collapse of, or failure to extend of, one or more legs of the landing gear, in the case of aeroplanes with a type certificate issued after 31 March 2000.

AOCR.IDE.A.270 Megaphones

Aeroplanes with an MOPSC of more than 60 and carrying at least one passenger shall be equipped with the following quantities of portable battery-powered megaphones readily accessible for use by crew members during an emergency evacuation:

(a) For each passenger deck:
Table 1

<table>
<thead>
<tr>
<th>Passenger seating configuration</th>
<th>Number of megaphones</th>
</tr>
</thead>
<tbody>
<tr>
<td>61 to 99</td>
<td>1</td>
</tr>
<tr>
<td>More than 100</td>
<td>2</td>
</tr>
</tbody>
</table>

(b) For aeroplanes with more than one passenger deck, in all cases when the total passenger seating configuration is more than 60, at least one megaphone.

**AMC1 AOCR.IDE.A.270 Megaphones**

**LOCATION OF MEGAPHONES**

(a) Where one megaphone is required, it should be readily accessible at the assigned seat of a cabin crew member or crew members other than flight crew.

(b) Where two or more megaphones are required, they should be suitably distributed in the passenger compartment(s) and readily accessible to crew members assigned to direct emergency evacuations.

(c) This does not necessarily require megaphones to be positioned such that they can be physically reached by a crew member when strapped in a cabin crew member’s seat.

**AOCR.IDE.A.275 Emergency lighting and marking**

(a) Aeroplanes with an MOPSC of more than nine shall be equipped with an emergency lighting system having an independent power supply to facilitate the evacuation of the aeroplane.

(b) In the case of aeroplanes with an MOPSC of more than 19, the emergency lighting system, referred to in (a) shall include:

(1) sources of general cabin illumination;
(2) internal lighting in floor level emergency exit areas;

(3) illuminated emergency exit marking and locating signs;

(4) in the case of aeroplanes for which the application for the type certificate or equivalent was filed before 1 May 1972, when operated by night, exterior emergency lighting at all overwing exits and at exits where descent assist means are required;

(5) in the case of aeroplanes for which the application for the type certificate or equivalent was filed after 30 April 1972, when operated by night, exterior emergency lighting at all passenger emergency exits; and

(6) in the case of aeroplanes for which the type certificate was first issued on or after 31 December 1957, floor proximity emergency escape path marking system(s) in the passenger compartments.

(c) In the case of aeroplanes with an MOPSC of 19 or less and type certified on the basis of the airworthiness codes, the emergency lighting system, referred to in (a) shall include the equipment referred to in (b)(1) to (3).

(d) In the case of aeroplanes with an MOPSC of 19 or less that are not certified on the basis of the airworthiness codes, the emergency lighting system, referred to in (a) shall include the equipment referred to in (b)(1).

(e) Aeroplanes with an MOPSC of nine or less, operated at night, shall be equipped with a source of general cabin illumination to facilitate the evacuation of the aeroplane.

**AOCR.IDE.A.280 Emergency locator transmitter (ELT)**

(a) Aeroplanes with an MOPSC of more than 19 shall be equipped with at least:

(1) two ELTs, one of which shall be automatic, in the case of aeroplanes first issued with an individual CofA after 1 July 2008; or

(2) one automatic ELT or two ELTs of any type, in the case of aeroplanes first issued with an individual CofA on or before 1 July 2008.

(b) Aeroplanes with an MOPSC of 19 or less shall be equipped with at least:
(1) One automatic ELT, in the case of aeroplanes first issued with an individual CofA after 1 July 2008; or

(2) One ELT of any type, in the case of aeroplanes first issued with an individual CofA on or before 1 July 2008.

(c) An ELT of any type shall be capable of transmitting simultaneously on 121.5 MHz and 406 MHz.

**AMC1 AOCR.IDE.A.280 Emergency locator transmitter (ELT)**

**ELT BATTERIES**

Batteries used in the ELTs should be replaced (or recharged, if the battery is rechargeable) when the equipment has been in use for more than 1 cumulative hour, and also when 50 % of their useful life (or for rechargeable, 50 % of their useful life of charge), as established by the equipment manufacturer has expired. The new expiry date for the replacement (or recharged) battery should be legibly marked on the outside of the equipment. The battery useful life (or useful life of charge) requirements of this paragraph do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

**AMC2 AOCR.IDE.A.280 Emergency locator transmitter (ELT)**

**TYPES OF ELT AND GENERAL TECHNICAL SPECIFICATIONS**

(a) The ELT required by this provision should be one of the following:

(1) Automatic fixed (ELT(AF)). An automatically activated ELT that is permanently attached to an aeroplane and is designed to aid search and rescue (SAR) teams in locating the crash site.

(2) Automatic portable (ELT(AP)). An automatically activated ELT, that is rigidly attached to an aeroplane before a crash, but is readily removable from the aeroplane after a crash. It functions as an ELT during the crash sequence. If the ELT(AP) does not employ an integral antenna, the aeroplane-mounted antenna may be disconnected and an auxiliary antenna (stored on the ELT case) attached to the ELT. The ELT can be tethered to a survivor or a life-raft. This type of ELT is intended to aid SAR teams in locating the crash site or survivor(s).

(3) Automatic deployable (ELT(AD)). An ELT that is rigidly attached to the aeroplane before the crash and that is automatically ejected, deployed and activated by an impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided. This
(4) Survival ELT (ELT(S)). An ELT that is removable from an aeroplane, stowed so as to facilitate its ready use in an emergency, and manually activated by a survivor. An ELT(S) may be activated manually or automatically (e.g. by water activation). It should be designed either to be tethered to a life-raft or a survivor.

(b) To minimise the possibility of damage in the event of crash impact, the automatic ELT should be rigidly fixed to the aeroplane structure, as far aft as is practicable, with its antenna and connections arranged so as to maximise the probability of the signal being transmitted after a crash.

(c) Any ELT carried should operate in accordance with the relevant provisions of ICAO Annex 10, Volume III communications systems and should be registered with the national agency responsible for initiating search and rescue or other nominated agency.

**GM1 CAT.IDE.A.280 Emergency locator transmitter (ELT)**

**TERMINOLOGY**

‘ELT’ is a generic term describing equipment that broadcasts distinctive signals on designated frequencies and, depending on application, may be activated by impact or may be manually activated.

**AOCR.IDE.A.285 Flight over water**

(a) The following aeroplanes shall be equipped with a life-jacket for each person on board or equivalent flotation device for each person on board younger than 24 months, stowed in a position that is readily accessible from the seat or berth of the person for whose use it is provided:

(1) landplanes operated over water at a distance of more than 50 NM from the shore or taking off or landing at an aerodrome where the take-off or approach path is so disposed over water that there would be a likelihood of a ditching; and

(2) seaplanes operated over water.

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

(c) Seaplanes operated over water shall be equipped with:
(1) a sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the seaplane on water, appropriate to its size, weight and handling characteristics; and

(2) equipment for making the sound signals as prescribed in the International Regulations for Preventing Collisions at Sea, where applicable.

(d) Aeroplanes operated over water at a distance away from land suitable for making an emergency landing, greater than that corresponding to:

(1) 120 minutes at cruising speed or 400 NM, whichever is the lesser, in the case of aeroplanes capable of continuing the flight to an aerodrome with the critical engine(s) becoming inoperative at any point along the route or planned diversions; or

(2) for all other aeroplanes, 30 minutes at cruising speed or 100 NM, whichever is the lesser,

shall be equipped with the equipment specified in (e).

(e) Aeroplanes complying with (d) shall carry the following equipment:

(1) life-rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in an emergency, and being of sufficient size to accommodate all the survivors in the event of a loss of one raft of the largest rated capacity;

(2) a survivor locator light in each life-raft;

(3) life-saving equipment to provide the means for sustaining life, as appropriate for the flight to be undertaken; and

(4) at least two survival ELTs (ELT(S)).

AMC1 AOCR.IDE.A.285 Flight over water

LIFE-RAFTS AND EQUIPMENT FOR MAKING DISTRESS SIGNALS

(a) The following should be readily available with each life-raft:

(1) means for maintaining buoyancy;

(2) a sea anchor;

(3) life-lines and means of attaching one life-raft to another;
(4) paddles for life-rafts with a capacity of six or less;

(5) means of protecting the occupants from the elements;

(6) a water-resistant torch;

(7) signaling equipment to make the pyrotechnic distress signals described in ICAO Annex 2, Rules of the Air;

(8) 100 g of glucose tablets for each four, or fraction of four, persons that the life-raft is designed to carry;

(9) at least 2 litres of drinkable water provided in durable containers or means of making sea water drinkable or a combination of both; and

(10) first-aid equipment.

(b) As far as practicable, items listed in (a) should be contained in a pack.

**AMC1 AOCR.IDE.A.285(e)(4)& AOCR.IDE.A.305(a)(2) Flight over water & Survival equipment**

**SURVIVAL ELT**

An ELT(AP) may be used to replace one required ELT(S) provided that it meets the ELT(S) requirements. A water-activated ELT(S) is not an ELT(AP).

**AMC1 AOCR.IDE.A.285(a) Flight over water**

**ACCESSIBILITY OF LIFE-JACKETS**

The life-jacket should be accessible from the seat or berth of the person for whose use it is provided, with a safety belt or restraint system fastened.

**AMC2 AOCR.IDE.A.285(a) Flight over water**

**ELECTRIC ILLUMINATION OF LIFE-JACKETS**

The means of electric illumination should be a survivor locator light as defined in the applicable ETSO.

**GM1 AOCR.IDE.A.285(a) Flight over water**

**SEAT CUSHIONS**

Seat cushions are not considered to be flotation devices.
AOCR.IDE.A.305 Survival equipment

(a) Aeroplanes operated over areas in which search and rescue would be especially difficult shall be equipped with:

(1) signaling equipment to make the distress signals;
(2) at least one ELT(S); and
(3) additional survival equipment for the route to be flown taking account of the number of persons on board.

(b) The additional survival equipment specified in (a)(3) does not need to be carried when the aeroplane:

(1) remains within a distance from an area where search and rescue is not especially difficult corresponding to:
   (i) 120 minutes at one-engine-inoperative (OEI) cruising speed for aeroplanes capable of continuing the flight to an aerodrome with the critical engine(s) becoming inoperative at any point along the route or planned diversion routes; or
   (ii) 30 minutes at cruising speed for all other aeroplanes;

(2) remains within a distance no greater than that corresponding to 90 minutes at cruising speed from an area suitable for making an emergency landing, for aeroplanes certified in accordance with the applicable airworthiness standard.

AMC1 AOCR.IDE.A.305 Survival equipment

ADDITIONAL SURVIVAL EQUIPMENT

(a) The following additional survival equipment should be carried when required:

(1) 2 litres of drinkable water for each 50, or fraction of 50, persons on board provided in durable containers;
(2) one knife;
(3) first-aid equipment; and
(4) one set of air/ground codes;
In addition, when polar conditions are expected, the following should be carried:

1. a means for melting snow;
2. one snow shovel and one ice saw;
3. 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; and
4. one arctic/polar suit for each crew member.

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.

**AMC1 AOCR.IDE.A.305(b)(2) Survival equipment**

**APPLICABLE AIRWORTHINESS STANDARD**

The applicable airworthiness standard should be CS-25 or equivalent.

**GM1 AOCR.IDE.A.305 Survival equipment**

**SIGNALLING EQUIPMENT**

The signaling equipment for making distress signals is described in ICAO Annex 2, Rules of the Air.

**GM2 AOCR.IDE.A.305 Survival equipment**

**AREAS IN WHICH SEARCH AND RESCUE WOULD BE ESPECIALLY DIFFICULT**

The expression “areas in which search and rescue would be especially difficult” should be interpreted, in this context, as meaning:

(a) areas so designated by the authority responsible for managing search and rescue; or

(b) areas that are largely uninhabited and where:

1. the authority referred to in (a) has not published any information to confirm whether search and rescue would be or would not be especially difficult; and
AOCR.IDE.A.325 Headset

(a) Aeroplanes shall be equipped with a headset with a boom or throat microphone or equivalent for each flight crew member at their assigned station in the flight crew compartment.

(b) Aeroplanes operated under IFR or at night shall be equipped with a transmit button on the manual pitch and roll control for each required flight crew member.

AMC1 AOCR.IDE.A.325 Headset

GENERAL

(a) A headset consists of a communication device that includes two earphones to receive and a microphone to transmit audio signals to the airplane’s communication system. To comply with the minimum performance requirements, the earphones and microphone should match the communication system’s characteristics and the flight crew compartment environment. The headset should be sufficiently adjustable to fit the pilot’s head. Headset boom microphones should be of the noise cancelling type.

(b) If the intention is to utilise noise cancelling earphones, the operator should ensure that the earphones do not attenuate any aural warnings or sounds necessary for alerting the flight crew on matters related to the safe operation of the aeroplane.

GM1 AOCR.IDE.A.325 Headset

GENERAL

The term “headset” includes any aviation helmet incorporating headphones and microphone worn by a flight crew member.

AOCR.IDE.A.330 Radio communication equipment

(a) Aeroplanes shall be equipped with the radio communication equipment required by the applicable airspace requirements.

(b) The radio communication equipment shall provide for communication on the aeronautical emergency frequency 121.5 MHz.

AOCR.IDE.A.335 Audio selector panel
Aeroplanes operated under IFR shall be equipped with an audio selector panel operable from each required flight crew member station.

**AOCR.IDE.A.340 Radio equipment for operations under VFR over routes navigated by reference to visual landmarks**

Aeroplanes operated under VFR over routes navigated by reference to visual landmarks shall be equipped with radio communication equipment necessary under normal radio propagation conditions to fulfil the following:

(a) communicate with appropriate ground stations;

(b) communicate with appropriate ATC stations from any point in controlled airspace within which flights are intended; and

(c) receive meteorological information.

**AOCR.IDE.A.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks**

(a) Aeroplanes operated under IFR or under VFR over routes that cannot be navigated by reference to visual landmarks shall be equipped with radio communication and navigation equipment in accordance with the applicable airspace requirements.

(b) Radio communication equipment shall include at least 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.

(c) Notwithstanding (b), aeroplanes operated for short haul operations in the North Atlantic minimum navigation performance specifications (NAT MNPS) airspace and not crossing the North Atlantic shall be equipped with at least one long range communication system, in case alternative communication procedures are published for the airspace concerned.

(d) Aeroplanes shall have sufficient 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 shall allow safe navigation in accordance with the flight plan.

(e) Aeroplanes operated on flights in which it is intended to land in IMC shall be equipped with suitable equipment capable of providing guidance to a point from which a visual landing can be performed for
each aerodrome at which it is intended to land in IMC and for any designated alternate aerodrome.

**AMC1** AOCR.IDE.A.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks

**TWO INDEPENDENT MEANS OF COMMUNICATION**

Whenever two independent means of communication are required, each system should have an independent antenna installation, except where rigidly supported non-wire antennae or other antenna installations of equivalent reliability are used.

**AMC2** AOCR.IDE.A.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks

**ACCEPTABLE NUMBER AND TYPE OF COMMUNICATION AND NAVIGATION EQUIPMENT**

(a) An acceptable number and type of communication and navigation equipment is:

1. one VHF omnidirectional radio range (VOR) receiving system, one automatic direction finder (ADF) system, one distance measuring equipment (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;

2. one instrument landing system (ILS) or microwave landing system (MLS) where ILS or MLS is required for approach navigation purposes;

3. one marker beacon receiving system where a marker beacon is required for approach navigation purposes;

4. area navigation equipment when area navigation is required for the route being flown (e.g. equipment required by Part-SPA);

5. an additional DME system on any route, or part thereof, where navigation is based only on DME signals;

6. an additional VOR receiving system on any route, or part thereof, where navigation is based only on VOR signals; and

7. an additional ADF system on any route, or part thereof, where navigation is based only on non-directional beacon (NDB) signals.
(b) Aeroplanes may be operated without the navigation equipment specified in (6) and (7) provided they are equipped with alternative equipment. The reliability and the accuracy of alternative equipment should allow safe navigation for the intended route.

(c) The operator conducting extended range operations with two-engined aeroplanes (ETOPS) should ensure that the aeroplanes have a communication means capable of communicating with an appropriate ground station at normal and planned contingency altitudes. For ETOPS routes where voice communication facilities are available, voice communications should be provided. For all ETOPS operations beyond 180 minutes, reliable communication technology, either voice-based or data link, should be installed. Where voice communication facilities are not available and where voice communication is not possible or is of poor quality, communications using alternative systems should be ensured.

(d) To perform IFR operations without an ADF system installed, the operator should consider the following guidelines on equipment carriage, operational procedures and training criteria.

(1) ADF equipment may only be removed from or not installed in an aeroplane intended to be used for IFR operations when it is not essential for navigation, and provided that alternative equipment giving equivalent or enhanced navigation capability is carried. This may be accomplished by the carriage of an additional VOR receiver or a GNSS receiver approved for IFR operations.

(2) For IFR operations without ADF, the operator should ensure that:

(i) route segments that rely solely on ADF for navigation are not flown;

(ii) ADF/NDB procedures are not flown;

(iii) the minimum equipment list (MEL) has been amended to take account of the non-carriage of ADF;

(iv) the operations manual does not refer to any procedures based on NDB signals for the aeroplanes concerned; and

(v) flight planning and dispatch procedures are consistent with the above mentioned criteria.

(3) The removal of ADF should be taken into account by the operator in the initial and recurrent training of flight crew.
VHF communication equipment, ILS localiser and VOR receivers installed on aeroplanes to be operated in IFR should comply with the following FM immunity performance standards:

1. ICAO Annex 10, Volume I - Radio Navigation Aids, and Volume III, Part II - Voice Communications Systems; and


AMC3 AOCR.IDE.A.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks

FAILURE OF A SINGLE UNIT

Required communication and navigation equipment should be 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.

AMC4 AOCR.IDE.A.345 Communication and navigation equipment for operations under IFR or under VFR over routes not navigated by reference to visual landmarks

LONG RANGE COMMUNICATION SYSTEMS

(a) A long range communication system should be either a high frequency/HF-system or another two-way communication system if allowed by the relevant airspace procedures.

(b) When using one communication system only, the Authority may restrict the minimum navigation performance specifications (MNPS) approval to the use of the specific routes.

AOCR.IDE.A.350 Transponder

Aeroplanes shall be equipped with a pressure altitude reporting secondary surveillance radar (SSR) transponder and any other SSR transponder capability required for the route being flown.
AOCR.IDE.A.355 Electronic navigation data management

(a) The operator shall only use electronic navigation data products that support a navigation application meeting standards of integrity that are adequate for the intended use of the data.

(b) When the electronic navigation data products support a navigation application needed for an operation for which Part SPA requires an approval, the operator shall demonstrate to the Authority that the process applied and the delivered products meet standards of integrity that are adequate for the intended use of the data.

(c) The operator shall continuously monitor the integrity of both the process and the products, either directly or by monitoring the compliance of third party providers.

(d) The operator shall ensure the timely distribution and insertion of current and unaltered electronic navigation data to all aeroplanes that require it.

AMC1 AOCR.IDE.A.355 Electronic navigation data management

ELECTRONIC NAVIGATION DATA PRODUCTS

(a) When the operator of a complex motor-powered aeroplane uses a navigation database that supports an airborne navigation application as a primary means of navigation, the navigation database supplier should hold a Type 2 letter of acceptance (LoA), or equivalent.

(b) If this airborne navigation application is needed for an operation requiring a specific approval in accordance with Annex V (Part-SPA), the operator’s procedures should be based upon the Type 2 LoA acceptance process.

GM1 AOCR.IDE.A.355 Electronic navigation data management

LETTERS OF ACCEPTANCE AND STANDARDS FOR ELECTRONIC NAVIGATION DATA PRODUCTS

(a) A Type 2 LoA is issued by the Agency in accordance with the Agency’s Opinion No 01/2005 on The Acceptance of Navigation Database Suppliers. The definitions of navigation database, navigation database supplier, data application integrator, Type 1 LoA and Type 2 LoA can be found in Opinion No 01/2005.

(b) Equivalent to a Type 2 LoA is the FAA Type 2 LoA, issued in accordance with the Federal Aviation Administration (FAA) Advisory Circular AC 20-153 or AC 20-153A, and the Transport Canada Civil Aviation (TCCA)
“Acknowledgement Letter of an Aeronautical Data Process”, which uses the same basis.

(c) EUROCAE ED-76/Radio Technical Commission for Aeronautics (RTCA) DO-200A Standards for Processing Aeronautical Data contains guidance relating to the processes that the supplier may follow.
Chapter 5

SPECIFIC APPROVALS

A General

AOCR.SPA.GEN.100 Competent authority

The competent authority for issuing a specific approval for the commercial air transport operator shall be the DCA.

AOCR.SPA.GEN.105 Application for a specific approval

(a) The operator applying for the initial issue of a specific approval shall provide to the Authority the documentation required in the applicable part, together with the following information:

(1) the name, address and mailing address of the applicant;

(2) a description of the intended operation.

(b) The operator shall provide the following evidence to the Authority:

(1) compliance with the requirements of the applicable part;

(2) that the relevant elements defined in the data established;

(c) The operator shall retain records relating to (a) and (b) at least for the duration of the operation requiring a specific approval.

AMC1 AOCR.SPA.GEN.105(a) Application for a specific approval

DOCUMENTATION

(a) Operating procedures should be documented in the operations manual.

(b) If an operations manual is not required, operating procedures may be described in a procedures manual.

AOCR.SPA.GEN.110 Privileges of an operator holding a specific approval

The scope of the activity that an operator holding an air operator certificate (AOC) is approved to conduct shall be documented and specified in the operations specifications to the AOC.
AOCR.SPA.GEN.115 Changes to a specific approval

When the conditions of a specific approval are affected by changes, the operator shall provide the relevant documentation to the Authority and obtain prior approval for the operation.

AOCR.SPA.GEN.120 Continued validity of a specific approval

Specific approvals shall be issued for an unlimited duration and shall remain valid subject to the operator remaining in compliance with the requirements associated with the specific approval and taking into account the relevant elements defined.
B Performance-Based Navigation (PBN) Operations

AOCR.SPA.PBN.100 PBN operations

Aircraft shall only be operated in designated airspace, on routes or in accordance with procedures where performance-based navigation (PBN) specifications are established if the operator has been granted an approval by the Authority to conduct such operations. No specific approval is required for operations in area navigation 5 (RNAV5 (basic area navigation, B-RNAV)) designated airspace.

**GM1 AOCR.SPA.PBN.100 PBN operations**

**GENERAL**

(a) There are two kinds of navigation specifications: area navigation (RNAV) and required navigation performance (RNP). These specifications are similar. The key difference is that a navigation specification that includes a requirement to have an on-board performance monitoring and alerting system is referred to as an RNP specification. An RNAV specification does not have such a requirement. The performance-monitoring and alerting system provides some automated assurance functions to the flight crew. These functions monitor system performance and alert the flight crew when the RNP parameters are not met, or cannot be guaranteed with a sufficient level of integrity. RNAV and RNP performance is expressed by the total system error (TSE). This is the deviation from the nominal or desired position and the aircraft’s true position, measured in nautical miles. The TSE should remain equal to or less than the required accuracy expected to be achieved at least 95% of the flight time by the population of aircraft operating within the airspace, route or procedure.

(b) The structure of RNAV and RNP navigation specifications can be classified by phases of flight as detailed in Table 1. Some of these special approvals are in current use, some are under development, and some apply to emerging standards for which AMC-20 material has yet to be defined.

(c) The following RNAV and RNP navigation specifications are considered:

(1) Oceanic/Remote, RNAV10 (designated and authorised as RNP10) Acceptable means of compliance for RNAV10 (RNP10) are provided in EASA AMC 20-12, “Recognition of FAA order 8400.12a for RNP10 Operations”. Although RNAV10 airspace is, for historical reasons, also called RNP10 airspace, there is no requirement for on-board monitoring and alerting systems. RNAV10 can support 50 NM track spacing. For an aircraft to operate in RNAV10 (RNP10) airspace it needs to be fitted with a
minimum of two independent long range navigation systems (LRNSs). Each LRNS should in principle have a flight management system (FMS) that utilises positional information from either an approved global navigation satellite system (GNSS) or an approved inertial reference system (IRS) or mixed combination. The mix of sensors (pure GNSS, pure IRS or mixed IRS/GNSS) determines pre-flight and in-flight operation and contingencies in the event of system failure.

(2) Oceanic/Remote, RNP4 Guidance for this RNP standard is provided in ICAO Doc 9613. RNP4 is the oceanic/remote navigation specification to support 30 NM track spacing with ADS-C and CPDLC required. To meet this more accurate navigation requirement, two independent LRNS are required for which GNSS sensors are mandatory. If GNSS is used as a stand-alone LRNS, an integrity check is foreseen (fault detection and exclusion). Additional aircraft requirements include two long range communication systems (LRCSs) in order to operate in RNP4 designated airspace. The appropriate air information publication (AIP) should be consulted to assess coverage of HF and SATCOM. The additional requirements may include use of automatic dependent surveillance (ADS) and/or controller pilot data link communication (CPDLC).

(3) RNAV5 (B-RNAV)


(4) RNAV2

This is a non-European en-route standard. Guidance for this RNP standard is provided in ICAO Doc 9613.

(5) RNAV1 (P-RNAV)

Acceptable means of compliance for RNAV1 (P-RNAV) are provided in JAA TGL-10 “Airworthiness and Operational approval for precision RNAV operations in designated European Airspace”, planned to be replaced by AMC 20 material.

(6) Basic–RNP1

This is a future standard yet to be implemented. Guidance material is provided in ICAO Doc 9613.

(7) RNP APCH (RNP Approach)
Non-precision approaches supported by GNSS and APV (approach procedure with vertical guidance) which are themselves divided in two types of APV approaches: APV Baro and APV SBAS. RNP APCH is charted as RNAV (GNSS). A minima line is provided for each of the available types of non-precision approaches and the APV procedure at a specific runway:

- non-precision approach – lateral navigation (LNAV) or localiser performance (LP) minima line;

- APV Baro - LNAV/VNAV (vertical navigation) minima line; and

- APV SBAS - localiser performance with vertical guidance (LPV) minima line.

Non-precision approaches to LNAV minima and APV approaches to LNAV/VNAV minima are addressed in AMC 20-27, “Airworthiness Approval and Operational Criteria for RNP approach (RNP APCH) operations including APV Baro VNAV operations”.

APV approaches to LPV minima are addressed in AMC 20-28 “Airworthiness Approval and Operational Criteria for RNAV GNSS approach operation to LPV minima using SBAS”.

Non-precision approaches to LP minima have not yet been addressed in AMC 20.

(8) RNP AR APCH (approach)

RNP AR criteria have been developed to support RNP operations to RNP minima using RNP less than or equal to 0.3 NM or fixed radius turns (RF).

The vertical performance is defined by a vertical error budget based upon Baro VNAV. Equivalent means of compliance using SBAS may be demonstrated.

RNP AR APCH is charted as RNAV (RNP). A minima line is provided for each available RNP value.

Acceptable Means of Compliance for RNP AR are provided in AMC20-26 “Airworthiness Approval and Operational Criteria for RNP Authorisation Required (RNP AR) Operations”.
Each RNP AR approach requires a special approval.

(d) Guidance material for the global performances specifications, approval process, aircraft requirement (e.g. generic system performances, accuracy, integrity, continuity, signal-in-space, RNP navigation specifications required for the on-board performance monitoring and alerting system), requirements for specific sensor technologies, functional requirements, operating procedures, flight crew knowledge and training and navigation databases integrity requirements, can be found in:

(1) ICAO Doc 9613 Performance-Based Navigation (PBN) Manual; and

(2) Table 1.

**Table 1: Overview of PBN specifications**

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<tr>
<th>FLIGHT PHASE</th>
<th>En-route</th>
<th>Arrival</th>
<th>Approach</th>
<th>Departure</th>
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**AOCR.SPA.PBN.105 PBN operational approval**

To obtain a PBN operational approval from the Authority, the operator shall provide evidence that:

(a) the relevant airworthiness approval of the RNAV system has been obtained;

(b) a training programme for the flight crew members involved in these operations has been established;

(c) operating procedures have been established specifying:

   (1) the equipment to be carried, including its operating limitations and appropriate entries in the minimum equipment list (MEL);

   (2) flight crew composition and experience requirements;

   (3) normal procedures;

   (4) contingency procedures;

   (5) monitoring and incident reporting;

   (6) electronic navigation data management.
C  Operations with Specified Minimum Navigation Performance (MNPS)

AOCR. SPA.MNPS.100 MNPS operations

Aircraft shall only be operated in designated minimum navigation performance specifications (MNPS) airspace in accordance with regional supplementary procedures, where minimum navigation performance specifications are established, if the operator has been granted an approval by the Authority to conduct such operations.

GM1 AOCR.SPA.MNPS.100 MNPS operations

DOCUMENTATION

MNPS and the procedures governing their application are published in the Regional Supplementary Procedures, ICAO Doc 7030, as well as in national AIPs.

AOCR.SPA.MNPS.105 MNPS operational approval

To obtain an MNPS operational approval from the Authority, the operator shall provide evidence that:

(a) the navigation equipment meets the required performance;

(b) navigation displays, indicators and controls are visible and operable by either pilot seated at his/her duty station;

(c) a training programme for the flight crew members involved in these operations has been established;

(d) operating procedures have been established specifying:

(1) the equipment to be carried, including its operating limitations and appropriate entries in the MEL;

(2) flight crew composition and experience requirements;

(3) normal procedures;

(4) contingency procedures including those specified by the authority responsible for the airspace concerned;

(5) monitoring and incident reporting.

AMC1 AOCR.SPA.MNPS.105 MNPS operational approval
LONG RANGE NAVIGATION SYSTEM (LRNS)

(a) For unrestricted operation in MNPS airspace an aircraft should be equipped with two independent LRNSs.

(b) An LRNS may be one of the following:

(1) one inertial navigation system (INS);

(2) one global navigation satellite system (GNSS); or

(3) one navigation system using the inputs from one or more inertial reference system (IRS) or any other sensor system complying with the MNPS requirement.

(c) In case of the GNSS is used as a stand-alone system for LRNS, an integrity check should be carried out.

(d) For operation in MNPS airspace along notified special routes the aeroplane should be equipped with one LRNS.
D Operations in Airspace with Reduced Vertical Separation Minima (RVSM)

AOCR.SPA.RVSM.100 RVSM operations

Aircraft shall only be operated in designated airspace where a reduced vertical separation minimum of 300 m (1000 ft) applies between flight level (FL) 290 and FL 410, inclusive, if the operator has been granted an approval by the Authority to conduct such operations.

AOCR.SPA.RVSM.105 RVSM operational approval

To obtain an RVSM operational approval from the Authority, the operator shall provide evidence that:

(a) the RVSM airworthiness approval has been obtained;
(b) procedures for monitoring and reporting height-keeping errors have been established;
(c) a training programme for the flight crew members involved in these operations has been established;
(d) operating procedures have been established specifying:
   (1) the equipment to be carried, including its operating limitations and appropriate entries in the MEL;
   (2) flight crew composition and experience requirements;
   (3) flight planning;
   (4) pre-flight procedures;
   (5) procedures prior to RVSM airspace entry;
   (6) in-flight procedures;
   (7) post-flight procedures;
   (8) incident reporting;
   (9) specific regional operating procedures.
AMC1 AOCR.SPA.RVSM.105 RVSM operational approval

CONTENT OF OPERATOR RVSM APPLICATION

The following material should be made available to the Authority, in sufficient time to permit evaluation, before the intended start of RVSM operations:

(a) Airworthiness documents

Documentation that shows that the aircraft has RVSM airworthiness approval. This should include an aircraft flight manual (AFM) amendment or supplement.

(b) Description of aircraft equipment

A description of the aircraft appropriate to operations in an RVSM environment.

(c) Training programmes, operating practices and procedures

The operator should submit training syllabi for initial and recurrent training programmes together with other relevant material. The material should show that the operating practices, procedures and training items, related to RVSM operations in airspace that requires State operational approval, are incorporated.

(d) Operations manual and checklists

The appropriate manuals and checklists should be revised to include information/guidance on standard operating procedures. Manuals should contain a statement of the airspeeds, altitudes and weights considered in RVSM aircraft approval, including identification of any operating limitations or conditions established for that aircraft type. Manuals and checklists may need to be submitted for review by the Authority as part of the application process.

(e) Past performance

Relevant operating history, where available, should be included in the application. The applicant should show that any required changes have been made in training, operating or maintenance practices to improve poor height-keeping performance.

(f) Minimum equipment list

Where applicable, a minimum equipment list (MEL), adapted from the master minimum equipment list (MMEL), should include items pertinent to operating in RVSM airspace.
(g) **Plan for participation in verification/monitoring programmes**

The operator should establish a plan for participation in any applicable verification/monitoring programme acceptable to the Authority. This plan should include, as a minimum, a check on a sample of the operator’s fleet by an regional monitoring agency (RMA)”s independent height-monitoring system.

**AMC2 AOCR.SPA.RVSM.105 RVSM operational approval**

**OPERATING PROCEDURES**

(a) **Flight planning**

(1) During flight planning the flight crew should pay particular attention to conditions that may affect operation in RVSM airspace. These include, but may not be limited to:

(i) verifying that the airframe is approved for RVSM operations;

(ii) reported and forecast weather on the route of flight;

(iii) minimum equipment requirements pertaining to height-keeping and alerting systems; and

(iv) any airframe or operating restriction related to RVSM operations.

(b) **Pre-flight procedures**

(1) The following actions should be accomplished during the pre-flight procedure:

(i) Review technical logs and forms to determine the condition of equipment required for flight in the RVSM airspace. Ensure that maintenance action has been taken to correct defects to required equipment.

(ii) During the external inspection of aircraft, particular attention should be paid to the condition of static sources and the condition of the fuselage skin near each static source and any other component that affects altimetry system accuracy. This check may be accomplished by a qualified and authorised person other than the pilot (e.g. a flight engineer or ground engineer).
(iii) Before take-off, the aircraft altimeters should be set to the QNH (atmospheric pressure at nautical height) of the airfield and should display a known altitude, within the limits specified in the aircraft operating manuals. The two primary altimeters should also agree within limits specified by the aircraft operating manual. An alternative procedure using QFE (atmospheric pressure at aerodrome elevation/runway threshold) may also be used. The maximum value of acceptable altimeter differences for these checks should not exceed 23 m (75 ft). Any required functioning checks of altitude indicating systems should be performed.

(iv) Before take-off, equipment required for flight in RVSM airspace should be operative and any indications of malfunction should be resolved.

(c) Prior to RVSM airspace entry

(1) The following equipment should be operating normally at entry into RVSM airspace:

(i) two primary altitude measurement systems. A cross-check between the primary altimeters should be made. A minimum of two will need to agree within ±60 m (±200 ft). Failure to meet this condition will require that the altimetry system be reported as defective and air traffic control (ATC) notified;

(ii) one automatic altitude-control system;

(iii) one altitude-alerting device; and

(iv) operating transponder.

(2) Should any of the required equipment fail prior to the aircraft entering RVSM airspace, the pilot should request a new clearance to avoid entering this airspace.

(d) In-flight procedures

(1) The following practices should be incorporated into flight crew training and procedures:

(i) Flight crew should comply with any aircraft operating restrictions, if required for the specific aircraft type, e.g. limits on indicated Mach number, given in the RVSM airworthiness approval.
(ii) Emphasis should be placed on promptly setting the sub-scale on all primary and standby altimeters to 1013.2 hPa / 29.92 in Hg when passing the transition altitude, and rechecking for proper altimeter setting when reaching the initial cleared flight level.

(iii) In level cruise it is essential that the aircraft is flown at the cleared flight level. This requires that particular care is taken to ensure that ATC clearances are fully understood and followed. The aircraft should not intentionally depart from cleared flight level without a positive clearance from ATC unless the crews are conducting contingency or emergency manoeuvres.

(iv) When changing levels, the aircraft should not be allowed to overshoot or undershoot the cleared flight level by more than 45 m (150 ft). If installed, the level off should be accomplished using the altitude capture feature of the automatic altitude-control system.

(v) An automatic altitude-control system should be operative and engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement. In any event, adherence to cruise altitude should be done by reference to one of the two primary altimeters. Following loss of the automatic height-keeping function, any consequential restrictions will need to be observed.

(vi) Ensure that the altitude-alerting system is operative.

(vii) At intervals of approximately 1 hour, cross-checks between the primary altimeters should be made. A minimum of two will need to agree within ±60 m (±200 ft). Failure to meet this condition will require that the altimetry system be reported as defective and ATC notified or contingency procedures applied:

(A) the usual scan of flight deck instruments should suffice for altimeter cross-checking on most flights; and

(B) before entering RVSM airspace, the initial altimeter cross-check of primary and standby altimeters should be recorded.
(viii) In normal operations, the altimetry system being used to control the aircraft should be selected for the input to the altitude reporting transponder transmitting information to ATC.

(ix) If the pilot is notified by ATC of a deviation from an assigned altitude exceeding ±90 m (±300 ft), then the pilot should take action to return to cleared flight level as quickly as possible.

(2) Contingency procedures after entering RVSM airspace are as follows:

(i) The pilot should notify ATC of contingencies (equipment failures, weather) that affect the ability to maintain the cleared flight level and coordinate a plan of action appropriate to the airspace concerned. The pilot should obtain guidance on contingency procedures contained in the relevant publications dealing with the airspace.

(ii) Examples of equipment failures that should be notified to ATC are:

(A) failure of all automatic altitude-control systems aboard the aircraft;

(B) loss of redundancy of altimetry systems;

(C) loss of thrust on an engine necessitating descent; or

(D) any other equipment failure affecting the ability to maintain cleared flight level.

(iii) The pilot should notify ATC when encountering greater than moderate turbulence.

(iv) If unable to notify ATC and obtain an ATC clearance prior to deviating from the cleared flight level, the pilot should follow any established contingency procedures for the region of operation and obtain ATC clearance as soon as possible.

(e) Post-flight procedures

(1) In making technical log entries against malfunctions in height-keeping systems, the pilot should provide sufficient detail to enable maintenance to effectively troubleshoot and repair the
The pilot should detail the actual defect and the crew action taken to try to isolate and rectify the fault.

(2) The following information should be recorded when appropriate:

(i) primary and standby altimeter readings;
(ii) altitude selector setting;
(iii) subscale setting on altimeter;
(iv) autopilot used to control the aircraft and any differences when an alternative autopilot system was selected;
(v) differences in altimeter readings, if alternate static ports selected;
(vi) use of air data computer selector for fault diagnosis procedure; and
(vii) the transponder selected to provide altitude information to ATC and any difference noted when an alternative transponder was selected.

(f) Crew training

(1) The following items should also be included in flight crew training programmes:

(i) knowledge and understanding of standard ATC phraseology used in each area of operations;
(ii) importance of crew members cross-checking to ensure that ATC clearances are promptly and correctly complied with;
(iii) use and limitations in terms of accuracy of standby altimeters in contingencies. Where applicable, the pilot should review the application of static source error correction/position error correction through the use of correction cards; such correction data should be available on the flight deck;
(iv) problems of visual perception of other aircraft at 300 m (1 000 ft) planned separation during darkness, when encountering local phenomena such as northern lights, for opposite and same direction traffic, and during turns;
(v) characteristics of aircraft altitude capture systems that may lead to overshoots;

(vi) relationship between the aircraft’s altimetry, automatic altitude control and transponder systems in normal and abnormal conditions; and

(vii) any airframe operating restrictions, if required for the specific aircraft group, related to RVSM airworthiness approval.

GM1 AOCR.SPA.RVSM.105(d)(9) RVSM operational approval

SPECIFIC REGIONAL PROCEDURES

(a) The areas of applicability (by Flight Information Region) of RVSM airspace in identified ICAO regions is contained in the relevant sections of ICAO Document 7030/4. In addition, these sections contain operating and contingency procedures unique to the regional airspace concerned, specific flight planning requirements and the approval requirements for aircraft in the designated region.

(b) Comprehensive guidance on operational matters for European RVSM airspace is contained in EUROCONTROL Document ASM ET1.ST.5000 entitled “The ATC Manual for a Reduced Vertical Separation (RVSM) in Europe” with further material included in the relevant State aeronautical publications.

AOCR.SPA.RVSM.110 RVSM equipment requirements

Aircraft used for operations in RVSM airspace shall be equipped with:

(a) two independent altitude measurement systems;

(b) an altitude alerting system;

(c) an automatic altitude control system;

(d) a secondary surveillance radar (SSR) transponder with altitude reporting system that can be connected to the altitude measurement system in use for altitude control.

AMC1 AOCR.SPA.RVSM.110(a) RVSM equipment requirements

TWO INDEPENDENT ALTITUDE MEASUREMENT SYSTEMS

Each system should be composed of the following components:
(a) cross-coupled static source/system, with ice protection if located in areas subject to ice accretion;

(b) equipment for measuring static pressure sensed by the static source, converting it to pressure altitude and displaying the pressure altitude to the flight crew:

(c) equipment for providing a digitally encoded signal corresponding to the displayed pressure altitude, for automatic altitude reporting purposes;

(d) static source error correction (SSEC), if needed to meet the performance criteria for RVSM flight envelopes; and

(e) signals referenced to a flight crew selected altitude for automatic control and alerting. These signals will need to be derived from an altitude measurement system meeting the performance criteria for RVSM flight envelopes.

AOCR.SPA.RVSM.115 RVSM height-keeping errors

(a) The operator shall report recorded or communicated occurrences of height-keeping errors caused by malfunction of aircraft equipment or of operational nature, equal to or greater than:

   (1) a total vertical error (TVE) of ± 90 m (± 300 ft);

   (2) an altimetry system error (ASE) of ± 75 m (± 245 ft); and

   (3) an assigned altitude deviation (AAD) of ± 90 m (± 300 ft).

(b) Reports of such occurrences shall be sent to the Authority within 72 hours. Reports shall include an initial analysis of causal factors and measures taken to prevent repeat occurrences.

(c) When height-keeping errors are recorded or received, the operator shall take immediate action to rectify the conditions that caused the errors and provide follow-up reports, if requested by the Authority.
E Low Visibility Operations (LVO)

AOCR.SPA.LVO.100 Low visibility operations

The operator shall only conduct the following low visibility operations (LVO) when approved by the Authority:

(a) low visibility take-off (LVTO) operation;
(b) lower than standard category I (LTS CAT I) operation;
(c) standard category II (CAT II) operation;
(d) other than standard category II (OTS CAT II) operation;
(e) standard category III (CAT III) operation;
(f) approach operation utilising enhanced vision systems (EVS) for which an operational credit is applied to reduce the runway visual range (RVR) minima by no more than one third of the published RVR.

AMC1 AOCR.SPA.LVO.100 Low visibility operations

LVTO OPERATIONS - AEROPLANES

For a low visibility take-off (LVTO) with an aeroplane the following provisions should apply:

(a) for an LVTO with a runway visual range (RVR) below 400 m the criteria specified in Table 1.A;
(b) for an LVTO with an RVR below 150 m but not less than 125 m:
   (1) high intensity runway centre line lights spaced 15 m or less apart and high intensity edge lights spaced 60 m or less apart that are in operation;
   (2) a 90 m visual segment that is available from the flight crew compartment at the start of the take-off run; and
   (3) the required RVR value is achieved for all of the relevant RVR reporting points;
(c) for an LVTO with an RVR below 125 m but not less than 75 m:
   (1) runway protection and facilities equivalent to CAT III landing operations are available; and
(2) the aircraft is equipped with an approved lateral guidance system.

**Table 1.A: LVTO – aeroplanes RVR vs. facilities**

<table>
<thead>
<tr>
<th>Facilities</th>
<th>RVR (m) *, **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day: runway edge lights and runway centre line markings</td>
<td>300</td>
</tr>
<tr>
<td>Night: runway edge lights and runway end lights or runway centre line lights and runway end lights</td>
<td></td>
</tr>
<tr>
<td>Runway edge lights and runway centre line lights</td>
<td>200</td>
</tr>
<tr>
<td>Runway edge lights and runway centre line lights</td>
<td>TDZ, MID, rollout 150***</td>
</tr>
<tr>
<td>High intensity runway centre line lights spaced 15 m or less and high intensity edge lights spaced 60 m or less are in operation</td>
<td>TDZ, MID, rollout 125***</td>
</tr>
<tr>
<td>Runway protection and facilities equivalent to CAT III landing operations are available and the aircraft is equipped either with an approved lateral guidance system or an approved HUD / HUDLS for take-off.</td>
<td>TDZ, MID, rollout 75</td>
</tr>
</tbody>
</table>

*: The reported RVR value representative of the initial part of the take-off run can be replaced by pilot assessment.

**: Multi-engined aeroplanes that in the event of an engine failure at any point during take-off can either stop or continue the take-off to a height of 1 500 ft above the aerodrome while clearing obstacles by the required margins.

**: The required RVR value to be achieved for all relevant RVRs

**TDZ**: touchdown zone, equivalent to the initial part of the take-off run

**MID**: midpoint

**AMC2 AOCP.SPA.LVO.100 Low visibility operations**

**LTS CAT I OPERATIONS**

(a) For lower than Standard Category I (LTS CAT I) operations the following provisions should apply:
(1) The decision height (DH) of an LTS CAT I operation should not be lower than the highest of:

(i) the minimum DH specified in the AFM, if stated;
(ii) the minimum height to which the precision approach aid can be used without the specified visual reference;
(iii) the applicable obstacle clearance height (OCH) for the category of aeroplane;
(iv) the DH to which the flight crew is qualified to operate; or
(v) 200 ft.

(2) An instrument landing system / microwave landing system (ILS/MLS) that supports an LTS CAT I operation should be an unrestricted facility with a straight-in course, ≤ 3° offset, and the ILS should be certified to:

(i) class I/T/1 for operations to a minimum of 450 m RVR; or
(ii) class II/D/2 for operations to less than 450 m RVR. Single ILS facilities are only acceptable if level 2 performance is provided.

(3) The following visual aids should be available:

(i) standard runway day markings, approach lights, runway edge lights, threshold lights and runway end lights;
(ii) for operations with an RVR below 450 m, additionally touch-down zone and/or runway centre line lights.

(4) The lowest RVR / converted meteorological visibility (CMV) minima to be used are specified in Table 2.
Table 2: LTS CAT I operation minima RVR/CMV vs. approach lighting system

<table>
<thead>
<tr>
<th>DH (ft)</th>
<th>FALS (m)</th>
<th>IALS (m)</th>
<th>BALS (m)</th>
<th>NALS (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200–210</td>
<td>400</td>
<td>500</td>
<td>600</td>
<td>750</td>
</tr>
<tr>
<td>211–220</td>
<td>450</td>
<td>550</td>
<td>650</td>
<td>800</td>
</tr>
<tr>
<td>221–230</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>900</td>
</tr>
<tr>
<td>231–240</td>
<td>500</td>
<td>650</td>
<td>750</td>
<td>1000</td>
</tr>
<tr>
<td>241–249</td>
<td>550</td>
<td>700</td>
<td>800</td>
<td>1100</td>
</tr>
</tbody>
</table>

*: FALS: full approach lighting system  
IALS: intermediate approach lighting system  
BALS: basic approach lighting system  
NALS: no approach lighting system

AMC3 AOCR.SPA.LVO.100 Low visibility operations

CAT II AND OTS CAT II OPERATIONS

(a) For CAT II and other than Standard Category II (OTS CAT II) operations the following provisions should apply:

(1) The ILS / MLS that supports OTS CAT II operation should be an unrestricted facility with a straight in course (≤ 3° offset) and the ILS should be certified to class II/D/2.

Single ILS facilities are only acceptable if level 2 performance is provided.

(2) The DH for CAT II and OTS CAT II operation should not be lower than the highest of:

(i) the minimum DH specified in the AFM, if stated;

(ii) the minimum height to which the precision approach aid can be used without the specified visual reference;

(iii) the applicable OCH for the category of aeroplane;

(iv) the DH to which the flight crew is qualified to operate; or
(v) 100 ft.

The following visual aids should be available:

(i) standard runway day markings and approach and the following runway lights: runway edge lights, threshold lights and runway end lights;

(ii) for operations in RVR below 450 m, additionally touchdown zone and/or runway centre line lights;

(iii) for operations with an RVR of 400 m or less, additionally centre line lights.

The lowest RVR minima to be used are specified:

(i) for CAT II operations in Table 3; and

(ii) for OTS CAT II operations in Table 4.

(b) For OTS CAT II operations, the terrain ahead of the runway threshold should have been surveyed.

**Table 3: CAT II operation minima RVR vs. DH**

<table>
<thead>
<tr>
<th>DH(ft)</th>
<th>Auto-coupled or approved HUDLS to below DH *</th>
<th>Aircraft categories A, B, C RVR (m)</th>
<th>Aircraft category D RVR (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 – 120</td>
<td>300</td>
<td>300/350**</td>
<td></td>
</tr>
<tr>
<td>121 – 140</td>
<td>400</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>141 – 199</td>
<td>450</td>
<td>450</td>
<td></td>
</tr>
</tbody>
</table>

*: This means continued use of the automatic flight control system or the HUDLS down to a height of 80 % of the DH.

**: An RVR of 300 m may be used for a category D aircraft conducting an auto-land.
### Table 4: OTS CAT II operation minima RVR vs. approach lighting system

<table>
<thead>
<tr>
<th>Class of light facility</th>
<th>Auto-land or approved HUDLS utilised to touchdown</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>FALS</td>
</tr>
<tr>
<td>Aircraft categories A – C</td>
<td></td>
</tr>
<tr>
<td>Aircraft category D</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DH (ft)</th>
<th>RVR (m)</th>
<th>Aircraft categories A – D</th>
<th>Aircraft categories A – D</th>
<th>Aircraft categories A – D</th>
<th>Aircraft categories A – D</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 – 120</td>
<td>350</td>
<td>400</td>
<td>450</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>121 – 140</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>141 – 160</td>
<td>400</td>
<td>500</td>
<td>500</td>
<td>600</td>
<td>750</td>
</tr>
<tr>
<td>161 – 199</td>
<td>400</td>
<td>500</td>
<td>550</td>
<td>650</td>
<td>750</td>
</tr>
</tbody>
</table>

**AMC4 AOCR.SPA.LVO.100 Low visibility operations**

**CAT III OPERATIONS**

The following provisions should apply to CAT III operations:

(a) Where the DH and RVR do not fall within the same category, the RVR should determine in which category the operation is to be considered.

(b) For operations in which a DH is used, the DH should not be lower than:

1. the minimum DH specified in the AFM, if stated;
2. the minimum height to which the precision approach aid can be used without the specified visual reference; or
3. the DH to which the flight crew is qualified to operate.

(c) Operations with no DH should only be conducted if:

1. the operation with no DH is specified in the AFM;
2. the approach aid and the aerodrome facilities can support operations with no DH; and
3. the flight crew is qualified to operate with no DH.
(d) The lowest RVR minima to be used are specified in Table 5.

**Table 5: CAT III operations minima RVR vs. DH and rollout control/guidance system**

<table>
<thead>
<tr>
<th>CAT</th>
<th>DH (ft)*</th>
<th>Rollout system</th>
<th>control/guidance system</th>
<th>RVR (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IIIA</td>
<td>Less than 100</td>
<td>Not required</td>
<td></td>
<td>200</td>
</tr>
<tr>
<td>IIIB</td>
<td>Less than 100</td>
<td>Fail-passive</td>
<td></td>
<td>150**</td>
</tr>
<tr>
<td>IIIB</td>
<td>Less than 50</td>
<td>Fail-passive</td>
<td></td>
<td>125</td>
</tr>
<tr>
<td>IIIB</td>
<td>Less than 50 or no DH</td>
<td>Fail-operational ***</td>
<td></td>
<td>75</td>
</tr>
</tbody>
</table>

*: Flight control system redundancy is determined under CS-AWO by the minimum certified DH.

**: For aeroplanes certified in accordance with CS-AWO 321(b)(3) or equivalent.

**: The fail-operational system referred to may consist of a fail-operational hybrid system.

**AMC5 AOCR.SPA.LVO.100 Low visibility operations**

**OPERATIONS UTILISING EVS**

The pilot using a certified enhanced vision system (EVS) in accordance with the procedures and limitations of the AFM:

(a) may reduce the RVR/CMV value in column 1 to the value in column 2 of Table 6 for CAT I operations, APV operations and NPA operations flown with the CDFA technique;

(b) for CAT I operations:

(1) may continue an approach below DH to 100 ft above the runway threshold elevation provided that a visual reference is displayed and identifiable on the EVS image; and

(2) should only continue an approach below 100 ft above the runway threshold elevation provided that a visual reference is distinctly visible and identifiable to the pilot without reliance on the EVS;

(c) for APV operations and NPA operations flown with the CDFA technique:
(1) may continue an approach below DH/MDH to 200 ft above the runway threshold elevation provided that a visual reference is displayed and identifiable on the EVS image; and

(2) should only continue an approach below 200 ft above the runway threshold elevation provided that a visual reference is distinctly visible and identifiable to the pilot without reliance on the EVS.

Table 6: Operations utilising EVS RVR/CMV reduction vs. normal RVR/CMV

<table>
<thead>
<tr>
<th>RVR/CMV (m) normally</th>
<th>RVR/CMV (m) required utilising EVS</th>
</tr>
</thead>
<tbody>
<tr>
<td>550</td>
<td>350</td>
</tr>
<tr>
<td>600</td>
<td>400</td>
</tr>
<tr>
<td>650</td>
<td>450</td>
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<td>1 100</td>
<td>750</td>
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<td>1 200</td>
<td>800</td>
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<td>1 300</td>
<td>900</td>
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<td>1 400</td>
<td>900</td>
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<td>1 200</td>
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<td>1 900</td>
<td>1 300</td>
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<td>2 100</td>
<td>1 400</td>
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<td>2 200</td>
<td>1 500</td>
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<tr>
<td>2 300</td>
<td>1 500</td>
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<tr>
<td>2 400</td>
<td>1 600</td>
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<td>2 500</td>
<td>1 700</td>
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<td>3 100</td>
<td>2 000</td>
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<tr>
<td>3 200</td>
<td>2 100</td>
</tr>
<tr>
<td>3 300</td>
<td>2 200</td>
</tr>
<tr>
<td>3 400</td>
<td>2 200</td>
</tr>
</tbody>
</table>
AMC6 AOCR.SPA.LVO.100 Low visibility operations

EFFECT ON LANDING MINIMA OF TEMPORARILY FAILED OR DOWNGRADED EQUIPMENT

(a) General

These instructions are intended for use both pre-flight and in-flight. It is however not expected that the pilot-in-command/commander would consult such instructions after passing 1 000 ft above the aerodrome. If failures of ground aids are announced at such a late stage, the approach could be continued at the pilot-in-command/commander’s discretion. If failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in Table 7, and the approach may have to be abandoned.

(b) The following conditions should be applicable to the tables below:

1. multiple failures of runway/FATO lights other than indicated in Table 7 are not acceptable;
2. deficiencies of approach and runway/FATO lights are treated separately;
3. for CAT II and CAT III operations, a combination of deficiencies in runway/FATO lights and RVR assessment equipment are not permitted; and
4. failures other than ILS and MLS affect RVR only and not DH.
### Table 7: Failed or downgraded equipment – effect on landing minima
Operations with an LVO approval

<table>
<thead>
<tr>
<th>Failed or downgraded equipment</th>
<th>Effect on landing minima</th>
<th>CAT IIIB (no DH)</th>
<th>CAT IIIIB</th>
<th>CAT IIIA</th>
<th>CAT II</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILS/MLS stand-by transmitter</td>
<td>Not allowed</td>
<td>RVR 200 m</td>
<td>No effect</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outer marker</td>
<td>No effect if replaced by height check at 1 000 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle marker</td>
<td>No effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RVR assessment systems</td>
<td>At least one RVR value to be available on the aerodrome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>On runways equipped with two or more RVR assessment units, one may be inoperative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach lights</td>
<td>No effect</td>
<td></td>
<td></td>
<td>Not allowed</td>
<td></td>
</tr>
<tr>
<td>Approach lights except the last 210 m</td>
<td>No effect</td>
<td></td>
<td></td>
<td>Not allowed</td>
<td></td>
</tr>
<tr>
<td>Approach lights except the last 420 m</td>
<td>No effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standby power for approach lights</td>
<td>No effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edge lights, threshold lights and runway end lights</td>
<td>No effect</td>
<td></td>
<td>Day: no effect</td>
<td>Day: no effect</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Night: RVR 550 m</td>
<td>Night: not allowed</td>
<td></td>
</tr>
<tr>
<td>Centre line lights</td>
<td>Day: RVR 200 m</td>
<td>Not allowed</td>
<td>Day: RVR 300 m</td>
<td>Day: RVR 350 m</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Night: not allowed</td>
<td></td>
<td>Night: RVR 400 m</td>
<td>Night: RVR 550 m (400 m with HUDLS or auto-land)</td>
<td></td>
</tr>
</tbody>
</table>
GM1 AOCR.SPA.LVO.100 Low visibility operations

DOCUMENTS CONTAINING INFORMATION RELATED TO LOW VISIBILITY OPERATIONS

The following documents provide further information to low visibility operations (LVO):

(a) ICAO Annex 2 Rules of the Air;
(b) ICAO Annex 6 Operation of Aircraft;
(c) ICAO Annex 10 Telecommunications Vol. 1;
(d) ICAO Annex 14 Aerodromes Vol. 1;
(e) ICAO Doc 8168 PANS - OPS Aircraft Operations;
(f) ICAO Doc 9365 AWO Manual;
(g) ICAO Doc 9476 Manual of surface movement guidance and control systems (SMGCS);
(h) ICAO Doc 9157 Aerodrome Design Manual;
(i) ICAO Doc 9328 Manual of RVR Observing and Reporting Practices;
(j) ICAO EUR Doc 013: European Guidance Material on Aerodrome Operations under Limited Visibility Conditions;
(k) ECAC Doc 17, Issue 3; and

(l) CS-AWO All weather operations.

**GM2 AOCR.SPA.LVO.100 Low visibility operations**

**ILS CLASSIFICATION**

The ILS classification system is specified in ICAO Annex 10.

**GM1 AOCR.SPA.LVO.100(c),(e) Low visibility operations**

**ESTABLISHMENT OF MINIMUM RVR FOR CAT II AND CAT III OPERATIONS**

(a) General

(1) When establishing minimum RVR for CAT II and CAT III operations, operators should pay attention to the following information that originates in ECAC Doc 17 3rd Edition, Subpart A. It is retained as background information and, to some extent, for historical purposes although there may be some conflict with current practices.

(2) Since the inception of precision approach and landing operations various methods have been devised for the calculation of aerodrome operating minima in terms of DH and RVR. It is a comparatively straightforward matter to establish the DH for an operation but establishing the minimum RVR to be associated with that DH so as to provide a high probability that the required visual reference will be available at that DH has been more of a problem.

(3) The methods adopted by various States to resolve the DH/RVR relationship in respect of CAT II and CAT III operations have varied considerably. In one instance there has been a simple approach that 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 that is applicable to a wide range of aircraft. The basic principles that are observed in establishing the values in such a table are that the scale of visual...
reference required by a pilot at and below DH depends on the task that he/she has to carry out, and that the degree to which his/her vision is obscured depends on the obscuring medium, the general rule in fog being that it becomes more dense with increase in height. Research using flight simulation training devices (FSTDs) coupled with flight trials has shown the following:

(i) most pilots require visual contact to be established about 3 seconds above DH though it has been observed that this reduces to about 1 second when a fail-operational automatic landing system is being used;

(ii) to establish lateral position and cross-track velocity most pilots need to see not less than a three light segment of the centre line of the approach lights, or runway centre line, or runway edge lights;

(iii) for roll guidance most pilots need to see a lateral element of the ground pattern, i.e. an approach light cross bar, the landing threshold, or a barrette of the touchdown zone light; and

(iv) to make an accurate adjustment to the flight path in the vertical plane, such as a flare, using purely visual cues, most pilots need to see a point on the ground which has a low or zero rate of apparent movement relative to the aircraft.

(v) With regard to fog structure, data gathered in the United Kingdom over a 20 year period have shown that in deep stable fog there is a 90 % probability that the slant visual range from eye heights higher than 15 ft above the ground will be less than the horizontal visibility at ground level, i.e. RVR. There are at present no data available to show what the relationship is between the slant visual range and RVR in other low visibility conditions such as blowing snow, dust or heavy rain, but there is some evidence in pilot reports that the lack of contrast between visual aids and the background in such conditions can produce a relationship similar to that observed in fog.

(b) CAT II operations

The selection of the dimensions of the required visual segments that are used for CAT II operations is based on the following visual provisions:

(1) a visual segment of not less than 90 m will need to be in view at and below DH for pilot to be able to monitor an automatic system;
(2) A visual segment of not less than 120 m will need to be in view for a pilot to be able to maintain the roll attitude manually at and below DH; and

(3) For a manual landing using only external visual cues, a visual segment of 225 m 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.

Before using a CAT II ILS for landing, the quality of the localiser between 50 ft and touchdown should be verified.

(c) CAT III fail-passive operations

(1) CAT III operations utilising fail-passive automatic landing equipment were introduced in the late 1960s and it is desirable that the principles governing the establishment of the minimum RVR for such operations be dealt with in some detail.

(2) During an automatic landing the pilot needs to monitor the performance of the aircraft system, not in order to detect a failure that is better done by the monitoring devices built into the system, but so as to know precisely the flight situation. In the final stages the pilot should establish visual contact and, by the time the pilot reaches DH, the pilot should have checked the aircraft position relative to the approach or runway centre line lights. For this the pilot will need sight of horizontal elements (for roll reference) and part of the touchdown area. The pilot should check for lateral position and cross-track velocity and, if not within the pre-stated lateral limits, the pilot should carry out a missed approach procedure. The pilot should also check longitudinal progress and sight of the landing threshold is useful for this purpose, as is sight of the touchdown zone lights.

(3) In the event of a failure of the automatic flight guidance system below DH, there are two possible courses of action; the first is a procedure that allows the pilot to complete the landing manually if there is adequate visual reference for him/her to do so, or to initiate a missed approach procedure if there is not; the second is to make a missed approach procedure mandatory if there is a system disconnect regardless of the pilot’s assessment of the visual reference available:

(i) If the first option is selected then the overriding rule in the determination of a minimum RVR is for sufficient visual cues to be available at and below DH for the pilot to be able
to carry out a manual landing. Data presented in ECAC Doc 17 showed that a minimum value of 300 m would give a high probability that the cues needed by the pilot to assess the aircraft in pitch and roll will be available and this should be the minimum RVR for this procedure.

(ii) The second option, to require a missed approach procedure to be carried out should the automatic flight-guidance system fail below DH, will permit a lower minimum RVR because the visual reference provision 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 DH 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 m. It should further be recognised that there is some risk in carrying out a manual missed approach procedure from below 50 ft in very low visibility and it should therefore be accepted that if an RVR lower than 300 m is to be approved, the flight deck procedure should not normally allow the pilot to continue the landing manually in such conditions and the aircraft system should be sufficiently reliable for the missed approach procedure rate to be low.

(4) These criteria may be relaxed in the case of an aircraft with a fail-passive automatic landing system that is supplemented by a head-up display that does not qualify as a fail-operational system but that gives guidance that 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 missed approach procedure mandatory in the event of a failure of the automatic landing system when the RVR is less than 300 m.

(d) CAT III fail-operational operations - with a DH

(1) For CAT III operations utilising a fail-operational landing system with a DH, a pilot should be able to see at least one centre line light.

(2) For CAT III operations utilising a fail-operational hybrid landing system with a DH, a pilot should have a visual reference
containing a segment of at least three consecutive lights of the runway centre line lights.

(e) CAT III fail operational operations - with no DH

(1) For CAT III operations with no DH the pilot is not required to see the runway prior to touchdown. The permitted RVR is dependent on the level of aircraft equipment.

(2) A CAT III runway may be assumed to support operations with no DH unless specifically restricted as published in the AIP or NOTAM.

**GM1 AOCR.SPA.LVO.100(e) Low visibility operations**

**CREW ACTIONS IN CASE OF AUTOPILOT FAILURE AT OR BELOW DH IN FAIL-PASSIVE CAT III OPERATIONS**

For operations to actual RVR values less than 300 m, a missed approach procedure is assumed in the event of an autopilot failure at or below DH. This means that a missed approach procedure 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 pilot-in-command/commander determines that this is the safest course of action. The operator’s policy and the operational instructions should reflect this information.

**GM1 AOCR.SPA.LVO.100(f) Low visibility operations**

**OPERATIONS UTILISING EVS**

(a) **Introduction**

(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 HUD. The systems can be used in all phases of flight and can improve situational awareness. In particular, infra-red 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.

(b) **Background to EVS provisions**
(1) The provisions for EVS were developed after an operational evaluation of two different EVS systems, along with data and support 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 infra-red EVS performance can vary depending on the weather conditions encountered. Therefore, the provisions take a conservative approach to cater for the wide variety of conditions which may be encountered. It may be necessary to amend the provisions in the future to take account of greater operational experience.

(2) Provisions for the use of EVS during take-off have not been developed. The systems evaluated did not perform well when the RVR was below 300 m. There may be some benefit for use of EVS during take-off with greater visibility and reduced light; however, such operations would need to be evaluated.

(3) Provisions have been developed to cover use of infra-red 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 provision. During the development, it was envisaged what minimum equipment should be fitted to the aircraft. Given the present state of technological development, it is considered that a HUD is an essential element of the EVS equipment.

(4) In order to avoid the need for tailored charts for approaches utilising EVS, it is envisaged that the operator will use AMC6 AOFR.SPA.LVO.110 Table 6 Operations utilising EVS RVR/CMV reduction vs. normal RVR/CMV to determine the applicable RVR at the commencement of the approach.

(c) Additional operational considerations

(1) EVS equipment should have:

(i) 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);

(ii) 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; and
(iii) means to ensure that the pilot monitoring is kept in the “loop” and crew resource management (CRM) does not break down.

AOCR.SPA.LVO.105 LVO approval

To obtain an LVO approval from the Authority, the operator shall demonstrate compliance with the requirements of this part.

AMC1 SPA.LVO.105 LVO approval

OPERATIONAL DEMONSTRATION - AEROPLANES

(a) General

(1) The purpose of the operational demonstration should be 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 CAT II/III programme being approved.

(i) At least 30 approaches and landings should be accomplished in operations using the CAT 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 should be accomplished.

(ii) If the 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 should show that the various variants have satisfactory performance, but need not conduct a full operational demonstration for each variant. The number of approaches and landings may be based on credit given for the experience gained by another operator, using the same aeroplane type or variant and procedures.

(iii) If the number of unsuccessful approaches exceeds 5 % of the total, e.g. unsatisfactory landings, system disconnects, the evaluation programme should be extended in steps of at least 10 approaches and landings until the overall failure rate does not exceed 5 %.

(2) The operator should establish a data collection method to record approach and landing performance. The resulting data and a summary of the demonstration data should be made available to the Authority for evaluation.
(3) Unsatisfactory approaches and/or automatic landings should be documented and analysed.

(b) Demonstrations

(1) Demonstrations may be conducted in line operations or any other flight where the operator’s procedures are being used.

(2) In unique situations where the completion of 100 successful landings could take an unreasonably long period of time 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. This justification should take into account factors such as a small number of aircraft in the fleet, limited opportunity to use runways having CAT II/III procedures or the inability to obtain ATS sensitive area protection during good weather conditions. 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).

(3) If the 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 or class of aircraft, the operator should show that the various variants have satisfactory performance, but need not conduct a full operational demonstration for each variant.

(4) Not more than 30% of the demonstration flights should be made on the same runway.

(c) Data collection for operational demonstrations

(1) Data should be collected whenever an approach and landing is attempted utilising the CAT II/III system, regardless of whether the approach is abandoned, unsatisfactory, or is concluded successfully.

(2) The data should, as a minimum, include the following information:

(i) Inability to initiate an approach. Identify deficiencies related to airborne equipment that preclude initiation of a CAT 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 rollout performance. Describe whether or not the aircraft landed satisfactorily within the desired touchdown area with lateral velocity or cross track error that 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 centre line and the runway threshold, respectively, should be indicated in the report. This report should also include any CAT II/III system abnormalities that required manual intervention by the pilot to ensure a safe touchdown or touchdown and rollout, as appropriate.

(d) Data analysis

Unsuccessful approaches due to the following factors may be excluded from the analysis:

1. 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.

2. Faulty navaid signals. Navaid (e.g. ILS localiser) irregularities, such as those caused by other aircraft taxiing, over-flying the navaid (antenna).

3. Other factors. Any other specific factors that could affect the success of CAT II/III operations that are clearly discernible to the flight crew should be reported.

AMC2 AOCR.SPA.LVO.105 LVO approval

OPERATIONAL DEMONSTRATION - HELICOPTERS

(a) The operator should comply with the provisions prescribed below when introducing into CAT II or III service a helicopter type that is new to the EU.

1. Operational reliability

The CAT II and III success rate should not be less than that required by CS-AWO or equivalent.
(2) Criteria for a successful approach

An approach is regarded as successful if:

(i) the criteria are as specified in CS-AWO or equivalent are met; and

(ii) no relevant helicopter system failure occurs.

For helicopter types already used for CAT II or III operations in another Member State, the in-service proving programme in (e) should be used instead.

(b) Data collection during airborne system demonstration - general

(1) The operator should establish a reporting system to enable checks and periodic reviews to be made during the operational evaluation period before the operator is approved to conduct CAT II or III operations. The reporting system should cover all successful and unsuccessful approaches, with reasons for the latter, and include a record of system component failures. This reporting system should be based upon flight crew reports and automatic recordings as prescribed in (c) and (d) below.

(2) The recordings of approaches may be made during normal line flights or during other flights performed by the operator.

(c) Data collection during airborne system demonstration – operations with DH not less than 50 ft

(1) For operations with DH not less than 50 ft, data should be recorded and evaluated by the operator and evaluated by the Authority when necessary.

(2) It is sufficient for the following data to be recorded by the flight crew:

(i) FATO and runway used;

(ii) weather conditions;

(iii) time;

(iv) reason for failure leading to an aborted approach;

(v) adequacy of speed control;
(vi) trim at time of automatic flight control system disengagement;

(vii) compatibility of automatic flight control system, flight director and raw data;

(viii) an indication of the position of the helicopter relative to the ILS, MLS centre line when descending through 30 m (100 ft); and

(ix) touchdown position.

(3) The number of approaches made during the initial evaluation should be sufficient to demonstrate that the performance of the system in actual airline service is such that a 90 % confidence and a 95 % approach success will result.

(d) Data collection during airborne system demonstration – operations with DH less than 50 ft or no DH

(1) For operations with DH less than 50 ft or no DH, a flight data recorder (FDR), or other equipment giving the appropriate information, should be used in addition to the flight crew reports to confirm that the system performs as designed in actual airline service. The following data should be recorded:

(i) distribution of ILS, MLS deviations at 30 m (100 ft), at touchdown and, if appropriate, at disconnection of the rollout control system and the maximum values of the deviations between those points; and

(ii) sink rate at touchdown.

(2) Any landing irregularity should be fully investigated using all available data to determine its cause.

(e) In-service proving

The operator fulfilling the provisions of (f) above should be deemed to have met the in-service proving contained in this subparagraph.

(1) The system should demonstrate reliability and performance in line operations consistent with the operational concepts. A sufficient number of successful landings should be accomplished in line operations, including training flights, using the auto-land and rollout system installed in each helicopter type.
(2) The demonstration should be accomplished using a CAT II or CAT III ILS. Demonstrations may be made on other ILS or MLS facilities if sufficient data are recorded to determine the cause of unsatisfactory performance.

(3) If the operator has different variants of the same type of helicopter utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of helicopter, the operator should show that the variants comply with the basic system performance criteria, but the operator need not conduct a full operational demonstration for each variant.

(4) Where the operator introduces a helicopter type that has already been approved by the Authority of any Member State for CAT II and/or CAT III operations, a reduced proving programme may be acceptable.

**AMC3 AOCR.SPA.LVO.105 LVO approval**

**CONTINUOUS MONITORING – ALL AIRCRAFT**

(a) After obtaining the initial approval, the operations should be continuously monitored by the operator to detect any undesirable trends before they become hazardous. Flight crew reports may be used to achieve this.

(b) The following information should be retained for a period of 12 months:

(1) the total number of approaches, by aircraft type, where the airborne CAT II or III equipment was utilised to make satisfactory, actual or practice, approaches to the applicable CAT II or III minima; and

(2) reports of unsatisfactory approaches and/or automatic landings, by aerodrome and aircraft registration, in the following categories:

   (i) airborne equipment faults;

   (ii) ground facility difficulties;

   (iii) missed approaches because of ATC instructions; or

   (iv) other reasons.

(c) The operator should establish a procedure to monitor the performance of the automatic landing system or HUDLS to touchdown performance, as appropriate, of each aircraft.
AMC4 AOCR.SPA.LVO.105 LVO approval

TRANSITIONAL PERIODS FOR CAT II AND CAT III OPERATIONS

(a) Operators with no previous CAT II or CAT III experience

(1) The operator without previous CAT II or III operational experience, applying for a CAT II or CAT IIIA operational approval, should demonstrate to the Authority that it has gained a minimum experience of 6 months of CAT I operations on the aircraft type.

(2) The operator applying for a CAT IIIIB operational approval should demonstrate to the Authority that it has already completed 6 months of CAT II or IIIA operations on the aircraft type.

(b) Operators with previous CAT II or III experience

(1) The operator with previous CAT II or CAT III experience, applying for a CAT II or CAT III operational approval with reduced transition periods as set out in (a), should demonstrate to the Authority that it has maintained the experience previously gained on the aircraft type.

(2) The operator approved for CAT II or III operations using auto-coupled approach procedures, with or without auto-land, and subsequently introducing manually flown CAT II or III operations using a HUDLS should provide the operational demonstrations set out in AMC1 AOCR.SPA.LVO.105 and AMC2 AOCR.SPA.LVO.105 as if it would be a new applicant for a CAT II or CAT III approval.

AMC5 AOCR.SPA.LVO.105 LVO approval

MAINTENANCE OF CAT II, CAT III AND LVTO EQUIPMENT

Maintenance instructions for the on-board guidance systems should be established by the operator, in liaison with the manufacturer, and included in the operator’s aircraft maintenance program.

AMC6 AOCR.SPA.LVO.105 LVO approval

ELIGIBLE AERODROMES AND RUNWAYS

(a) Each aircraft type/runway combination should be verified by the successful completion of at least one approach and landing in CAT II or better conditions, prior to commencing CAT III operations.
(b) For runways with irregular pre-threshold terrain or other foreseeable or known deficiencies, each aircraft type/runway combination should be verified by operations in CAT I or better conditions, prior to commencing LTS CAT I, OTS CAT II or CAT III operations.

(c) If the operator has different variants of the same type of aircraft in accordance with (d), utilising the same basic flight control and display systems, or different basic flight control and display systems on the same type of aircraft in accordance with (d), the operator should show that the variants have satisfactory operational performance, but need not conduct a full operational demonstration for each variant/runway combination.

(d) For the purpose of this AMC, an aircraft type or variant of an aircraft type should be deemed to be the same type/variant of aircraft if that type/variant has the same or similar:

(1) level of technology, including the following:
   (i) flight control/guidance system (FGS) and associated displays and controls;
   (ii) FMS and level of integration with the FGS; and
   (iii) use of HUDLS;

(2) operational procedures, including:
   (i) alert height;
   (ii) manual landing / automatic landing;
   (iii) no DH operations; and
   (iv) use of HUD/HUDLS in hybrid operations;

(3) handling characteristics, including:
   (i) manual landing from automatic or HUDLS guided approach;
   (ii) manual missed approach procedure from automatic approach; and
   (iii) automatic/manual rollout.
(e) Operators using the same aircraft type/class or variant of a type in accordance with (d) above may take credit from each other’s experience and records in complying with this subparagraph.

(f) Where an approval is sought for OTS CAT II, the same provisions as set out for CAT II should be applied.

GM1 AOCR.SPA.LVO.105 LVO approval

CRITERIA FOR A SUCCESSFUL CAT II, OTS CAT II, CAT III APPROACH AND AUTOMATIC LANDING

(a) The purpose of this GM is to provide operators with supplemental information regarding the criteria for a successful approach and landing to facilitate fulfilling the requirements prescribed in SPA.LVO.105.

(b) An approach may be considered to be successful if:

(1) from 500 ft to start of flare:

   (i) speed is maintained as specified in AMC-AWO 231, paragraph 2 “Speed Control”; and

   (ii) no relevant system failure occurs; and

(2) from 300 ft to DH:

   (i) no excess deviation occurs; and

   (ii) no centralised warning gives a missed approach procedure command (if installed).

(c) An automatic landing may be considered to be successful if:

(1) no relevant system failure occurs;

(2) no flare failure occurs;

(3) no de-crab failure occurs (if installed);

(4) longitudinal touchdown is beyond a point on the runway 60 m after the threshold and before the end of the touchdown zone light (900 m from the threshold);

(5) lateral touchdown with the outboard landing gear is not outside the touchdown zone light edge;
(6) sink rate is not excessive;
(7) bank angle does not exceed a bank angle limit; and
(8) no rollout failure or deviation (if installed) occurs.

(d) More details can be found in CS-AWO 131, CS-AWO 231 and AMC-AWO 231.

AOCR.SPA.LVO.110 General operating requirements

(a) The operator shall only conduct LTS CAT I operations if:

(1) each aircraft concerned is certified for operations to conduct CAT II operations; and

(2) the approach is flown:

(i) auto-coupled to an auto-land that needs to be approved for CAT IIIA operations; or

(ii) using an approved head-up display landing system (HUDLS) to at least 150 ft above the threshold.

(b) The operator shall only conduct CAT II, OTS CAT II or CAT III operations if:

(1) each aircraft concerned is certified for operations with a decision height (DH) below 200 ft, or no DH, and equipped in accordance with the applicable airworthiness requirements;

(2) a 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 DH is determined by means of a radio altimeter;

(4) the flight crew consists of at least two pilots;

(5) all height call-outs below 200 ft above the aerodrome threshold elevation are determined by a radio altimeter.

(c) The operator shall only conduct approach operations utilising an EVS if:
(1) the EVS is certified for the purpose of this Subpart and combines infra-red sensor image and flight information on the HUD;

(2) for operations with an RVR below 550 m, the flight crew consists of at least two pilots;

(3) for CAT I operations, natural visual reference to runway cues is attained at least at 100 ft above the aerodrome threshold elevation;

(4) for approach procedure with vertical guidance (APV) and non-precision approach (NPA) operations flown with CDFA technique, natural visual reference to runway cues is attained at least at 200 ft above the aerodrome threshold elevation and the following requirements are complied with:

(i) the approach is flown using an approved vertical flight path guidance mode;

(ii) the approach segment from final approach fix (FAF) to runway threshold is straight and the difference between the final approach course and the runway centreline is not greater than 2 °;

(iii) the final approach path is published and not greater than 3,7 °;

(iv) the maximum cross-wind components established during certification of the EVS are not exceeded.

**GM1 AOCR.SPA.LVO.110(c)(4)(i) General operating requirements**

**APPROVED VERTICAL FLIGHT PATH GUIDANCE MODE**

The term “approved” means that the vertical flight path guidance mode has been certified by the Authority as part of the avionics product.

**AOCR.SPA.LVO.115 Aerodrome related requirements**

(a) The operator shall not use an aerodrome for LVOs below a visibility of 800 m unless:

(1) the aerodrome has been approved for such operations by the State of the aerodrome; and

(2) low visibility procedures (LVP) have been established.
(b) If the operator selects an aerodrome where the term LVP is not used, the operator shall ensure that there are equivalent procedures that adhere to the requirements of LVP at the aerodrome. This situation shall be clearly noted in the operations manual or procedures manual including guidance to the flight crew on how to determine that the equivalent LVP are in effect.

**AOCR.SPA.LVO.120 Flight crew training and qualifications**

The operator shall ensure that, prior to conducting an LVO:

(a) each flight crew member:

(1) complies with the training and checking requirements prescribed in the operations manual, including flight simulation training device (FSTD) training, in operating to the limiting values of RVR/VIS (visibility) and DH specific to the operation and the aircraft type;

(2) is qualified in accordance with the standards prescribed in the operations manual;

(b) the training and checking is conducted in accordance with a detailed syllabus.

**AMC1 AOCR.SPA.LVO.120 Flight crew training and qualifications**

**GENERAL PROVISIONS**

(a) The operator should ensure that flight crew member training programmes for LVO include structured courses of ground, FSTD and/or flight training.

(1) Flight crew members with no CAT II or CAT III experience should complete the full training programme prescribed in (b), (c), and (d) below.

(2) Flight crew members with CAT II or CAT III experience with a similar type of operation (auto-coupled/auto-land, HUDLS/hybrid HUDLS or EVS) or CAT II with manual land, if appropriate, with another EU operator may undertake an:

   (i) abbreviated ground training course if operating a different type or class from that on which the previous CAT II or CAT III experience was gained;

   (ii) abbreviated ground, FSTD and/or flight training course if operating the same type or class and variant of the same
type or class on which the previous CAT II or CAT III experience was gained. The abbreviated course should include at least the provisions of (d)(1), (d)(2)(i) or (d)(2)(ii) as appropriate and (d)(3)(i). The operator may reduce the number of approaches/landings required by (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);
(B) operating procedures;
(C) handling characteristics;
(D) use of HUDLS/hybrid HUDLS; and
(E) use of EVS,

as the previously operated type or class, otherwise the provisions of (d)(2)(i) should be met.

(3) Flight crew members with CAT II or CAT III experience with the operator may undertake an abbreviated ground, FSTD and/or flight training course.

(i) When changing aircraft type or class, the abbreviated course should include at least the provisions of (d)(1), (d)(2)(i) or (d)(2)(ii) as appropriate and (d)(3)(i).

(ii) When changing to a different variant of aircraft within the same type or class rating that has the same or similar:

(A) level of technology - FGS;
(B) operating procedures - integrity;
(C) handling characteristics;
(D) use of HUDLS/ Hybrid HUDLS; and
(E) use of EVS,

as the previously operated type or class, a difference course or familiarisation appropriate to the change of variant should fulfil the abbreviated course provisions.
When changing to a different variant of aircraft within the same type or class rating that has a significantly different:

(A) level of technology - FGS;

(B) operating procedures - integrity;

(C) handling characteristics;

(D) use of HUDLS/Hybrid HUDLS; or

(E) use of EVS,

the provisions of (d)(1), (d)(2)(i) or (d)(2)(ii) as appropriate and (d)(3)(i) should be fulfilled.

The operator should ensure when undertaking CAT II or CAT III operations with different variant(s) of aircraft within the same type or class rating that the differences and/or similarities of the aircraft concerned justify such operations, taking into account at least the following:

(i) the level of technology, including the:

(A) FGS and associated displays and controls;

(B) FMS and its integration or not with the FGS; and

(C) use of HUD/HUDLS with hybrid systems and/or EVS;

(ii) operating procedures, including:

(A) fail-passive / fail-operational, alert height;

(B) manual landing / automatic landing;

(C) no DH operations; and

(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 missed approach procedure from automatic approach; and
Ground Training

(b) The initial ground training course for LVO should include at least the following:

(1) characteristics and limitations of the ILS and/or MLS;
(2) characteristics of the visual aids;
(3) characteristics of fog;
(4) operational capabilities and limitations of the particular airborne system to include HUD symbology and EVS characteristics, if appropriate;
(5) effects of precipitation, ice accretion, low level wind shear and turbulence;
(6) effect of specific aircraft/system malfunctions;
(7) use and limitations of RVR assessment systems;
(8) principles of obstacle clearance requirements;
(9) recognition of and action to be taken in the event of failure of ground equipment;
(10) 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) significance of DHs 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) importance and significance of alert height, if applicable, and the action in the event of any failure above and below the alert height;
(13) qualification requirements for pilots to obtain and retain approval to conduct LVOs; and
(14) importance of correct seating and eye position.

FSTD Training and/or Flight Training
(c) **FSTD training and/or flight training**

(1) FSTD and/or flight training for LVO should include at least:

   (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 MELs;

   (vi) operating limitations resulting from airworthiness certification;

   (vii) guidance on the visual cues required at DH 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) Flight crew members should be trained to carry out their duties and instructed on the coordination required with other crew members. Maximum use should be made of suitably equipped FSTDs for this purpose.

(3) Training should be divided into phases covering normal operation with no aircraft or equipment failures but including all weather conditions that may be encountered and detailed scenarios of aircraft and equipment failure that could affect CAT II or III operations. If the aircraft system involves the use of hybrid or other special systems, such as HUD/HUDLS or enhanced vision equipment, then flight crew members should practise the use of
these systems in normal and abnormal modes during the FSTD phase of training.

(4) Incapacitation procedures appropriate to LVTO, CAT II and CAT III operations should be practised.

(5) For aircraft with no FSTD available to represent that specific aircraft, operators should ensure that the flight training phase specific to the visual scenarios of CAT II operations is conducted in a specifically approved FSTD. Such training should include a minimum of four approaches. Thereafter, the training and procedures that are type specific should be practised in the aircraft.

(6) Initial CAT II and III training should include at least the following exercises:

(i) approach using the appropriate flight guidance, autopilots and control systems installed in the aircraft, to the appropriate DH 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 aircraft down to the appropriate DH followed by missed approach - all without external visual reference;

(iii) where appropriate, approaches utilising automatic flight systems to provide automatic flare, hover, landing and rollout; and

(iv) normal operation of the applicable system both with and without acquisition of visual cues at DH.

(7) Subsequent phases of training should include at least:

(i) approaches with engine failure at various stages on the approach;

(ii) approaches with critical equipment failures, such as 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, hover, landing and rollout or missed approach; or

(B) reversion to manual flight or a downgraded automatic mode to control missed approaches from, at or below DH including those which may result in a touchdown on the runway;

(iv) failures of the systems that will result in excessive localiser and/or glideslope deviation, both above and below DH, in the minimum visual conditions specified for the operation. In addition, a continuation to a manual landing should be practised 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 aircraft type or variant.

(8) The training programme should provide practice in handling faults which require a reversion to higher minima.

(9) The training programme should include the handling of the aircraft when, during a fail-passive CAT III approach, the fault causes the autopilot to disconnect at or below DH when the last reported RVR is 300 m or less.

(10) Where take-offs are conducted in RVRs of 400 m and below, training should be established to cover systems failures and engine failure resulting in continued as well as rejected take-offs.

(11) The training programme should 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 DH or below, including those which may result in a touchdown on the runway.

(12) When undertaking LVTO, LTS CAT I, OTS CAT II, CAT II and CAT III operations utilising a HUD/HUDLS, hybrid HUD/HUDLS or an EVS, the training and checking programme should include, where appropriate, the use of the HUD/HUDLS in normal operations during all phases of flight.

CONVERSION TRAINING
Flight crew members should complete the following low visibility procedures (LVPs) training if converting to a new type or class or variant of aircraft in which LVTO, LTS CAT I, OTS CAT II, approach operations utilising EVS with an RVR of 800 m or less and CAT II and CAT III operations will be conducted. Conditions for abbreviated courses are prescribed in (a)(2), (a)(3) and (a)(4).

1. **Ground training**

   The appropriate provisions are as prescribed in (b), taking into account the flight crew member’s CAT II and CAT III training and experience.

2. **FSTD training and/or flight training**

   (i) A minimum of six, respectively eight for HUDLS with or without EVS, approaches and/or landings in an FSTD. The provisions for eight HUDLS approaches may be reduced to six when conducting hybrid HUDLS operations.

   (ii) Where no FSTD is available to represent that specific aircraft, a minimum of three, respectively five for HUDLS and/or EVS, approaches including at least one missed approach procedure is required on the aircraft. For hybrid HUDLS operations a minimum of three approaches is required, including at least one missed approach procedure.

   (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 800 m, a minimum of five approaches, including at least one missed approach procedure are required on the aircraft.

3. **Flight crew qualification**

   The flight crew qualification provisions are specific to the operator and the type of aircraft operated.

   (i) The operator should ensure that each flight crew member completes a check before conducting CAT II or III operations.

   (ii) The check specified in (d)(3)(i) may be replaced by successful completion of the FSTD and/or flight training specified in (d)(2).

4. **Line flying under supervision**
Flight crew member should undergo the following line flying under supervision (LIFUS):

(i) For CAT II when a manual landing or a HUDLS approach to touchdown is required, a minimum of:

(A) three landings from autopilot disconnect; and

(B) four landings with HUDLS used to touchdown, except that only one manual landing, respectively two using HUDLS, to touchdown is required when the training required in (d)(2) has been carried out in an FSTD qualified for zero flight time conversion.

(ii) For CAT III, a minimum of two auto-lands, except that:

(A) only one auto-land is required when the training required in (d)(2) has been carried out in an FSTD qualified for zero flight time conversion;

(B) no auto-land is required during LIFUS when the training required in (d)(2) has been carried out in an FSTD qualified for zero flight time (ZFT) conversion and the flight crew member successfully completed the ZFT type rating conversion course; and

(C) the flight crew member, trained and qualified in accordance with (B), 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 CAT III approaches using HUDLS to touchdown, a minimum of four approaches.

TYPE AND COMMAND EXPERIENCE

(e) Type and command experience

(1) Before commencing CAT II operations, the following additional provisions should be applicable to pilots-in-command/commanders, or pilots to whom conduct of the flight may be delegated, who are new to the aircraft type or class:

(i) 50 hours or 20 sectors on the type, including LIFUS; and
(ii) 100 m should be added to the applicable CAT II RVR minima when the operation requires a CAT 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 CAT II manual landing operations with an EU operator;

(C) for HUDLS operations the sector provisions in (e)(1) and (e)(2)(i) should always be applicable; the hours on type or class do not fulfil the provisions.

(2) Before commencing CAT III operations, the following additional provisions should be applicable to pilots-in-command/commanders, or pilots to whom conduct of the flight may be delegated, who are new to the aircraft type:

(i) 50 hours or 20 sectors on the type, including LIFUS; and

(ii) 100 m should be added to the applicable CAT II or CAT III RVR minima unless he/she has previously qualified for CAT II or III operations with an EU operator, until a total of 100 hours or 40 sectors, including LIFUS, has been achieved on the type.

RECURRENT TRAINING AND CHECKING

(f) Recurrent training and checking – LVO

(1) The operator should ensure that, in conjunction with the normal recurrent training and operator’s proficiency checks, the pilot’s knowledge and ability to perform the tasks associated with the particular category of operation, for which the pilot is authorised by the operator, are checked. The required number of approaches to be undertaken in the FSTD within the validity period of the operator’s proficiency check should be a minimum of two, respectively four when HUDLS and/or EVS is utilised to touchdown, one of which should be a landing at the lowest approved RVR. In addition, one, respectively two for HUDLS and/or operations utilising EVS, of these approaches may be substituted by an approach and landing in the aircraft using approved CAT II and CAT III procedures. One missed approach should be flown during the conduct of an operator proficiency
check. If the operator is approved to conduct take-off with RVR less than 150 m, at least one LVTO to the lowest applicable minima should be flown during the conduct of the operator’s proficiency check.

(2) For CAT III operations the operator should use an FSTD approved for this purpose.

(3) For CAT III operations on aircraft with a fail-passive flight control system, including HUDLS, a missed approach should be completed by each flight crew member at least once over the period of three consecutive operator proficiency checks as the result of an autopilot failure at or below DH when the last reported RVR was 300 m or less.

LVTO OPERATIONS

(g) LVTO with RVR less than 400 m

(1) Prior to conducting take-offs in RVRs below 400 m, the flight crew should undergo the following training:

(i) normal take-off in minimum approved RVR conditions;

(ii) take-off in minimum approved RVR conditions with an engine failure:

(A) for aeroplanes between V1 and V2 (take-off safety speed), or as soon as safety considerations permit;

(B) for helicopters at or after take-off decision point (TDP); and

(iii) take-off in minimum approved RVR conditions with an engine failure:

(A) for aeroplanes before V1 resulting in a rejected take-off; and

(B) for helicopters before the TDP.

(2) The operator approved for LVTOs with an RVR below 150 m should ensure that the training specified by (g)(1) is carried out in an FSTD. This training should include the use of any special procedures and equipment.

(3) The operator should ensure that a flight crew member has completed a check before conducting LVTO in RVRs of less than
150 m. The check may be replaced by successful completion of the FSTD and/or flight training prescribed in (g)(1) on conversion to an aircraft type.

**LTS CAT I, OTS CAT II, OPERATIONS UTILISING EVS**

(h) Additional training provisions

(1) General

Operators conducting LTS CAT I operations, OTS CAT II operations and operations utilising EVS with RVR of 800 m or less should comply with the provisions applicable to CAT II operations and include the provisions applicable to HUDLS, if appropriate. The operator may combine these additional provisions where appropriate provided that the operational procedures are compatible.

(2) LTS CAT I

During conversion training the total number of approaches should not be additional to the requirements of AOGR. FC 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 provision is met and at least one approach using LTS CAT I minima is conducted at least once every 18 months.

(3) OTS CAT II

During conversion training the total number of approaches should not be less than those to complete CAT II training utilising a HUD/HUDLS. During recurrent training and checking the operator may also combine the separate provisions provided the above operational procedure provision is met and at least one approach using OTS CAT II minima is conducted at least once every 18 months.

(4) Operations utilising EVS with RVR of 800 m or less

During conversion training the total number of approaches required should not be less than that required to complete CAT II training utilising a HUD. During recurrent training and checking the operator may also combine the separate provisions provided the above operational procedure provision is met and at least one approach utilising EVS is conducted at least once every 12 months.
GM1 AOCR.SPA.LVO.120 Flight crew training and qualifications

FLIGHT CREW TRAINING

The number of approaches referred to in AMC1 AOCR.SPA.LVO.120 (g)(1) includes one approach and landing that may be conducted in the aircraft using approved CAT II/III procedures. This approach and landing may be conducted in normal line operation or as a training flight.

AOCR.SPA.LVO.125 Operating procedures

(a) The operator shall establish procedures and instructions to be used for LVOs. These procedures and instructions shall be included in the operations manual or procedures manual and contain the duties of flight crew members during taxiing, take-off, approach, flare, landing, rollout and missed approach operations, as appropriate.

(b) Prior to commencing an LVO, the pilot-in-command/commander shall be satisfied that:

(1) the status of the visual and non-visual facilities is sufficient;

(2) appropriate LVPs are in force according to information received from air traffic services (ATS);

(3) flight crew members are properly qualified.

AMC1 AOCR.SPA.LVO.125 Operating procedures

GENERAL

(a) LVOs should include the following:

(1) manual take-off, with or without electronic guidance systems or HUDLS/hybrid HUD/HUDLS;

(2) approach flown with the use of a HUDLS/hybrid HUD/HUDLS and/or EVS;

(3) auto-coupled approach to below DH, with manual flare, hover, landing and rollout;

(4) auto-coupled approach followed by auto-flare, hover, auto-landing and manual rollout; and

(5) auto-coupled approach followed by auto-flare, hover, auto-landing and auto-rollout, when the applicable RVR is less than 400 m.
(b) The operator should specify detailed operating procedures and instructions in the operations manual.

(1) The precise nature and scope of procedures and instructions given should depend upon the airborne equipment used and the flight deck procedures followed. The operator should clearly define flight crew member duties during take-off, approach, flare, hover, rollout and missed approach in the operations manual. Particular emphasis should 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 should 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) The instructions should be compatible with the limitations and mandatory procedures contained in the AFM and cover the following items in particular:

(i) checks for the satisfactory functioning of the aircraft equipment, both before departure and in flight;

(ii) effect on minima caused by changes in the status of the ground installations and airborne equipment;

(iii) procedures for the take-off, approach, flare, hover, landing, rollout and missed approach;

(iv) procedures to be followed in the event of failures, warnings to include HUD/HUDLS/EVS and other non-normal situations;

(v) the minimum visual reference required;

(vi) the importance of correct seating and eye position;

(vii) action that may be necessary arising from a deterioration of the visual reference;

(viii) allocation of crew duties in the carrying out of the procedures according to (b)(2)(i) to (iv), to allow the pilot-in-command/commander to devote himself/herself mainly to supervision and decision making;
(ix) the rule for all height calls below 200 ft to be based on the radio altimeter and for one pilot to continue to monitor the aircraft instruments until the landing is completed;

(x) the rule for the localiser sensitive area to be protected;

(xi) the use of information relating to wind velocity, wind shear, turbulence, runway contamination and use of multiple RVR assessments;

(xii) procedures to be used for:

(A) LTS CAT I;

(B) OTS CAT II;

(C) approach operations utilising EVS; and

(D) practice approaches and landing on runways at which the full CAT II or CAT III aerodrome procedures are not in force;

(xiii) operating limitations resulting from airworthiness certification; and

(xiv) information on the maximum deviation allowed from the ILS glide path and/or localiser.

**AOCR.SPA.LVO.130 Minimum equipment**

(a) The operator shall include the minimum equipment that has to be serviceable at the commencement of an LVO in accordance with the aircraft flight manual (AFM) or other approved document in the operations manual or procedures manual, as applicable.

(b) The pilot-in-command/commander shall be satisfied that the status of the aircraft and of the relevant airborne systems is appropriate for the specific operation to be conducted.
**PART F  Extended Range Operations with Two-Engined Aeroplanes (ETOPS)**

**AOCR.SPA.ETOPS.100 ETOPS**

In commercial air transport operations, two-engined aeroplanes shall only be operated beyond the threshold distance determined in accordance with AOCR.OP.MPA.140 if the operator has been granted an ETOPS operational approval by the Authority.

**AOCR.SPA.ETOPS.105 ETOPS operational approval**

To obtain an ETOPS operational approval from the Authority, the operator shall provide evidence that:

(a) the aeroplane/engine combination holds an ETOPS type design and reliability approval for the intended operation;

(b) a training programme for the flight crew members and all other operations personnel involved in these operations has been established and the flight crew members and all other operations personnel involved are suitably qualified to conduct the intended operation;

(c) the operator’s organisation and experience are appropriate to support the intended operation;

(d) operating procedures have been established.

**GM1 AOCR.SPA.ETOPS.105 ETOPS operational approval**

**AMC 20-6**

**AMC 20-6 provides further criteria for the operational approval of ETOPS.**

**AOCR.SPA.ETOPS.110 ETOPS en-route alternate aerodrome**

(a) An ETOPS en-route alternate aerodrome shall be considered adequate, if, at the expected time of use, the aerodrome is available and equipped with necessary ancillary services such as air traffic services (ATS), sufficient lighting, communications, weather reporting, navigation aids and emergency services and has at least one instrument approach procedure available.

(b) Prior to conducting an ETOPS flight, the operator shall ensure that an ETOPS en-route alternate aerodrome is available, within either the operator’s approved diversion time, or a diversion time based on the
DEPARTMENT OF CIVIL AVIATION

AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

MEL generated serviceability status of the aeroplane, whichever is shorter.

(c) The operator shall specify any required ETOPS en-route alternate aerodrome(s) in the operational flight plan and ATS flight plan.

**AOCR.SPA.ETOPS.115 ETOPS en-route alternate aerodrome planning minima**

(a) The 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, between the anticipated time of landing until one hour after the latest possible time of landing, conditions will exist at or above the planning minima calculated by adding the additional limits of Table 1.

(b) The operator shall include in the operations manual the method for determining the operating minima at the planned ETOPS en-route alternate aerodrome.

**Table 1**

Planning minima for the ETOPS en-route alternate aerodrome

<table>
<thead>
<tr>
<th>Type of approach</th>
<th>Planning minima</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision approach</td>
<td>DA/H + 200 ft RVR/VIS + 800 m (*)</td>
</tr>
<tr>
<td>Non-precision approach or Circling approach</td>
<td>RVR/VIS + 1 500 m</td>
</tr>
</tbody>
</table>

(*) VIS: visibility; MDA/H: minimum descent altitude/height.
G Transport of Dangerous Goods

AOCR.SPA.DG.100 Transport of dangerous goods

An operator shall only transport dangerous goods by air if the operator has been approved by the Authority.

AOCR.SPA.DG.105 Approval to transport dangerous goods

To obtain the approval to transport dangerous goods, the operator shall in accordance with the technical instructions:

(a) establish and maintain a training programme for all personnel involved and demonstrate to the Authority that adequate training has been given to all personnel;

(b) establish operating procedures to ensure the safe handling of dangerous goods at all stages of air transport, containing information and instructions on:

1. the operator's policy to transport dangerous goods;
2. the requirements for acceptance, handling, loading, stowage and segregation of dangerous goods;
3. actions to take in the event of an aircraft accident or incident when dangerous goods are being carried;
4. the response to emergency situations involving dangerous goods;
5. the removal of any possible contamination;
6. the duties of all personnel involved, especially with relevance to ground handling and aircraft handling;
7. inspection for damage, leakage or contamination;
8. dangerous goods accident and incident reporting.

AMC1 AOCR.SPA.DG.105(a) Approval to transport dangerous goods

TRAINING PROGRAMME

(a) The operator should indicate for the approval of the training programme how the training will be carried out. For formal training courses, the course objectives, the training programme syllabus/curricula and examples of the written examination to be undertaken should be included.
(b) Instructors should have knowledge of training techniques as well as in the field of transport of dangerous goods by air so that the subject is covered fully and questions can be adequately answered.

(c) Training intended to give general information and guidance may be by any means including handouts, leaflets, circulars, slide presentations, videos, computer-based training, etc., and may take place on-the-job or off-the-job. The person being trained should receive an overall awareness of the subject. This training should include a written, oral or computer-based examination covering all areas of the training programme, showing that a required minimum level of knowledge has been acquired.

(d) Training intended to give an in-depth and detailed appreciation of the whole subject or particular aspects of it should be by formal training courses, which should include a written examination, the successful passing of which will result in the issue of the proof of qualification. The course may be by means of tuition, as a self-study programme, or a mixture of both. The person being trained should gain sufficient knowledge so as to be able to apply the detailed rules of the Technical Instructions.

(e) Training in emergency procedures should include as a minimum:

(1) for personnel other than crew members:
   (i) dealing with damaged or leaking packages; and
   (ii) other actions in the event of ground emergencies arising from dangerous goods;

(2) for flight crew members:
   (i) actions in the event of emergencies in flight occurring in the passenger compartment or in the cargo compartments; and
   (ii) the notification to ATS should an in-flight emergency occur;

(3) for crew members other than flight crew members:
   (i) dealing with incidents arising from dangerous goods carried by passengers; or
   (ii) dealing with damaged or leaking packages in flight.

(f) Training should be conducted at intervals of no longer than 2 years.
AMC1 AOCR.SPA.DG.105(b) Approval to transport dangerous goods

PROVISION OF INFORMATION IN THE EVENT OF AN IN-FLIGHT EMERGENCY

If an in-flight emergency occurs the pilot-in-command/commander should, as soon as the situation permits, inform the appropriate ATS unit of any dangerous goods carried as cargo on board the aircraft, as specified in the Technical Instructions.

GM1 AOCR.SPA.DG.105(b)(6) Approval to transport dangerous goods

PERSONNEL

Personnel include all persons involved in the transport of dangerous goods, whether they are employees of the operator or not.

AOCR.SPA.DG.110 Dangerous goods information and documentation

The operator shall, in accordance with the technical instructions:

(a) provide written information to the pilot-in-command/commander:
    (1) about dangerous goods to be carried on the aircraft;
    (2) for use in responding to in-flight emergencies;

(b) use an acceptance checklist;

(c) ensure that dangerous goods are accompanied by the required dangerous goods transport document(s), as completed by the person offering dangerous goods for air transport, except when the information applicable to the dangerous goods is provided in electronic form;

(d) ensure that where a dangerous goods transport document is provided in written form, a copy of the document is retained on the ground where it will be possible to obtain access to it within a reasonable period until the goods have reached their final destination;

(e) ensure that a copy of the information to the pilot-in-command/commander is retained on the ground and that this copy, or the information contained in it, is readily accessible to the aerodromes of last departure and next scheduled arrival, until after the flight to which the information refers;
(f) retain the acceptance checklist, transport document and information to the pilot-in-command/commander for at least three months after completion of the flight;

(g) retain the training records of all personnel for at least three years.

**AMC1 AOCR.SPA.DG.110(a) Dangerous goods information and documentation**

**INFORMATION TO THE PILOT-IN-COMMAND/COMMANDER**

If the volume of information provided to the pilot-in-command/commander by the operator is such that it would be impracticable to transmit it in the event of an in-flight emergency, an additional summary of the information should also be provided, containing at least the quantities and class or division of the dangerous goods in each cargo compartment.

**AMC1 AOCR.SPA.DG.110(b) Dangerous goods information and documentation**

**ACCEPTANCE OF DANGEROUS GOODS**

(a) The operator should not accept dangerous goods unless:

1. the package, overpack or freight container has been inspected in accordance with the acceptance procedures in the Technical Instructions;

2. they are accompanied by two copies of a dangerous goods transport document or the information applicable to the consignment is provided in electronic form, except when otherwise specified in the Technical Instructions; and

3. the English language is used for:

   i. package marking and labelling; and

   ii. the dangerous goods transport document, in addition to any other language provision.

(b) The operator or his/her handling agent should use an acceptance checklist which allows for:

1. all relevant details to be checked; and

2. the recording of the results of the acceptance check by manual, mechanical or computerised means.
H Management of Crew Fatigue including Flight Time Limitations

AOCR.SPA.FTL.100 Objective and scope

An operator shall establish a flight and duty time limitations and rest scheme (FTL) for crew members, which sets out a process for the management of crew fatigue, maximum flying duty periods and a minimum rest periods appropriate to the nature of the flight operations, which is approved by the Authority.

1 An operator shall ensure that for all its flights:

1.1 The flight and duty time limitations and rest scheme is in accordance with both:

(a) the provisions of this Chapter; and

(b) any additional provisions that are applied by the Authority in accordance with the provisions of this chapter for the purpose of maintaining safety.

1.2 Flights are planned to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the flight and turn-around times.

13 Duty rosters will be prepared and published sufficiently in advance to provide the opportunity for crew members to plan adequate rest.

2 Operators responsibilities:

2.1 An operator shall nominate a home base for each crew member.

2.2 Operators shall be expected to appreciate the relationship between the frequencies and pattern of flight duty periods and rest periods and give due consideration to the cumulative effects of undertaking long duty hours interspersed with minimum rest.

2.3 Operators shall allocate duty patterns which avoid such undesirable practices as alternating day/night duties or the positioning of crew members so that a serious disruption of established sleep/work pattern occurs.

2.4 Operators shall plan local days free of duty and notify crew members in advance.
2.5 Operators shall ensure that rest periods provide sufficient time to enable crew to overcome the effects of the previous duties and to be well rested by the start of the following flight duty period.

2.6 Operators shall ensure flight duty periods are planned to enable crew members to remain sufficiently free from fatigue so they can operate to a satisfactory level of safety under all circumstances.

3 Crew members responsibilities:

3.1 A crew member shall not operate an aeroplane if he/she knows that he/she is suffering from or is likely to suffer from fatigue or feels unfit, to the extent that the flight may be endangered.

3.2 Crew members should make optimum use of the opportunities and facilities for rest provided and plan and use their rest periods properly.

4 Responsibilities of the Authority

4.1 Variations

4.1.1 The Authority may grant variations to the requirements in this Chapter in accordance with applicable laws and procedures within Mauritius concerned and in consultation with interested parties.

4.1.2 Each operator will have to demonstrate to the Authority, using operational experience and taking into account other relevant factors such as current scientific knowledge, that its request for a variation produces an equivalent level of safety.

Such variations will be accompanied with suitable mitigation measures where appropriate.

AOCR.SPA.FTL.105 Definitions

For the purposes of these requirements, the following definitions shall apply:

1.1 Augmented flight crew:

A flight crew which comprises more than the minimum number required for the operation of the aeroplane and in which each flight crew member can leave his/her post and be replaced by another appropriately qualified flight crew member.
1.2 Block time:

The time between an aeroplane first moving from its parking place for the purpose of taking off until it comes to rest on the designated parking position and all engines or propellers are stopped.

1.3 Break:

A period free of all duties, which counts as duty, being less than a rest period.

1.4 Duty:

Any task that a crew member is required to carry out associated with the business of an AOC holder. Unless where specific rules are provided for by these requirements, the Authority shall define whether and to what extent standby is to be accounted for as duty.

1.5 Duty period:

A period which starts when a crew member is required by an operator to commence a duty and ends when the crew member is free from all duties.

1.6 Flight duty period:

A flight duty period (FDP) is any time during which a person operates in an aircraft as a member of its crew. The FDP starts when the crew member is required by an operator to report for a flight or a series of flights; it finishes at the end of the last flight on which he/she is an operating crew member.

1.7 Home base:

The location nominated by the operator to the crew member from where the crew member normally starts and ends a duty period or a series of duty periods and where, under normal conditions, the operator is not responsible for the accommodation of the crew member concerned.

1.8 Local day:

A 24 hour period commencing at 00.00 local time.

1.9 Local night:

A period of eight hours falling between 22.00 and 08.00 local time.
1.10 A single day free of duty:

A single day free of duty shall include two local nights. A rest period may be included as part of the day off.

1.11 Operating crew member:

A crew member who carries out his/her duties in an aircraft during a flight or during any part of a flight.

1.12 Positioning:

The transferring of a non-operating crew member from place to place, at the behest of the operator, excluding travelling time. Travelling time is defined as:

— time from home to a designated reporting place and vice versa,
— time for local transfer from a place of rest to the commencement of duty and vice versa.

1.13 Rest period:

An uninterrupted and defined period of time during which a crew member is free from all duties and airport standby.

1.14 Standby:

A defined period of time during which a crew member is required by the operator to be available to receive an assignment for a flight, positioning or other duty without an intervening rest period.

1.15 Window of Circadian Low (WOCL):

The Window of Circadian Low (WOCL) is the period between 02.00 and 05.59. Within a band of three time zones the WOCL refers to home base time. Beyond these three time zones the WOCL refers to home base time for the first 48 hours after departure from home base time zone, and to local time thereafter.

**AOCR.SPA.FTL.110 Flight and duty limitations**

1.1 Cumulative duty hours

An operator shall ensure that the total duty periods to which a crew member is assigned do not exceed:
DEPARTMENT OF CIVIL AVIATION

AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

(a) 190 duty hours in any 28 consecutive days, spread as evenly as practicable throughout this period; and

(b) 60 duty hours in any seven consecutive days.

1.2 Limit on total block times

An operator shall ensure that the total block times of the flights on which an individual crew member is assigned as an operating crew member does not exceed:

(a) 900 block hours in a calendar year;

(b) 100 block hours in any 28 consecutive days.

AOCR.SPA.FTL.115 Maximum daily flight duty period (FDP)

1.1 This requirements does not apply to single pilot operations and to emergency medical service operations.

1.2 An operator shall specify reporting times that realistically reflect the time for safety related ground duties as approved by the Authority.

1.3 The maximum basic daily FDP is 13 hours.

1.4 These 13 hours will be reduced by 30 minutes for each sector from the third sector onwards with a maximum total reduction of two hours.

1.5 When the FDP starts in the WOCL, the maximum stated in point 1.3 and point 1.4 will be reduced by 100 % of its encroachment up to a maximum of two hours. When the FDP ends in or fully encompasses the WOCL, the maximum FDP stated in point 1.3 and point 1.4 will be reduced by 50 % of its encroachment.

2 Extensions:

2.1 The maximum daily FDP can be extended by up to one hour.

2.2 Extensions are not allowed for a basic FDP of six sectors or more.

2.3 Where an FDP encroaches on the WOCL by up to two hours extensions are limited to up to four sectors.

2.4 Where an FDP encroaches on the WOCL by more than two hours extensions are limited to up to two sectors.
2.5 The maximum number of extensions is two in any seven consecutive days.

2.6 Where an FDP is planned to use an extension pre and post flight minimum rest is increased by two hours or post flight rest only is increased by four hours. Where the extensions are used for consecutive FDPs the pre and post rest between the two operations shall run consecutively.

2.7 When an FDP with extension starts in the period 22.00 to 04.59 the operator will limit the FDP to 11.45.

3 Cabin Crew

3.1 For cabin crew being assigned to a flight or series of flights, the FDP of the cabin crew may be extended by the difference in reporting time between cabin crew and flight crew, as long as the difference does not exceed one hour.

4 Operational Robustness

4.1 Planned schedules must allow for flights to be completed within the maximum permitted flight duty period. To assist in achieving this operators will take action to change a schedule or crewing arrangements at the latest where the actual operation exceeds the maximum FDP on more than 33 % of the flights in that schedule during a scheduled seasonal period.

5 Positioning

5.1 All the time spent on positioning is counted as duty.

5.2 Positioning after reporting but prior to operating shall be included as part of the FDP but shall not count as a sector.

5.3 A positioning sector immediately following operating sector will be taken into account for the calculation of minimum rest as defined in AOCR.SPA.FTL.120 points 1.1 and 1.2 below.

6 Extended FDP (split duty)

6.1 The Authority may grant approval to an operation based on an extended FDP including a break, subject to the provisions of the Civil Aviation Regulations.

6.2 Each operator will have to demonstrate to the Authority, using operational experience and taking into account other relevant
factors, such as current scientific knowledge, that its request for an extended FDP produces an equivalent level of safety.

**AOCR.SPA.FTL.120 Rest**

1 **Minimum rest**

1.1 The minimum rest which must be provided before undertaking a flight duty period starting at home base shall be at least as long as the preceding duty period or 12 hours whichever is the greater;

1.2 The minimum rest which must be provided before undertaking a flight duty period starting away from home base shall be at least as long as the preceding duty period or 10 hours whichever is the greater; when on minimum rest away from home base, the operator must allow for an eight hour sleep opportunity taking due account of travelling and other physiological needs;

1.3 An operator will ensure that effects on crew members of time zone differences will be compensated by additional rest, as regulated by the Authority

1.4.1 Notwithstanding 1.1 and 1.2 the Authority may grant reduced rest arrangements.

1.4.2 Each operator will have to demonstrate to the Authority, using operational experience and taking into account other relevant factors, such as current scientific knowledge, that its request for reduced rest arrangements produces an equivalent level of safety.

2 **Rest periods**

2.1 An operator shall ensure that the minimum rest provided as outlined above is increased periodically to a weekly rest period, being a 36-hour period including two local nights, such that there shall never be more than 168 hours between the end of one weekly rest period and the start of the next. As an exception to AOCR.SPA.FTL.105 point 1.9, the Authority may decide that the second of those local nights may start from 20:00 hours if the weekly rest period has a duration of at least 40 hours.

**AOCR.SPA.FTL.125 Extension of flight duty period due to in-flight rest**

1 Each operator should demonstrate to the Authority, using operational experience and taking into account other relevant factors such as
current scientific knowledge, that its request produces an equivalent level of safety:

1.1 Flight crew augmentation

The Authority shall set the requirements in connection with the augmentation of a basic flight crew for the purpose of extending the flight duty period beyond the limits in AOCR.SPA.FTL.115

1.2. Cabin crew

The Authority shall set the requirements in connection with the minimum in-flight rest by cabin crew member(s) when the FDP goes beyond the limitations in AOCR.SPA.FTL.115 above.

AOCR.SPA.FTL.130 Unforeseen circumstances in actual flight operations — commander’s discretion

1 Taking into account the need for careful control of these instances implied underneath, during the actual flight operation, which starts at the reporting time, the limits on flight duty, duty and rest periods prescribed in this Subpart may be modified in the event of unforeseen circumstances. Any such modifications must be acceptable to the commander after consultation with all other crew members and must, in all circumstances, comply with the following:

1.1 The maximum FDP referred to in AOCR.SPA.FTL.115 point 1.3 above may not be increased by more than two hours unless the flight crew has been augmented, in which case the maximum flight duty period may be increased by not more than three hours;

1.1.1 If on the final sector within a FDP unforeseen circumstances occur after take-off that will result in the permitted increase being exceeded, the flight may continue to the planned destination or alternate;

1.1.2 In the event of such circumstances, the rest period following the FDP may be reduced but never below the minimum rest defined in AOCR.SPA.FTL.120 point 1.2 of this chapter;

1.2 The Commander shall, in case of special circumstances, which could lead to severe fatigue, and after consultation with the crew members affected, reduce the actual flight duty time and/or increase the rest time in order to eliminate any detrimental effect on flight safety;

1.3 An operator shall ensure that:
1.3.1 The Commander submits a report to the operator whenever a FDP is increased by his/her discretion or when a rest period is reduced in actual operation and

1.3.2 Where the increase of a FDP or reduction of a rest period exceeds one hour, a copy of the report, to which the operator must add his comments, is sent to the Authority no later than 28 days after the event.

**AOCR.SPA.FTL.135 Standby**

1 Airport standby

1.1 A crew member is on airport standby from reporting at the normal report point until the end of the notified standby period.

1.2 Airport standby will count in full for the purposes of cumulative duty hours.

1.3 Where airport standby is immediately followed by a flight duty, the relationship between such airport standby and the assigned flight duty shall be defined by the Authority. In such a case, airport standby shall be added to the duty period referred to in AOCR.SPA.FTL.110 under points 1.1 and 1.2 for the purposes of calculating minimum rest.

1.4 Where the airport standby does not lead to assignment on a flight duty, it shall be followed at least by a rest period as regulated by the Authority.

1.5 While on airport standby the operator will provide to the crew member a quiet and comfortable place not open to the public.

2 Other forms of standby (including standby at hotel)

2.1 All other forms of standby shall be regulated by the Authority, taking into account the following:

2.1.1 All activity shall be rostered and/or notified in advance.

2.1.2 The start and end time of the standby shall be defined and notified in advance.

2.1.3 The maximum length of any standby at a place other than a specified reporting point shall be determined.
2.1.4 Taking into account facilities available for the crew member to rest and other relevant factors, the relationship between the standby and any assigned flight duty resulting from the standby shall be defined.

2.1.5. The counting of standby times for the purposes of cumulative duty hours shall be defined.

AOCR.SPA.FTL.140 Nutrition

A meal and drink opportunity must occur in order to avoid any detriment to a crew member’s performance, especially when the FDP exceeds six hours.

AOCR.SPA.FTL.145 Flight duty, duty and rest period records

1 An operator shall ensure that crew member’s records include:
   (a) block times;
   (b) start, duration and end of each duty or flight duty periods;
   (c) rest periods and days free of all duties;

   and are maintained to ensure compliance with the requirements of this chapter; copies of these records will be made available to the crew member upon request.

2 If the records held by the operator under paragraph 1 do not cover all of his/her flight duty, duty and rest periods, the crew member concerned shall maintain an individual record of his/her:
   (a) block times;
   (b) start, duration and end of each duty or flight duty periods; and
   (c) rest periods and days free of all duties.

3 A crew member shall present his/her records on request to any operator who employs his/her services before he/she commences a flight duty period.

4 Records shall be preserved for at least 15 calendar months from the date of the last relevant entry or longer if required in accordance with national laws.

5 Additionally, operators shall separately retain all aircraft commander’s discretion reports of extended flight duty periods, extended flight hours and reduced rest periods for at least six months after the event.
DEPARTMENT OF CIVIL AVIATION

AIRCRAFT OPERATOR CERTIFICATION REQUIREMENTS

Chapter 6

Part A

THE AVOIDANCE OF EXCESSIVE FATIGUE FLIGHT CREW

DEFINITIONS

In this document various terms have the meanings defined below ascribed to them:

(a) **Duty Period**

Any continuous period throughout which either a crew member flies in any aircraft, whether as a crew member or as a passenger, at the behest of his employer, or otherwise carries out a required duty in the course of his employment. It includes any flying duty period, positioning at the behest of the operator, ground training, ground duties and standby at an airport.

(Note: Standby at home or in hotel accommodation does not form part of a duty period, but the time spent on standby at home or in hotel accommodation may be factorised for the purposes of cumulative duty limits.)

(b) **Flying Duty Period (FDP)**

Any duty period during which a crew member flies in an aircraft as a member of its operating crew. It starts at the time the crew member is required by the operator to report for duty and includes such preflight and immediate post flight duties as are required by the operator.

(c) **Standby**

A period of time when an operator places restraints on a crew member who would otherwise be off duty.

(d) **Rest Period**

A period before starting a flying duty period which is intended to ensure that a crew member is adequately rested before flight. A crew member who completes a period of standby at home or in hotel accommodation need not be given a rest period before his next flying duty.
(e) **Positioning**

The practice of transferring crews from place to place as passengers on surface or air transport at the behest of the operator. Travelling between place of rest and place of duty is not classified as positioning.

(f) **Local Night**

A period of 8 hours falling between 2200 hours and 0800 hours local time.

(g) **Normal Operating Crew**

The minimum flight deck crew required for public transport operation in compliance with the Civil Aviation Regulations and the Certificate of Airworthiness.

(h) **Augmented Crew**

A normal operating crew augmented by one or more pilots and, where the crew includes a flight engineer, one flight engineer.

(i) **Days Off**

A single day off shall be a period of 30 hours free of all duty starting either at 1800 hours or at midnight local time. Consecutive days off shall be consecutive 24 hour periods immediately following a single day off. A rest period may be included as part of a day off.

1 **INTRODUCTION – REQUIREMENTS OF THE CIVIL AVIATION REGULATIONS**

1.1 The relevant paragraphs of the Civil Aviation Regulations require, broadly, that an operator of an aircraft to which the paragraphs apply shall have a scheme for the regulation of flight times of his crews. This scheme must be included in the Company Operations Manual, or incorporated in a document, a copy of which has been made available to all crew members.

1.2 These requirements of the Civil Aviation Regulations apply in relation to an aircraft registered in Mauritius which is either:

   (a) engaged on a flight for the purpose of public transport; or

   (b) operated by an air transport undertaking;

provided that the requirements shall not apply in relation to a flight made for the purpose of instruction in flying, given by or on behalf of a
flying club or a flying school, or an organisation which is not an air transport undertaking.

2 GENERAL PRINCIPLES OF CONTROL OF FLIGHT, DUTY AND REST TIME

2.1 The prime objective of any scheme of flight time limitations is to ensure that crew members are adequately rested at the beginning of each flying duty period. Aircraft operators will therefore need to take account of inter-related planning constraints on individual duty and rest periods, on the length of cycles of duty and the associated periods of time off and on cumulative duty hours within specific periods.

2.2 Duties must be scheduled within the limits of the operator’s scheme. To allow for unforeseeable delays the aircraft commander may within prescribed conditions, use his discretion to exceed the limits on the day. Nevertheless, flight schedules must be realistic, and the planning of duties must be designed to avoid, as far as possible, overruns of flying duty limits.

2.3 The Authority will conduct periodic and spot checks of operators’ records and aircraft commanders’ reports to assess whether the operator’s planning of flight schedules and duty in general is producing results in practice which are compatible with the limitations provided for in the operator’s scheme.

2.4 Other general considerations in the sensible planning of duties are:

(a) the need to construct consecutive work patterns which will avoid as far as possible such undesirable rostering practices as alternating day/night duties and the positioning of crews in a manner likely to result in a serious disruption of established sleep/work patterns;

(b) the need, particularly where flights are carried out on a programmed basis, to allow a reasonable period for the pre-flight notification of duty to crews, other than those on standby; and

(c) the need to plan time off and also to ensure that crews are notified of their allocation well in advance.

3 RESPONSIBILITIES OF CREW MEMBERS

3.1 Responsibility for the proper control of flight and duty time cannot rest on the operator alone. It is the responsibility of all crew members to make optimum use of the opportunities and facilities for rest provided by the operator, and to plan and use their rest periods properly so as to minimise the risk of fatigue.
4 STANDARD PROVISIONS REQUIRED FOR AN OPERATOR’S SCHEME OF LIMITATIONS

4.1 The standard provisions which the Authority regards as the basis for an acceptable scheme of flight and duty limitations are contained in paragraphs 5 to 10 of this Appendix.

5 LIMITATIONS ON SINGLE FLYING DUTY PERIODS - FLIGHT CREW

5.1 The maximum rostered FDP (in hours) shall be in accordance with Table A or B (multi-crew aeroplanes), Table C (single pilot aeroplanes) or Table D (helicopters) modified as appropriate by paragraphs 5.2, 5.3 and 5.4 of this Appendix.

5.1.1 Maximum Rostered FDP - Aeroplanes in which the normal crew consists of two or more flight deck crew members

Table A shall apply when the FDP starts at a place where the crew member is acclimatised to local time, and Table B shall apply at other times. To be considered acclimatised for the purposes of this document, a crew member must be allowed 3 consecutive local nights free of duty within a local time zone band which is two hours wide. He/she will thereafter be considered to remain acclimatised to that same time zone band until he/she ends a duty period at a place where local time is outside it.

<table>
<thead>
<tr>
<th>Local Time of Start</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>0600–0759</td>
<td>13</td>
<td>12¼</td>
<td>11½</td>
<td>10¾</td>
<td>10</td>
<td>9¼</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>0800–1259</td>
<td>14</td>
<td>13¼</td>
<td>12½</td>
<td>11¾</td>
<td>11</td>
<td>10½</td>
<td>10</td>
<td>9 ½</td>
</tr>
<tr>
<td>1300–1759</td>
<td>13</td>
<td>12¼</td>
<td>11½</td>
<td>10¾</td>
<td>10</td>
<td>9¼</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>1800–2159</td>
<td>12</td>
<td>11 ¼</td>
<td>10 ½</td>
<td>9 ¾</td>
<td>9</td>
<td>9 ½</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>2200–0559</td>
<td>11</td>
<td>10¼</td>
<td>9½</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>
Table B  Not acclimatised to local time

<table>
<thead>
<tr>
<th>Length of preceding rest (hours)</th>
<th>Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Up to 18 or over 30</td>
<td>13</td>
</tr>
<tr>
<td>Between 18 and 30</td>
<td>11½</td>
</tr>
</tbody>
</table>

5.1.2 Table C  Maximum Rostered FDP – Single pilot aeroplanes

<table>
<thead>
<tr>
<th>Local Time to Start</th>
<th>Sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Up to 4</td>
</tr>
<tr>
<td>0600 – 0659</td>
<td>10</td>
</tr>
<tr>
<td>0700 – 1259</td>
<td>11</td>
</tr>
<tr>
<td>1300 – 1759</td>
<td>10</td>
</tr>
<tr>
<td>1800 – 2159</td>
<td>9</td>
</tr>
<tr>
<td>2200 – 0559</td>
<td>8</td>
</tr>
</tbody>
</table>
5.1.3 **Table D** Maximum Rostered FDP – helicopters

<table>
<thead>
<tr>
<th>Local Time of Start</th>
<th>Maximum Length of Flying Duty Period (hours)</th>
<th>Maximum Flying Time (hours)</th>
<th>Maximum Flying Duty Period (hours)</th>
<th>Maximum Flying Time (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0600 – 0659</td>
<td>9</td>
<td>6</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>0700 – 0759</td>
<td>10</td>
<td>7</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>0800 – 1359</td>
<td>10</td>
<td>7</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>1400 – 2159</td>
<td>9</td>
<td>6</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>2200 – 0559</td>
<td>8</td>
<td>5</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

5.1.4 **Additional Limits on Two-Crew Long Sectors**

When an aeroplane flight crew consists only of two pilots, the FDP calculated from Table A or B will be adjusted by counting long sectors as more than one sector in the following manner:

Single sector length (Block Time) as

<table>
<thead>
<tr>
<th>Count as (Sector)</th>
<th>Table A</th>
<th>Table B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 7 but not over 9 hours</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Over 9 but not over 11 hours</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Over 11 hours</td>
<td>4</td>
<td>N/A</td>
</tr>
</tbody>
</table>

5.2 **Extension of Maximum Rostered FDP by Augmented Crew**

5.2.1 When an augmented crew is used to extend the maximum rostered FDP the additional crew member or members shall hold qualifications which meet the requirements of the operational duty he/she will perform. The qualifications must be specified by the operator and mutually agreed with the Authority.
5.2.2 Aeroplanes with a normal flight deck crew of 2 crew members

The maximum rostered FDP as determined from Table A or B and paragraph 5.1.4 may be extended:

(a) by up to 4 hours if the crew is augmented by one pilot and there is suitable rest facilities available for one pilot.

(b) by up to 7 hours if the crew is augmented by two pilots and there are suitable rest facilities available for two pilots.

(c) up to the normal limits of Table A or B without applying paragraph 5.1.4 if the crew is augmented by one pilot and no suitable rest facilities is available.

5.2.3 Aeroplanes with a normal flight deck crew of more than two persons

If the crew is augmented by one pilot and one flight engineer with suitable rest facilities being available for the pilot and flight engineer, the maximum rostered FDP as determined from Table A or B may be extended to 16 hours.

5.3 Split Duty

5.3.1 When a rostered FDP consists of two or more sectors separated by an off-duty period of less than the minimum rest period, the limits in Table A, B, C and D may be increased according to the time between scheduled arrival and scheduled departure, known as the transit period, as follows:

<table>
<thead>
<tr>
<th>Consecutive hours rest</th>
<th>Increase in FDP limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3</td>
<td>Nil</td>
</tr>
<tr>
<td>3 to 10</td>
<td>A period equal to half the consecutive hours rest taken</td>
</tr>
</tbody>
</table>

5.3.2 When the transit period is not more than 6 hours it will be sufficient if a quiet and comfortable place is available, not open to the public, but if the transit period is more than 6 hours a bed must be provided.

5.4 Combinations of flying and other duty

All time spent on positioning as required by the operator shall be classed as duty, but positioning shall not count as a sector when assessing the maximum permissible FDP. Positioning, any form of ground duty and standby at an airport which immediately precedes a flying duty shall be included in the FDP and subject to the limits in
paragraphs 5.1 to 5.3. Positioning and ground duties immediately following a flying duty shall not be part of the FDP, but shall be duty; the ensuing rest period shall not start until all duty is finished, and its length shall be based on the total length of FDP plus duty. Positioning which neither immediately precedes nor follows a FDP shall

5.5 **Delayed Reporting Time**

When crew members are informed of a delay before leaving their place of rest the FDP shall start at the new reporting time, or 4 hours after the original reporting time, whichever is the earliest. The maximum FDP shall be based on the original reporting time. This paragraph shall not apply if crew members are given 10 hours or more notice of a new reporting time.

6 **DISCRETION TO EXTEND A FDP**

6.1 An aircraft commander after taking note of the circumstances of other members of the crew may at his discretion extend an FDP beyond the limits permitted by paragraph 5 provided that:-

(a) the safety of the flight will not be prejudiced; and

(b) the extended FDP shall not exceed by more than three hours the maximum FDP permitted by paragraph 5, except in an emergency.

**Note:** An emergency in respect of an extension of a flying duty is a situation which in the judgement of the commander presents a serious risk to health or safety.

7 **REST PERIODS**

7.1 The minimum rest period which must be scheduled prior to a flying duty period shall be:

(a) not less than 10 hours if it includes a local night and not less than 11 hours if it does not include a local night; and

(b) as least as long as the preceding duty rounded up to the next whole hour; and

(c) if the preceding duty exceeded 16 hours, not less than 16 hours plus two hours for every hour or part of an hour that the previous duty exceeded 16 hours.
7.2 The rest periods required by paragraph 7.1 shall be subject to the following provisos;

(a) if the preceding duty period exceeded 18 hours, the rest period must include a local night.

(b) if the rest is taken in accommodation provided by the operator the minima in Para 7.1(a) are to be increased by the amount, if any, by which the return travelling time to and from the rest accommodation exceeds one hour.

7.3 Discretion to reduce a Rest Period

A commander on behalf of the crew or an individual on his own behalf may at his discretion reduce a rest period below the minima in Para 7.1 (b) or (c) provided:-

(a) the safety of the flight or flights will not be prejudiced, and

(b) the rest actually taken allows a minimum of 10 hours at the accommodation where rest is taken

8 CUMULATIVE LIMITS

8.1 The maximum number of flying hours a crew member may be permitted to undertake are:

100 hours in any consecutive 28 days

900 hours in any consecutive 12 complete calendar months

8.2 Duty hours

Crews on extended periods away from base on flying duties shall be scheduled within the following limits on cumulative duty counting from the day the crew member reports for duty at base up to and including the day he/she next goes off duty at base:

3 consecutive days 32 hours

7 consecutive days 56 hours

8 consecutive days 60 hours

9 consecutive days 64 hours

10 consecutive days 68 hours
11 consecutive days       72 hours
12 consecutive days       75 hours
13 consecutive days       78 hours
14 consecutive days       81 hours
15 consecutive days       84 hours

and for any further days at the rate of 3 hours per day.

In the event of disruption to a schedule after it has commenced the commander on behalf of the crew or an individual on his own behalf may at his discretion exceed these limits.

9 DAYS OFF

9.1 Crew members shall be granted an average of two days off per week, not counting periods of leave. A minimum of 6 days off in any consecutive 4 weeks is permissible, provided the shortfall is made good in the preceding or following 4 weeks. The detailed pattern of these days off shall, depending on the nature of the operation, meet the conditions of EITHER paragraph 9.2 OR paragraph 9.3.

9.2 Crew members shall normally:

(a) be rostered to have two consecutive days off every two weeks; and

(b) not work more than seven consecutive days between days off.

9.3 On a period of flying duties away from base:

(a) crews shall not work more than seven consecutive days without a short break of 30 consecutive hours; and

(b) on return to base crews shall be given days off at base according to the following table before being rostered for further flying duties.

<table>
<thead>
<tr>
<th>Days Away</th>
<th>Days Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 7</td>
<td>2</td>
</tr>
<tr>
<td>8 to 10</td>
<td>3</td>
</tr>
<tr>
<td>11 to 13</td>
<td>4</td>
</tr>
<tr>
<td>14 or more</td>
<td>5</td>
</tr>
</tbody>
</table>
Note 1: For the purposes of this paragraph the operator may define the "week" as seven days commencing on any day, as long as it is applied it consistently.

Note 2: A day off may include a rest period required by paragraph 7.

10 RECORDS AND REPORTING

10.1 To assist in meeting the above requirements, an operator shall keep records for all his flight deck crews of their duty, flying and rest periods achieved. Records shall be preserved for 12 months from the date of the last relevant entry.

10.2 Any commander or crew member who exercises his discretion under paragraph 6 or 7.3 shall make a report of the circumstances to the operator; and the operator shall retain such reports for 6 months. If the extension of duty or reduction of rest exceeded 2 hours, the operator shall report it to the authority within 30 days. The report should include date, time, aircraft, crew, details of planned and achieved schedules and the report of the circumstances.

10.3 A flight crew member is required to inform anyone who employs his services as a flight crew member of all flying he/she undertakes, whether professionally or privately.
1 GENERAL

1.1 The standard provisions on cabin crew flight duty and rest periods set up in this section apply to all cabin crew operating a flight and not only to the minimum cabin crew complement carried on board the aircraft to meet the provisions of the Civil Aviation Regulations.

1.2 The provisions of an operator’s scheme for the regulation of flight times applicable to cabin crew shall comply with the requirements set out below.

2 FLIGHT DUTY PERIOD (FDP)

2.1 An operator may assign a duty period to a cabin crew only when the applicable flight duty period (FDP) limitations of this paragraph are met.

2.2 Except as provided in sub paragraph 2.3, an operator may not assign a cabin crew a FDP of more than 14 hours without rest facilities being provided.

2.3 An operator may assign a cabin crew for a FDP up to 19 hours provided the following conditions are met:

   (a) Horizontal rest facilities are provided.

   (b) The divisions of duty and rest is fairly distributed among all cabin crew members on a flight.

   (c) A minimum in-flight rest period of:

       3 hours must be provided for a FDP up to 17 hours

       4 hours must be provided for a FDP up to 19 hours

Note: (i) In the event when rest cannot be taken in-flight due to unforeseen circumstances, rest may be taken on the
ground. However such ground rest facilities must be located in a quiet place conducive to rest.

(ii) If horizontal rest facilities are not available due to unforeseen circumstances, the minimum in-flight rest period specified in paragraph 2.3 (c) shall be increased by 1 hour.

2.4 In the event of a flight disruption or delay, the FDP limits may be extended as follows:

(a) Paragraph 2.2 may be extended up to 16 1/2 hours or up to one hour beyond the maximum extended FDP of the applicable flight crew complement operating on the same flight sectors;

(b) Paragraph 2.3 may be extended up to one hour beyond the maximum extended FDP of the applicable flight crew complement operating on the same flight sector(s). (This would be applicable only when the maximum extended FDP of the flight crew is more than 19 hours.)

Note: The above limits shall not be exceeded except unless in an emergency situation where, in the judgement of the commander, there is a need to extend the FDP because of a serious risk to health or safety to persons on board the aircraft.

3 REST PERIOD AFTER A FDP

3.1 The minimum rest period for cabin crew immediately after a FDP shall be:

(a) as long as the preceding FDP less an hour; or

(b) 10 hours whichever is greater.

3.2 In the event of a flight disruption or delay, the minimum rest periods spelt out in paragraphs 3.1 (a) may be reduced to 9 hours. This limit shall not be exceeded except unless in an emergency situation where, in the judgement of the commander, there is a need to reduce the rest periods because of a serious risk to health or safety to persons on board the aircraft.

4 DAYS OFF

4.1 Cabin Crew shall:
(a) not be on duty more than 7 consecutive days between days off; and

(b) have a minimum of 2 days off in any consecutive 12 days; and

(c) have a minimum of 7 days off in any consecutive 4 weeks; and

(d) have an average of at least 8 days off in each consecutive 4 week period, averaged over three such periods.

Note: A day off is a 24 hour period starting from mid-night local time.

5 DUTY HOUR LIMITATION

5.1 Cabin crew duty hours shall not exceed:

(a) 60 hours in any 7 consecutive days. (However, in the event of unforeseen delays after the commencement of a rostered duty period covering a serious of duty periods, this limit may be increased to 65 hours);

(b) 105 hours in any 14 consecutive days;

(c) 210 hours in any 28 consecutive days;

Note: Duty will include flying duties, positioning at the behest of the operator, ground duties and standby duties at the airport.

6 RECORDS TO BE KEPT

6.1 All duty hours records must be kept for at least a period of one year.