KINGDOM OF BAHRAIN
Ministry of Transportation and Telecommunications

مملكة البحرين
وزارة المواصلات والاتصالات

ANTR OPS 1

COMMERCIAL & PRIVATE AIR TRANSPORTATION (AEROPLANES)

FOREWORD

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Bahrain CAA Publication Revisions Highlight Sheet

☒ ANTR: ANTR OPS 1 ☐ CAP:____ ☐ TPM: _______

The following pages of ANTR Part IV, OPS 1 have been revised to address the results of periodic review during the year 2024.

Item	Paragraph number	Page	Reason
1.	Revision Highlight	Page(1 of 7) to (2 of 7)	To indicate the current revision details.
2.	Revision Record	Page (3 of 7)	To indicate the current revision of record.
3.	LEP	Page(4 of 7) to (7 of 7)	To indicate the affected pages.
4.	Foreword, Contents (general) and Contents (details)	i	To indicate the current revision status.
5.	Content	v	amended table of content to indicate amendment of ANTR OPS 1.080.
6.	ANTR OPS 1.080	(1-B-11) to (1-B-12)	Introduction of regulation for carriage of persons without compliance with the passenger-carrying requirements.
7.	ANTR OPS 1.125	(1-B-16)	Amended to introduce accessibility of agreement summary.
8.	ANTR OPS 1.160(a)(4)(i)	(1-B-18)	Deletion of irrelevant references.
9.	Appendix 1 to ANTR OPS 1.005(a), Item No.(b)(4), (b)(29) & (a)(42)	(1-B-21), (1-B-25) & (1-B-27)	Amended to correct the applicable & current exposition requirement and carriage of persons in flight deck.
10.	Appendix 1 to ANTR OPS 1.125	(1-B-29)	Introduce the Format of summary IAW ICAO Annex 6, Part-I.
11.	Appendix 1 to ANTR OPS 1.175	(1-C-8) to (1-C-11)	Amendment to AOC, Operations Specification formats & its instructions.
12.	ANTR OPS 1.207(d)(1) & (d)(7)	(1-D-3) & (1-D-4)	Giving reference to the guidance material.
13.	ANTR OPS 1.285(d)(1)(vi)	(1-D-20)	Sub-Para item number correction.
14.	ANTR OPS 1.310(b)	(1-D-26)	Amendment to the assignment of duties to the Cabin Crew.
15.	ANTR OPS 1.420(c)(1)	(1-D-35)	Commander’s responsibility on Accident notification.

16.	ANTR OPS 1.430(c)	(1-E-1)	Sub-para numbers correction & ICAO DOC reference at Note 2.
17.	Appendix 1 to AC Ops 1.720/1.725		Deleted to remove duplication of information at Appendix 1 to ANTR OPS 1.705
18.	Appendix 1 to ANTR OPS 1.785	(1-K-62)	Removal of form and giving its form number reference instead.
19.	ANTR OPS 1.940(6) & (8)	(1-N-1)	Deletion of Flight Engineer & Flight Navigator requirement.
20.	ANTR OPS 1.965(6)	(1-N-8)	Introduction of recurrent training requirement.
21.	ANTR OPS 1.970(a)	(1-N-10)	Revision to the minimum requirement for the recency and deletion of non-standard extension provision.
22.	ANTR OPS 1.990(a)	(1-O-1)	Amendment to the assignment of duties to the Cabin Crew.
23.	ANTR OPS 1.1045	(1-P-2)	Deletion of irrelevant IEM reference.
24.	Appendix 1 to ANTR OPS 1.1045	(1-P-2)	Title - Deletion of irrelevant IEM link Para (b) - Deletion of irrelevant IEM reference in Section-B, Para 13.
25.	ANTR OPS 1.1070	(1-P-4)	Amended to correct the exposition terminology.
26.	Appendix 1 to ANTR OPS 1.1045	(1-P-19)	Amended of OMB Section 13.
27.	ANTR OPS 1.1233	(1-R-9)	Correction – para no.
28.	ANTR OPS 1.1250	(1-S-1)	Introduction of requirement for providing means of attenuating the blasts in cabin.
29.	AC to Appendix 1 to ANTR OPS 1.005(3) & (4)	(2-B-1)	Amended to correct the applicable & current exposition requirement. Deletion of Attachment to AC to Appendix 1 to ANTR OPS 1.005(a) – Sample of Aircraft Techlog format.
30.	AMC OPS 1.245(a)(2), 4(a)	(2-D-5)	Correction to the document reference.
31.	IEM OPS 1.526	(2-H-2)	To mention the currently used exposition manual.
32.	IEM OPS 1.1045(c)	(2-P-2)	Deleted to avoid duplication with the contents of Appendix 1 to ANTR OPS 1.1045
33.	IEM to Appendix 1 to ANTR OPS 1.1045	(2-P-3)	Deleted to avoid duplication with the contents of Appendix 1 to ANTR OPS 1.1045.

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REVISION RECORD

Revision No.	Date of Issue
3rd Edition Initial Issue	01 August 2010
Revision 1	01 March 2011
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Revision 12	23 June 2022
Revision 13	11 October 2022
Revision 14	28 January 2024
Revision 15	10 September 2024

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END

FOREWORD

1 The Kingdom of Bahrain Civil Aviation Affairs, known in these regulations as the "BCAA" has implemented ANTR OPS 1 (Air Navigation Technical Regulations – Operations 1) based on the ICAO Annexes, with a view to harmonizing legislation and to regulate commercial air transport and private operations of aeroplanes.

2 ICAO Annex 6 has been selected to provide the basic structure of ANTR OPS 1 and for Air Operator Certification and Private Operator Authorisation, but with additional sub-division where considered appropriate. The content of Annex 6 has been used and added to where acceptable.

3 The BCAA has adopted associated compliance or interpretative material wherever possible and, unless specifically stated otherwise, clarification will be based on this material or other ICAO and EASA documentation.

4 Future development of the requirements of ANTR OPS 1 will be in accordance with Notice of Proposed Amendment (NPA) procedures. These procedures allow for the amendment of ANTR OPS 1 to be harmonized with amendments to ICAO Annexes and EASA in a timely manner.

5 Definitions and abbreviations of terms used in ANTR OPS 1 that are considered generally applicable are contained in ANTR Part 1- Definitions. However, definitions and abbreviations of terms used in ANTR OPS 1 that are specific to a Subpart of ANTR OPS 1 are normally given in the Subpart concerned or, exceptionally, in the associated compliance or interpretative material.

6 The editing practices used in this document are as follows:

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

(b) 'Should' is used to indicate a recommendation and normally appears in AMCs and IEMs.

(c) 'May' is used to indicate discretion by the BCAA, the industry or the applicant, as appropriate.

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

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

7 New, amended and corrected text will be indicated with a side bar beside paragraphs, until a subsequent "amendment" is issued.

8 Section 1 regulations are presented in Times Roman font and Section 2 material presented in Arial font

9 This 3rd Edition Revision 15 is dated 10 September 2024.

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SUBPART A – APPLICABILITY

ANTR OPS 1.001 Applicability

(a) ANTR OPS 1 prescribes requirements applicable to the operation of any civil aeroplane for the purpose of commercial and private transportation by any operator whose principal place of business and, if any, its registered office is in the Kingdom of Bahrain. ANTR OPS 1 does not apply:

(1) to aeroplanes when used in military, customs and police services; nor

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

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

ANTR OPS 1.003 Terminology

Terms used in this Subpart and not defined in ANTRs have the following meaning:

(a) Commercial Operator. A commercial operator is the operator of an aeroplane engaged in transportation of passengers, cargo and mail for remuneration or hire offering service to the public.

(b) Commercial Activities. Unless otherwise specifically authorised by the BCAA, the following operations are categorized as commercial operations;

(1) Sightseeing flights

(2) Ferry or training flights;

(3) Aerial work operations, including:

(i) Fire suppression

(ii) Agricultural operations

(iii) External load operations

(iv) Aerial photography and survey

(v) Aerial reconnaissance

(vi) Aerial advertising

(vii) Air shows and aerial demonstrations

(viii) Carriage and dropping of parachutists (operator of aircraft)

(ix) Navigation aid calibration

(x) Other activities as determined by the BCAA.

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

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

(e) **'Supernumeraries'** – means the person(s) who are not acting in the capacity of a flight crew or a flight attendant and in general, not trained or qualified to act as a flight crew or a flight attendant and not listed on the load manifest as a flight crew member / flight attendant subject to compliance with respective regulation at ANTR OPS 1.

Note: An occupant of an aircraft required for its safe operation that is not a member of the flight or cabin crew. These occupants are limited to live animal handlers, loadmasters, person(s) with duties in respect of a particular shipment on board and maintenance technicians, safety pilots or inspectors from the BCAA.

SUBPART B – GENERAL

ANTR OPS 1.005 General

(See Appendix 1 to ANTR OPS 1.005(a))

(a) The operator shall not operate an aeroplane for the purpose of commercial air transportation other than in accordance with ANTR OPS 1. For operations of Performance Class B aeroplanes; alleviated requirements, can be found in Appendix 1 to ANTR OPS 1.005(a).

(b) The operator shall comply with the requirements in ANTR M applicable to aeroplanes operated for the purpose of commercial and private air transportation.

(c) Each aeroplane shall be operated in compliance with the terms of its Certificate of Airworthiness and within the approved limitations contained in its Aeroplane Flight Manual.

(d) Air Taxi and Aeroplane Emergency Medical Service (EMS) operations shall be conducted in accordance with the requirements contained in ANTR OPS 1.

(e) All Flight Synthetic Training Devices (FSTD), such as Flight Simulators or Flight Training Devices, replacing an aeroplane for training and/or checking purposes are to be qualified in accordance with ANTR-FSTD A requirements and user approved by the BCAA for the exercises to be conducted.

ANTR OPS 1.010 Exemptions

(See AC OPS 1.010)

The BCAA may exceptionally grant an exemption from the provisions of ANTR OPS 1 when satisfied that there is a need and subject to compliance with any supplementary condition the BCAA considers necessary in order to ensure an acceptable level of safety in the particular case.

ANTR OPS 1.015 Operational Directives

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

(b) Operational Directives state:

(1) The reason for issue;

(2) Applicability and duration; and

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

(c) Operational Directives are supplementary to the provisions of ANTR OPS 1.

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

(a) The operator must ensure that:

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

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

(3) The operator shall ensure that other members of the flight crew are familiar with such of these laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the aeroplane.

Note: Information for pilots and flight operations personnel on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Procedure for Aircraft Operation are contained in PAN-OPS (ICAO DOC 8168), Volume III. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

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

Note: The rights and obligations of a State in respect to the operation of aeroplanes registered in that State are not affected by this provision.

(5) Responsibility for operational control shall be delegated only to the pilot-in-command and to a flight operations officer/flight dispatcher if the operator's approved method of control and supervision of flight operations requires the use of flight operations officer/flight dispatcher personnel.

Note: Guidance on the operational control organization and the role of the flight operations officer/flight dispatcher is contained in the Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335). Detailed guidance on the authorization, duties and responsibilities of the flight operations officer/flight dispatcher is contained in the Preparation of an Operations Manual (Doc 10153). The requirements for age, skill, knowledge and experience for licensed flight operations officers/flight dispatchers are contained in ICAO, Annex 1 and ANTR FCL PART II Chapter-4.

(6) If an emergency situation which endangers the safety of the aeroplane or persons becomes known first to the flight operations officer/flight dispatcher, action by that person in accordance with ANTR OPS 1.207 shall include, where necessary, notification to the appropriate authorities of the nature of the situation without delay, and requests for assistance if required.

(7) If an emergency situation which endangers the safety of the aeroplane or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-in-command shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the State of the Operator. Such reports shall be submitted as soon as possible and normally within ten days.

(8) Operators shall ensure that pilots-in-command have available on board the aeroplane all the essential information concerning the search and rescue services in the area over which the aeroplane will be flown.

Note: This information may be made available to the pilot by means of the operations manual or such other means as is considered appropriate.

(9) Operators shall ensure that flight crew members demonstrate the ability to speak and understand the language used for radiotelephony communications as specified in ICAO, Annex 1 *and ANTR FCL PART II Chapter-1*.

(10) For each type of aeroplane, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation and to ensure annual training in accomplishing these functions are contained in the operator's training programme and include instruction in the use of all emergency and life-saving equipment required to be carried, and drills in the emergency evacuation of the aeroplane.

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

Note 1: "Reasonable means" in this Standard is intended to denote the use, at the point of departure or while the aircraft is in flight, of information available to the operator either through official information published by the aeronautical information services or readily obtainable from other sources.

Note 2: Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).

Note 3: The Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones (Doc 10084) contains further guidance on risk assessment for air operators when flying over or near conflict zones.

ANTR OPS 1.025 Common Language

(a) The operator must ensure that all crew members can communicate in a common language.

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

(c) Aeroplane pilots who are required to use the radio telephone aboard an aircraft shall demonstrate the ability to speak and understand the English language as used for radiotelephony communications.

ANTR OPS 1.030 Minimum Equipment Lists – Operator's Responsibilities

(a) The operator shall establish, for each aeroplane, a Minimum Equipment List (MEL) approved by the BCAA. This shall be based upon, but no less restrictive than, the relevant Master Minimum Equipment List (MMEL) accepted by the BCAA.

(b) The operator shall not operate an aeroplane other than in accordance with the MEL unless permitted by the BCAA. Any such permission will in no circumstances permit operation outside the constraints of the MMEL.

(c) The operator shall use the MMEL from the State of Design.

(d) the BCAA shall only adopt the MMEL from the State of Design.

ANTR OPS 1.035 Quality system

(See AMC OPS 1.035 and IEM OPS 1.035)

(a) The operator shall establish one Quality System and designate one Quality Manager to monitor compliance with, and the adequacy of, procedures required to ensure safe operational practices and airworthy aeroplanes. Compliance monitoring must include a feed-back system to the Accountable Manager (See also ANTR OPS 1.175(h)) to ensure corrective action as necessary.

(b) The Quality System must include a Quality Assurance Programme that contains procedures designed to verify that all operations are being conducted in accordance with all applicable requirements, standards and procedures.

(c) The Quality System and the Quality Manager must be acceptable to the BCAA.

(d) The quality system must be described in relevant documentation.

(e) Notwithstanding sub-paragraph (a) above, the BCAA may accept the nomination of two Quality Managers, one for operations and one for maintenance, provided that the operator has designated one Quality Management Unit to ensure that the Quality System is applied uniformly throughout the entire operation.

ANTR-OPS 1.037 Safety Management System
(See IEM OPS 1.037)

(a) The operator shall implement a safety management system, as specified in ANTR Vol. III Part 19 – Safety Management acceptable to the BCAA, that as a minimum:

(1) identifies safety hazards;

(2) ensures that remedial action necessary to maintain an acceptable level of safety is implemented;

(3) provides for continuous monitoring and regular assessment of the safety level achieved; and

(4) aims to make continuous improvement to the overall level of safety.

(b) A safety management system shall clearly define lines of safety accountability throughout the operator's organization, including a direct accountability for safety on the part of senior management.

(c) The System shall include an occurrence reporting scheme to enable the collation and assessment of relevant incident and accident reports in order to identify adverse trends or to address deficiencies in the interests of flight safety. The scheme shall protect the identity of the reporter and include the possibility that reports may be submitted anonymously. (See AC OPS 1.037(c))

(d) The operator of an aeroplane of a certificated take-off mass in excess of 27000 kg shall establish and maintain a flight data analysis programme as part of its safety management system. (See AC OPS 1.037(d))

Note: The operator may contract the operation of a flight data analysis programme to another party while retaining overall responsibility for the maintenance of such a programme.

(e) The following table provides examples of Flight Data Analysis Programme (FDAP) events that may be further developed using operator and aeroplane specific limits. The table is considered illustrative and not extensive.

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

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

Normal Acceleration	High normal acceleration on ground High normal acceleration in flight flaps up (+/ increment) High normal acceleration in flight flaps down (+/ increment) High normal acceleration at landing
Abnormal Configuration	Take off configuration warning Early configuration change after take-off (flap) Speed brake with flap Speedbrake on approach below 800 ft AAL Speedbrake not armed below 800 ft AAL
Ground ProximityWarning	GPWS operation hard warning GPWS operation soft warning GPWS operation windshear warning GPWS operation false warning
TCAS Warning	TCAS operation – Resolution Advisory
Margin to Stall/Buffet	Stickshake False stickshake Reduced lift margin except near ground Reduced lift margin at take-off Low buffet margin (above 20000 ft)
Flight Manual Limitations	Vmo exceedence Mmo exceedence Flap placard speed exceedence Gear down speed exceedence Gear selection up/down speed exceedence Flap/Slat altitude exceedence Maximum operating altitude exceedence

(f) Until 6 November 2019, a flight data analysis programme shall be non-punitive and contain adequate safeguards to protect the source(s) of the data.

Note 1: Guidance on the establishment of flight data analysis programmes is included in the Manual on Flight Data Analysis Programmes (FDAP) (Doc 10000).

Note 2: Legal guidance for the protection of information from safety data collection and processing systems is contained in Attachment B to the first edition of Annex 19.

(g) As of 7 November 2019, a flight data analysis programme shall contain adequate safeguards to protect the source(s) of the data in accordance with Appendix 3 to Annex 19.

Note: Guidance on the establishment of flight data analysis programmes is included in the Manual on Flight Data Analysis Programmes (FDAP) (Doc 10000).

(h) Until 6 November 2019, the operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system.

Note: Guidance on the development and organization of a flight safety documents system is provided in Attachment F to ICAO Annex 6, Part 1.

(i) As of 7 November 2019, States shall not allow the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident as per Annex 13, except where the recordings or transcripts are:

1) related to a safety-related event identified in the context of a safety management system; are restricted to the relevant portions of a de-identified transcript of the recording; and are subject to the protections accorded by Annex 19;

2) sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to the protections accorded by Annex 19; or

3) used for inspections of flight recorder systems as provided in Appendix 1 to ANTR OPS 1.700 **(**Section 7 of Appendix 8 to ICAO Annex-6, Part-I).

Note: Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19. When an investigation under Annex 13 is instituted, investigation records are subject to the protections accorded by Annex 13.

(j) As of 7 November 2019, States shall not allow the use of recordings or transcripts of FDR, ADRS as well as Class B and Class C AIR and AIRS for purposes other than the investigation of an accident or incident as per Annex 13, except where the recordings or transcripts are subject to the protections accorded by Annex 19 and are:

(1) used by the operator for airworthiness or maintenance purposes;

(2) used by the operator in the operation of a flight data analysis programme required in this Annex;

(3) sought for use in proceedings not related to an event involving an accident or incident investigation;

(4) de-identified; or

(5) disclosed under secure procedures.

Note: Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to Annex 19.

(k) As of 7 November 2019, the operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system.

Note: Guidance on the development and organization of a flight safety documents system is provided in Attachment F to ICAO Annex 6, Part 1.

(l) Evaluation of relevant information relating to accidents and incidents and the promulgation of related information, but not the attribution of blame;

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

(n) The operator, as part of their SMS, shall implement and maintain an updated "Safety Risk Register" accessible to the BCAA, including fatigue hazards (AC OPS 1.037(l).

(o) The operator shall, as part of its safety management system, assess the level of rescue and fire fighting service (RFFS) protection available at any aerodrome intended to be specified in the operational flight plan in order to ensure that an acceptable level of protection is available for the aeroplane intended to be used.

Note: Annex 19 includes safety management provisions for air operators. Further guidance is contained in the Safety Management Manual (Doc 9859).

ANTR OPS 1.040 Additional crew members

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

ANTR OPS 1.045 Aircraft Tracking

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

Note: Guidance on aircraft tracking capabilities is contained in the Aircraft Tracking Implementation Guidance (Cir 347).

(b) The operator should track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the inflight operation(s) under the following conditions:

(1) the aeroplane has a maximum certificated take-off mass of over 27 000 kg and a seating capacity greater than 19; and

(2) where an ATS unit obtains aeroplane position information at greater than 15 minutes intervals.

Note1: Oceanic area, for the purpose of aircraft tracking, is the airspace which overlies waters outside the territory of a State.

Note2: See ICAO Annex 11 Chapter 2 for coordination between the operator and air traffic services provisions regarding position report messages.

Note 3: Operational procedures for monitoring the aircraft tracking information are contained in PANS-OPS, Volume III, Section 10.

(c) The operator shall track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the inflight operation(s) that is planned in an oceanic area(s) under the following conditions:

(1) the aeroplane has a maximum certificated take-off mass of over 45 500 kg and a seating capacity greater than 19; and

(2) where an ATS unit obtains aeroplane position information at greater than 15 minute intervals.

Note 1: Oceanic area - for the purpose of aircraft tracking is the airspace which overlies waters outside the territory of a State.

Note 2: See ICAO Annex 11 Chapter 2 for coordination between the operator and air traffic services provisions regarding position report messages.

(d) The operator shall establish procedures, approved by the BCAA, for the retention of aircraft tracking data to assist SAR in determining the last known position of the aircraft.

Note: Refer to ANTR OPS 1.175 (p) for operator responsibilities when using third parties for the conduct of aircraft tracking.

(e) Notwithstanding the provisions in (a) to (d), the BCAA may, based on the results of an approved risk assessment process implemented by the operator, allow for variations to automated reporting intervals. The process shall demonstrate how risks to the operation resulting from such variations can be managed and shall include at least the following:

(1) capability of the operator's operational control systems and processes, including those for contacting ATS units;

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

(3) available means to determine the position of, and communicate with, the aeroplane;

(4) frequency and duration of gaps in automated reporting;

(5) human factors consequences resulting from changes to flight crew procedures; and

(6) specific mitigation measures and contingency procedures.

Note: Guidance on development, implementation and approval of the risk assessment process which allows for variations to the need for automatic reporting and the required interval, including variation examples, is contained in the Aircraft Tracking Implementation Guidelines (Cir 347).

ANTR OPS 1.050 Search and rescue information

(a) The operator shall ensure that essential information pertinent to the intended flight concerning search and rescue services is easily accessible on the flight deck.

(b) All aeroplanes on all flights shall be equipped with the ground-air signal codes for search and rescue purposes.

ANTR OPS 1.055 Information on emergency and survival equipment carried

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

ANTR OPS 1.060 Ditching

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

ANTR OPS 1.065 Carriage of weapons of war and munitions of war

(See IEM OPS 1.065)

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

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

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

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

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

ANTR OPS 1.070 Carriage of sporting weapons and ammunition

(See IEM OPS 1.070)

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

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

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

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

(c) Ammunition for sporting weapons may be carried in passengers' checked baggage, subject to certain limitations, in accordance with the Technical Instructions (See ANTR OPS 1.1152(a)(15).

ANTR OPS 1.075 Method of carriage of persons

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

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

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

ANTR OPS 1.080 Carriage of Persons without compliance with the passenger-carrying requirements of this ANTR OPS 1

(a) In accordance with ANTR OPS 1.010, when authorized by the holder of an Air Operator Certificate (AOC), the following persons, but no others, may be carried aboard an airplane without complying with the passenger-carrying airplane requirements of ANTR OPS 1.100, 1.270, 1.285, 1.731, 1.735, 1.810, 1.815, 1.1255 and 1.990. Compliance is required for ANTRs not listed herein.

(1) A crewmember.

(2) A Company Employee

(3) A person with duties in respect of a particular shipment on board, who is assigned to perform the following:

(i) the safe handling of animals on the airplane.

(ii) the safe handling of hazardous materials (ANTR Vol. II, Part-18).

(iii) the preservation of fragile or perishable cargo

(iv) the operation of special equipment for loading or unloading cargo

(v) the security of valuable or confidential cargo

(vi) the loading or unloading of outsize cargo

(vii) performing duty as a security or an honor guard accompanying a shipment made by or under the authority of the Kingdom of Bahrain.

(viii) with a military courier or a military route supervisor carried by a military cargo contract operator if that carriage is specifically authorized by the appropriate military service.

(4) A person described in paragraph (a)(3) above, when traveling to or from his assignment.

(5) An authorized representative of the BCAA conducting an en-route inspection.

(6) A person authorized by the BCAA.

(b) The operator shall not operate an aircraft with persons listed above unless;

(1) Persons carried are able bodied adults;

(2) Each person has unobstructed access from his seat to the flight crew compartment or to a regular or emergency exit at any type of emergency situations;

(3) The pilot in command has a means of notifying each person when smoking is prohibited and when safety belts must be fastened; and

(4) The airplane has an approved seat with an approved safety belt for each person. The seat must be located so that the occupant is not in any position to interfere with the flight crew members performing their duties.

(5) Before each take-off, each AOC holder operating an airplane carrying persons covered above at Paragraph 1 above shall ensure that all such persons have been orally briefed by the appropriate crewmember on—

(i) Smoking;

(ii) The use of seat belts;

(iii) The location and operation of emergency exits;

(iv) The use of oxygen and emergency oxygen equipment, location and use of oxygen drop down mask; and

(v) When take-off or landing at an aerodrome where the take-off or approach path is so disposed over water that in the event of a mishap there would be likely hood of ditching or extended overwater operations, the location of life rafts, and the location and operation of life preservers such as jackets, floatation devices and rafts, including a demonstration of the method of donning and inflating a life preserver.

(6) Each certificate holder operating an airplane carrying persons covered by Paragraph 1 above shall incorporate procedures for the safe carriage of such persons into the certificate holder's operations manual.

(7) The pilot in command may authorize a person covered by Paragraph 1 above to be admitted to the Flight Crew compartment under the provisions of the Article 87 of the Civil Aviation Law 14 of 2013 and subject to the security protocol of the respective state.

(c) The Operators carrying persons under the supernumerary category, shall ensure that the conditions and limitations if any stipulated under AFM and the BCAA accepted TC / STC with respect to the safety & security of such persons carried onboard for the said purpose and operations regulation.

ANTR OPS 1.085 Crew responsibilities

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

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

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

(b) A crew member shall:

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

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

(3) Comply with the relevant requirements of the operator's occurrence reporting schemes in specific to ensuring that the remedial action necessary to maintain an acceptable level of safety is implemented, in accordance with ANTR OPS 1.037(a)(2); In all such cases, a copy of the report(s) shall be communicated to the commander concerned.

(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; and

(iii) make optimum use of the opportunities and facilities for rest provided and plan and use their rest periods properly.

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

(d) A crew member shall not perform duties on an aeroplane:

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

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

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

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

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

(e) A crew member shall not:

(1) Consume alcohol less than 8 hours prior to the specified reporting time for flight duty or the commencement of standby;

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

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

(f) The commander shall:

(1) Be responsible for the safety of all crew members, passengers and cargo on board, as soon as he arrives on board, until he leaves the aeroplane at the end of the flight;

(2) Be responsible for the operation and safety of the aeroplane from the moment the aeroplane is 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 units are shut down;

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

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

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

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

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

(8) Ensure that all operational procedures and check lists are complied with in detail in accordance with the Operations Manual.

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

(10) Not permit:

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

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

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

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

(13) Ensure that at least one member of the flight crew holds a valid licence authorising operation of the type of radio transmitting equipment to be used.

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

(h) The pilot-in-command shall be responsible for ensuring that a flight;

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

(2) will not be continued beyond the nearest suitable aerodrome when flight crew members’ capacity to perform functions is significantly reduced by impairment of faculties from causes such as fatigue, sickness, lack of oxygen.

ANTR OPS 1.090 Authority of the commander

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

ANTR OPS 1.095 Authority to taxi an aeroplane

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

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

(i) taxi the aeroplane;

(ii) use the radio telephone; and

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

ANTR OPS 1.100 Admission to flight deck

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

(1) An operating crew member;

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

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

(b) The commander shall ensure that:

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

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

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

ANTR OPS 1.105 Unauthorised carriage

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

ANTR OPS 1.110 Portable electronic devices

(See AMC OPS 1.110 and IEM OPS 1.110)

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

ANTR OPS 1.115 Alcohol and drugs

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

ANTR OPS 1.120 Endangering safety

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

(1) So as to endanger an aeroplane or person therein;

(2) So as to cause or permit an aeroplane to endanger any person or property.

ANTR OPS 1.125 Documents to be carried
(See Appendix 1 to ANTR OPS 1.125)

(a) The operator shall ensure that the following are carried on each flight:

(1) The Certificate of Registration;

(2) The Certificate of Airworthiness;

(3) The original or a copy of the Noise Certificate (if applicable), including an English translation, where one has been provided by the Authority responsible for issuing the noise certificate;

(4) The original or a certified true copy of the Air Operator Certificate including the operations specifications relevant to the aeroplane type, issued in conjunction with the certificate;

(5) The Aircraft Radio Licence;

(6) The original or a copy of the Insurance Certificate(s), which cover the aircraft, its crew, passengers and third party liability clauses.

(7) An aeroplane, when operating under an Article 83 *bis* agreement entered into between the State of Registry and the State of the Operator, shall carry a certified true copy of the agreement summary, in either an electronic or hard copy format. When the summary is issued in a language other than English, an English translation shall be included. This agreement summary shall be made accessible to a civil aviation inspector to determine which functions and duties are transferred under the agreement by the State of Registry to the State of Operator, when conducting surveillance activities, such as ramp checks.

Note: Guidance concerning the transfer of responsibilities by the State of Registry to the State of the Operator in accordance with Article 83 bis is contained in the Manual on the Implementation of Article 83 bis of the Convention on International Civil Aviation (Doc 10059).

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

(c) A copy of the Permit to Fly / Special Flight Approval / Authorisation should be on board the aircraft at all times when operating under the terms of the Permit to Fly / Special Flight Approval / Authorisation

ANTR OPS 1.130 Manuals to be carried

(a) The operator shall ensure that:

(1) The current parts of the Operations Manual relevant to the duties of the crew are carried on each flight (See AMC OPS 1.130);

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

(3) The current Aeroplane Flight Manual is carried in the aeroplane unless the BCAA has accepted that the Operations Manual prescribed in ANTR OPS 1.1045, Appendix 1, Part B contains relevant information for that aeroplane.

ANTR OPS 1.135 Additional information and forms to be carried

(See Appendix 1 to ANTR OPS 1.135)

(a) The operator shall ensure that, in addition to the documents and manuals prescribed in ANTR OPS 1.125 and ANTR OPS 1.130, the following information and forms, relevant to the type and area of operation, are carried on each flight:

(1) Operational Flight Plan containing at least the information required in ANTR OPS 1.1060;

(2) ANTR M.A.306 Operator’s technical log system;

(3) Details of the filed ATS flight plan;

(4) Appropriate NOTAM/AIS/AIP/AIRAC briefing documentation;

(5) Appropriate meteorological information;

(6) Mass and balance documentation as specified in Subpart J;

(7) Notification of special categories of passenger such as security personnel, if not considered as crew, handicapped persons, inadmissible passengers, deportees and persons in custody;

(8) Notification of special loads including dangerous goods including written information to the commander as prescribed in ANTR OPS 1.1215(c);

(9) Current maps and charts and associated documents as prescribed in ANTR OPS 1.290(b)(7);

(10) Any other documentation which may be required by the States concerned with this flight, such as cargo manifest, passenger manifest, certificates etc; and

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

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

ANTR OPS 1.140 Information retained on the ground

(a) The operator shall ensure that:

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

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

(ii) The information is retained until it has been duplicated at the place at which it will be stored in accordance with ANTR OPS 1.1065; or, if this is impracticable,

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

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

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

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

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

(4) Mass and balance documentation if required (ANTR OPS 1.625 refers); and

(5) Special loads notification.

ANTR OPS 1.145 Power to inspect

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

ANTR OPS 1.150 Production of documentation and records

(a) The operator shall:

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

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

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

ANTR OPS 1.155 Preservation of documentation

(a) The operator shall ensure that:

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

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

ANTR OPS 1.160 Preservation, production and use of flight recorder recordings

(See AC OPS 1.160(a)(1) & (2)

(a) *Preservation of recordings*

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

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

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

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

(i) Save the recordings for the period of operating time as required by ANTR OPS 1.705, 1.710, and 1.715, except that, for the purpose of testing and maintaining flight data recorders, up to one hour of the oldest recorded material at the time of testing may be erased; and

(ii) Keep a document which presents the information necessary to retrieve and convert the stored data into engineering units. The documentation must be updated at regular intervals and shall contain;

(A) flight data recorder parameter allocations;

(B) conversion equations;

(C) periodic calibration records; and

(D) other serviceability/maintenance information.

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

(c) *Use of recordings*

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

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

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

(ii) De-identified; or

(iii) Disclosed under secure procedures.

ANTR OPS 1.165 Leasing

(a) *Terminology*

Terms used in this paragraph have the following meaning:

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

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

(b) *(Reserved)*

(c) *Leasing of aeroplanes between the operator and any entity*

(1) *Dry lease-in*

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

(ii) The operator shall ensure that, with regard to aeroplanes that are dry leased-in, any differences from the requirements prescribed in Subparts K, L, and/or ANTR M, are notified to and are acceptable to the BCAA.

(2) *Wet lease-in*

(See AC OPS 1.165(c)(2))

(i) The operator shall not wet lease-in an aeroplane from an entity without the approval of the BCAA.

(ii) The operator shall ensure that, with regard to aeroplanes that are wet leased-in:

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

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

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

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

(3) *Dry lease-out*

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

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

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

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

ANTR OPS 1.170 *Intentionally blank*

Appendix 1 to ANTR OPS 1.005(a)

Operations of performance Class B aeroplanes.
(See AC to Appendix 1 to ANTR OPS 1.005(a))

(a) *Terminology*

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

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

(3) Night – The hours between the end of evening civil twilight and the beginning of morning civil twilight or such other period between sunset and sunrise, as may be prescribed by the appropriate authority. (See AC to Appendix 1 to ANTR OPS 1.005(a) para 7)

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

(1) *ANTR OPS 1.035 Quality System*:

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

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

(2) *ANTR OPS 1.037 Safety Management System*:

(See AC to Appendix 1 to ANTR OPS 1.005 (a))

(3) *ANTR OPS 1.075 Methods of carriage of persons:*

Not required for VFR operations of single engine aeroplanes.

(4) *ANTR OPS 1.100 Admission to the flight deck:*

(i) The operator must establish a suitable procedure for the carriage of authorised persons required to be accommodated in flight deck .

(5) *ANTR OPS 1.105 Unauthorised Carriage:*

Not required for VFR operations of single engine aeroplanes.

(6) *ANTR OPS 1.135 Additional information and forms to be carried*:

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

(A) Operational Flight Plan;

(B) Aeroplane Technical Log;

(C) NOTAM/AIS briefing documentation;

(D) Meteorological Information;

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

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

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

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

(7) *ANTR OPS 1.215 Use of Air Traffic Services:*

For VFR operations of single engine aeroplanes by day, non-mandatory contact with ATS shall be maintained to the extent appropriate to the nature of the operation. Search and rescue services must be ensured in accordance with ANTR OPS 1.300.

(8) *ANTR OPS 1.225 Aerodrome Operating Minima:*

For VFR operations, the standard VFR operating minima will normally cover this requirement. Where necessary, the operator shall specify additional requirements taking into account such factors as radio coverage, terrain, nature of sites for take-off and landing, flight conditions and ATS capacity

(9) *ANTR OPS 1.235 Noise abatement procedures:*

Not applicable to VFR operations of single engine aeroplanes.

(10) *ANTR OPS 1.240 Routes and Areas of Operation:*

Subparagraph (a)(1) is not applicable to A to A VFR operations of single engine aeroplanes by day.

(11) *ANTR OPS 1.250 Establishment of minimum flight altitudes:*

For VFR operations by day, this requirement is applicable as follows. The operator shall ensure that operations are only conducted along such routes or within such areas for which a safe terrain clearance can be maintained and shall take account of such factors as temperature, terrain, unfavourable meteorological conditions (e.g. severe turbulence and descending air currents, corrections for temperature and pressure variations from standard values).

(12) *ANTR OPS 1.255 Fuel Policy*:

(i) For A to A Flights - The operator shall specify the minimum fuel contents at which a flight must end. This minimum, final reserve, fuel must not be less than the amount needed to fly for a period of 45 minutes.

(ii) For A to B Flights – The operator shall ensure that the pre-flight calculation of usable fuel required for a flight includes;

(A) Taxi fuel - Fuel consumed before take-off, if significant; and

(B) Trip fuel (Fuel to reach the destination); and

(C) Reserve fuel -

(1) Contingency fuel - Fuel that is not less than 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

(2) Final reserve fuel - Fuel to fly for an additional period of 45 minutes (piston engines) or 30 minutes (turbine engines); and

(D) Alternate fuel - Fuel to reach the destination alternate via the destination, if a destination alternate is required

(E) Extra fuel – Fuel that the commander may require in addition to that required under subparagraphs (A) – (D) above.

(13) *ANTR OPS 1.265 Carriage of inadmissible passengers, deportees or persons in custody:*

For VFR operations of single engine aeroplanes and where it is not intended to carry inadmissible passengers, deportees or persons in custody, the operator is not required to establish procedures for the carriage of such passengers.

(14) *ANTR OPS 1.280 Passenger Seating*:

Not Applicable to VFR operations of single engine aeroplanes.

(15) *ANTR OPS 1.285 Passenger Briefing:*

Demonstration and briefing shall be given as appropriate to the kind of operations. In single pilot operations, the pilot may not be allocated tasks distracting him from his flying duties.

(16) *ANTR OPS 1.290 Flight Preparation*:

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

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

(17) *ANTR OPS 1.295 Selection of aerodromes:*

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

(18) *ANTR OPS 1.310 Crew members at stations:*

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

(19) *ANTR OPS 1.375 In-flight fuel management:*

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

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

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

Not applicable to VFR operations.

(22) *ANTR OPS 1.430 to 1.460, including appendices:*

Not applicable to VFR operations.

(23) *ANTR OPS 1.530 Take-off*:

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

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

(A) Specify the type of aeroplane;

(B) Specify the type of operation;

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

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

(E) Specify the crew qualification, and

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

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

(24) *ANTR OPS 1.535 Take-off Obstacle Clearance – Multi-Engined aeroplanes*:

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

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

(A) Visual course guidance is considered available when the flight visibility is 1 500 m or more

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

(25) *ANTR OPS 1.545 Landing Destination and Alternate Aerodromes*:

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

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

(A) Specify the type of aeroplane;

(B) Specify the type of operation;

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

(D) Restrict the final approach and landing to be conducted under VMC;

(E) Specify the crew qualification, and

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

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

(26) *ANTR OPS 1.550 Landing Dry Runways:*

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

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

(A) Specify the type of aeroplane;

(B) Specify the type of operation;

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

(D) Restrict the final approach and landing to be conducted under VMC;

(E) Specify the crew qualification; and

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

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

(27) *Reserved*

(28) *ANTR OPS 1.650 Day VFR operations*:

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

(29) *ANTR M.A.704 Continuing airworthiness management exposition (CAME & its Interface Procedure document between Operator, CAMO and AMO)*

The operator shall keep a current approved continuing airworthiness management exposition as prescribed in ANTR M.A.704 Continuing airworthiness management exposition and the manual to describe the interface procedures adopted between the Operator, CAMO & AMO.

(30) *ANTR M.A.306 Operator's technical log system:*

(See AC to Appendix 1 to ANTR OPS 1.1005(a))

The BCAA may approve an abbreviated form of Technical Log System, relevant to the type of operation conducted.

(31) *ANTR OPS 1.940 Composition of Flight Crew:*

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

(32) *ANTR OPS 1.945 Conversion training and checking:*

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

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

(33) *ANTR OPS 1.955 Nomination as commander:*

Subparagraph (b) applies as follows.

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

(34) *ANTR OPS 1.960 Commanders holding a Commercial Pilot Licence*

Subparagraph (a)(1)(i) is not applicable to VFR operations by day.

(35) *ANTR OPS 1.965 Recurrent training and checking:*

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

(ii) Subparagraph (a)(3(ii) applies as follows. Training in the aeroplane may be conducted by a Type Rating Examiner (TRE).

(iii) Subparagraph (a)(4)(i) applies as follows. Operator proficiency check may be conducted by a Type Rating Examiner (TRE).

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

(36) *ANTR OPS 1.968 Pilot qualification for either pilot's seat:*

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

(37) *ANTR OPS 1.975 Route and Aerodrome Competence:*

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

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

(A) Except for operations to the most demanding aerodromes, by completion of at least 10 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 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 VMC from the applicable minimum sector altitude; and

(3) An adequate self-briefing has been made prior to the flight

(38) *ANTR OPS 1.980 More than one type or variant:*

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

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

(39) *ANTR OPS 1.981 Operation of helicopters and aeroplanes*:

Subparagraph (a)(1) is not applicable if operations are limited to single pilot classes of piston engine aeroplanes.

(40) *ANTR OPS 1.1045 Operations Manual – structure and contents*:

See AMC OPS 1.1045

(41) *ANTR OPS 1.1060 Operational flight plan:*

Not required for A to A VFR/Day operations. For A to B VFR/Day operations the requirement is applicable, but the flight plan may be in a simplified form relevant to the kind of operations conducted. (cf. ANTR OPS 1.135).

(42) *ANTR OPS 1.1070 CAME & its Interface Procedure document between Operator, CAMO and*:

The operator shall keep a current approved continuing airworthiness management exposition as prescribed in ANTR M.A.704 Continuing airworthiness management exposition and the manual to describe the interface procedures adopted between the Operator, CAMO & AMO.

(43) *ANTR OPS 1.1071 Aeroplane technical log:*

Applicable as indicated for ANTR M.A 306 Operator’s technical log system

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

See AC to Appendix 1 to ANTR OPS 1.005(a)

(45) *ANTR OPS 1.1235 Security requirements:*

See AC to Appendix 1 to ANTR OPS 1.005(a)

(46) *ANTR OPS 1.1240 Training programmes:*

The training programmes shall be adapted to the kind of operations performed. A self-study training programme may be acceptable for VFR operations.

(47) *ANTR OPS 1.1250 Aeroplane search procedure checklist:*

Not applicable for VFR operations by day.

Appendix 1 to ANTR OPS 1.125

Documents to be carried

See ANTR OPS 1.125

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

(b) The Article 83 bis agreement summary should contain the information in the template below, in a standardized format suggested below.

<table>
<tr><th colspan="5">ARTICLE 83 bis AGREEMENT SUMMARY</th></tr>
<tr><td colspan="2">Title of the Agreement:</td><td colspan="3"></td></tr>
<tr><td colspan="2">State of Registry:</td><td colspan="2"></td><td>Focal point:</td></tr>
<tr><td colspan="2">State of the principal location of a general aviation operator:</td><td colspan="2"></td><td>Focal point:</td></tr>
<tr><td colspan="2" rowspan="2">Date of signature:</td><td colspan="3">By State of Registry[1]:</td></tr>
<tr><td colspan="3">By State of the operator[1]:</td></tr>
<tr><td colspan="2">Duration:</td><td colspan="2">Start Date[1]:</td><td>End Date (if applicable)[2]:</td></tr>
<tr><td colspan="2">Languages of the Agreement</td><td colspan="3"></td></tr>
<tr><td colspan="2">ICAO Registration No.:</td><td colspan="3"></td></tr>
<tr><td colspan="2">Umbrella Agreement (if any) with ICAO Registration number:</td><td colspan="3"></td></tr>
<tr><th>Convention on International Civil Aviation</th><th colspan="4">ICAO Annexes affected by the transfer of responsibility in respect of certain functions and duties to the State of the operator.</th></tr>
<tr><td>Article 12: Rules of the air</td><td colspan="2">Annex 2, all chapters</td><td>Yes ☐
No ☐</td><td></td></tr>
<tr><td>Article 30 a): Aircraft radio equipment</td><td colspan="2">radio station licence</td><td>Yes ☐
No ☐</td><td></td></tr>
<tr><td>Articles 30 b) and 32 a): Licenses of personnel</td><td colspan="2">Annex 1, Chapters 1, 2, 3 and 6; andAnnex 6 Part I (radio operator); or Annex 6, Part III, Section II, (composition ofthe flight crew (radio operator); and/or Annex 6, Part II (qualifications and/or flight crew member licensing); or Annex 6, Part III, Section III (qualifications)</td><td>Yes ☐
No ☐</td><td>Annex 6: [Specify Part and paragraph][3]</td></tr>
<tr><td rowspan="3">Article 31: Certificates ofAirworthiness</td><td colspan="2">Annex 6
Part I or Part III, Section II</td><td>Yes ☐
No ☐</td><td>[Specify Part and chapters][3]</td></tr>
<tr><td colspan="2">Annex 6
Part II or Part III, Section III</td><td>Yes ☐
No ☐</td><td>[Specify Part and chapters][3]</td></tr>
<tr><td colspan="2">Annex 8
Part II, Chapters 3 and 4</td><td>Yes ☐
No ☐</td><td>[Specify chapters][3]</td></tr>
</table>

Aircraft affected by the transfer of responsibilities to the State of the operator / State of the principal location of a general aviation operator					
Aircraft make, model, series	Nationality and registration marks	Serial No.	AOC No. (Commercial air transport)	Dates of transfer of responsibilities	
				From[1]	To (if applicable)[2]

Notes:

1. *dd/mm/yyyy.*
2. *dd/mm/yyyy or N/A if not applicable.*
3. *Square brackets indicate information that needs to be provided.*

Appendix 1 to ANTR OPS 1.135

Additional information and forms to be carried

See ANTR OPS 1.135

The BCAA may authorise an alleviation against the non-carriage of specific documents for flights within the Bahraini FIR.

SUBPART C – OPERATOR CERTIFICATION AND SUPERVISION

ANTR OPS 1.175 General rules for Air Operator Certification/Authorisation

Note 1: Appendix 1 to this paragraph specifies the contents, specific approvals, conditions and limitations of the AOC/Authorisation.

Note2: Appendix 2 to this paragraph specifies the management and organisation requirements.

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

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

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

Note: Unless otherwise specified, reference to an Air Operator Certificate includes the operations specifications associated with the air operator certificate.

(c) For private aircraft operations, an Authorisation shall authorise the operator to conduct private operations in accordance with the operations specifications.

(d) An applicant for an AOC/Authorisation, or variation of an AOC/Authorisation, shall allow the BCAA to examine all safety aspects of the proposed operation.

(e) An applicant for an AOC/Authorisation must:

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

(2) Have his principal place of business and, if any, his registered office located in Bahrain; (See IEM OPS 1.175(e)(2));

(3) Have registered the aeroplanes which are to be operated under the AOC/Authorisation in the Kingdom of Bahrain; and

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

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

(g) The operator shall grant the BCAA access to his organisation and aeroplanes and shall ensure that, with respect to maintenance, access is granted to any associated ANTR 145 maintenance organisation, to determine continued compliance with ANTR–OPS.

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

(i) The operator must satisfy the BCAA that;

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

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

(j) The operator must have nominated an accountable manager acceptable to the BCAA who has corporate authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the BCAA. (See AC OPS 1.035)

(k) The operator must have nominated post holders, acceptable to the BCAA, who are responsible for the management and supervision of the following areas,

(1) Flight operations;

(2) The maintenance system;

(3) Crew training;

(4) Ground operations;

(5) Quality Assurance. (See AC OPS 1.175(k))

(l) A person may hold more than one of the nominated posts if acceptable to the BCAA but, for operators who employ 21 or more full time staff, a minimum of two persons are required to cover the four areas of responsibility. (See AC OPS 1.175(l) & (m).)

(m) For operators who employ 20 or less full time staff, one or more of the nominated posts may be filled by the accountable manager if acceptable to the BCAA. (See AC OPS 1.175(l) & (m).)

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

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

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

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

(r) The operator must comply with the maintenance requirements, in accordance with ANTR M, for all aeroplanes operated under the terms of its AOC/Authorisation.

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

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

(u) The operator shall not establish an operating base in another State, without prior approval from the BCAA and notification to the Authority of the State in which the operating base is located.

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

(a) The operator will not be granted an AOC/Authorisation, or a variation to an AOC/Authorisation, and that AOC/Authorisation will not remain valid unless:

(1) Aeroplanes operated have a valid Certificate of Airworthiness;

(2) The maintenance system has been approved by the BCAA in accordance with ANTR M; and

(3) He has satisfied the BCAA that he has the ability to:

(i) Establish and maintain an adequate organisation;

(ii) Establish and maintain a quality system in accordance with ANTR OPS 1.035,

(iii) Comply with required training programmes;

(iv) Comply with maintenance requirements, consistent with the nature and extent of the operations specified, including the relevant items prescribed in ANTR OPS 1.175(g) to (o); and

(v) Comply with ANTR OPS 1.175.

(b) Notwithstanding the provisions of ANTR OPS 1.185(f), the operator must notify the BCAA as soon as practicable of any changes to the information submitted in accordance with ANTR OPS 1.185(a) below.

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

(d) The BCAA has established a system for both the certification and the continued surveillance of the operator to ensure that the required standards of operations established in this Subpart are maintained.

ANTR OPS 1.185 Administrative requirements

(a) The operator shall ensure that the following information is included in the initial application for an AOC/Authorisation and, when applicable, any variation or renewal applied for:

(1) The official name and business name, address and mailing address of the applicant;

(2) A description of the proposed operation;

(3) A description of the management organisation;

(4) The name of the accountable manager;

(5) The names of major post holders, including those responsible for flight operations, the maintenance system, crew training and ground operations together with their qualifications and experience; and

(6) The Operations Manual.

(b) In respect of the operator’s maintenance system only, the following information must be included in the initial application for an AOC/Authorisation and, when applicable, any variation or renewal applied for, and for each aeroplane type to be operated (see IEM OPS 1.185(b)):

(1) The operator's Maintenance Management Exposition;

(2) The operator’s aeroplane maintenance programme(s);

(3) The aeroplane technical log;

(4) Where appropriate, the technical specification(s) of the maintenance contract(s) between the operator and any approved maintenance organisation;

(5) The number of aeroplanes.

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

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

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

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

ANTR OPS 1.190 *Intentionally blank*

Appendix 1 to ANTR OPS 1.175

Contents and conditions of the Air Operator Certificate/Authorisation

1. The air operator certificate shall contain at least the following information;

(a) The State of the Operator and the issuing authority;

(b) The air operator certificate number and its expiration date;

(c) The operator name, trading name (if different) address of the (principal place of business;

(d) Date of issue and name, signature and title of the authority representative; and

(e) The location, in a controlled document carried on board, where the contact details of operational management can be found.

2. The operations specifications associated with the air operator certificate shall contain at least the information for each aircraft model in the operator’s fleet, identified by aircraft make, model and series, the following list of authorisations, conditions and limitations shall be included:

(a) issuing authority contact details, operator name and AOC number, date of issue and signature of the authority representative, aircraft model, types and area of operations.

(b) Special limitations; and

(c) Special authorisations/Specific Approvals/Remarks e.g.:

(1) Dangerous Goods

(2) Low Visibility Operations (including CAT II/CAT III and approved minima)

(3) RVSM

(4) EDTO with threshold time and maximum diversion time

(5) Navigation specifications for PBN operations

(6) Continuing airworthiness

(7) EFB

(8) Other; such as

(i) special aerodrome operations (e.g. short take-off and landing operations or land and hold short operations);

(ii) special approach procedures (e.g. steep gradient approach, instrument landing system precision runway monitor approach, localizer-type directional aid precision runway monitor approach, RNP approach);

(iii) single-engine passenger transport at night or in instrument meteorological conditions; and

(iv) operations in areas with special procedures (e.g. operations in areas using different altimetry units or altimeter setting procedures).

Note: Private Authorisations may follow the same format

Appendix 2 to ANTR OPS 1.175

The management and organisation of an AOC/Authorisation holder

The issue of an air operator certificate by the Authority shall be dependent upon the operator demonstrating an adequate organization, method of control and supervision of flight operations, training programme as well as ground handling and maintenance arrangements consistent with the nature and extent of the operations specified.

These demonstrations should be in addition to the review or inspections of manuals, records, facilities and equipment. Some of the specific approvals and approvals required by this ANTR, such as specific approval for Category III low visibility operations, have significant safety implications and should be validated by demonstration before the BCAA approves authorizes such operations.

The continued validity of an air operator certificate/Authorisation shall depend upon the operator maintaining these requirements under the supervision of the Authority.

In particular;

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

(b) *Nominated post holders*

(1) A description of the functions and the responsibilities of the nominated post holders, including their names, must be contained in the Operations Manual and the BCAA must be given notice in writing of any intended or actual change in appointments or functions.

(2) The operator must make arrangements to ensure continuity of supervision in the absence of nominated post holders.

(3) A person nominated as a post holder by the holder of an AOC/Authority must not be nominated as a post holder by the holder of any other AOC/Authority, unless acceptable to the Authorities concerned.

(4) Persons nominated as post holders must be contracted to work sufficient hours to fulfil the management functions associated with the scale and scope of the operation.

(c) *Adequacy and supervision of staff*

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

(2) *Ground Staff*

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

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

(3) *Supervision*

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

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

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

(d) *Accommodation facilities*

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

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

(e) *Documentation.* The operator must make arrangements for the production of manuals, amendments and other documentation.

<table>
<tr><td colspan="3">AIR OPERATOR CERTIFICATE</td></tr>
<tr><td>[1]For the use by BCAA</td><td>[2] (State of the Operator)
KINGDOM OF BAHRAIN</td><td>[1]For the use by BCAA</td></tr>
<tr><td colspan="3">[3] (Issuing Authority)
CIVIL AVIATION AFFAIRS
Tel.: (+973) 17 321091 Fax: (+973) 17 321061 E-mail: aerolicensing@mtt.gov.bh
Address: P. O. Box 586, Kingdom of Bahrain</td></tr>
<tr><td>[4]AOC#: BH-----
[5]Expiry Date:
---------------------------</td><td>[6]Operator Name
[7]Dba Trading Name:
[8]Operator Address:
Kingdom of Bahrain
[9]Telephone: (+973)
Telephone: (+973)
Fax: (+973)
Email:</td><td>[10]Operational Point of Contact:
[11]Contact details, at which Operational Management can be contacted without undue delay, are listed in the Operations Manual Part A 1.2.</td></tr>
<tr><td colspan="3">This certificate certifies that ----------------------------[12] is authorized to perform commercial air operations, as defined in the attached operations specifications, in accordance with the operations manual and the Air Navigational Technical Regulations (ANTR)[13].</td></tr>
<tr><td>[14]Date of Issue:</td><td colspan="2">[15]Authorized Signature: ____________________________________
(Name)
(Title) Undersecretary for Civil Aviation Affairs</td></tr>
</table>

Note: See overleaf for the Operations Specification

Instructions:

1. *For use by BCAA (file reference).*
2. *Kingdom of Bahrain.*
3. *Bahrain Civil Aviation Affairs.*
4. *Unique AOC number, as issued by BCAA.*
5. *Date after which the AOC ceases to be valid (dd-mm-yyyy).*
6. *Replace by the operator's registered name.*
7. *Operator's trading name, if different. Insert "dba" before the trading name (for "doingbusiness as").*
8. *Operator's principal place of business address.*
9. *Operator's principal place of business telephone and fax details, including the country code.E-mail to be provided if available.*
10. *The contact details include the telephone and fax numbers, including the country code, and the e-mail address (if available) at which operational management can be contacted withoutundue delay for issues related to flight operations, airworthiness, flight and cabin crew competency, dangerous goods and other matters as appropriate.*
11. *Insert the controlled document, carried on board, in which the contact details are listed,with the appropriate paragraph or page reference, e.g.:"Contact details are listed in the operations manual, Gen/Basic, Chapter 1, 1.1" or "... are listed in the operations specifications, page 1" or "... are listed in an attachment to this document".*
12. *Operator's registered name.*
13. *Insertion of reference to the appropriate civil aviation regulations.*
14. *Issuance date of the AOC (dd-mm-yyyy).*
15. *Title, name and signature of the authority representative. In addition, an official stamp maybe applied on the AOC.*

Note: *The AOC and its Operations Specifications shall be prepared as per the methodology mentioned below:*

(a) *The AOC shall indicate the Appendices made applicable to each Operations Specifications for the respective aircraft type series on the overleaf (on the reverse page of the AOC)*

(b) *The operations Specifications attached as Appendices to the main AOC shall indicate the details showing the applicability of the aircraft (Tail Number / Registration Number) against each such specifications approved. These Appendices comprising of the Operations Specification may have number of pages based on the number of Operations Specification granted.*

OPERATIONS SPECIFICATIONS

(subject to the approved conditions in the operations manual)

Ref.: ALD/OPS/6/--

Bahrain Civil Aviation Affairs

[1]**Telephone:** (+973) - - - - - - - - **Fax:** (+973) - - - - - - - - - **Email:** aerolicensing@mtt.gov.bh

[2]AOC#: [3] Operator Name: [4]Date:

[3]Dba (Doing Business As) trading Name:

Authorised Signature:____

[5]Aircraft Model:

Type of operation: Commercial Air Transportation ☐ Passengers ☐ Cargo ☐ [6]Others:

[7]Area(s) of operation:

[8]Special limitations:

SPECIAL APPROVAL	YES	NO	[9]DESCRIPTION	REMARKS
Dangerous goods	☐	☐		
Low visibility operation				
Approach and landing	☐	☐	[10]CAT____ RVR DH:	
Take-Off	☐	☐	[11]RVR	
Operational credit(s)	☐	☐	[12]	
[13]RVSM ☐ N/A	☐	☐		
[14] EDTO ☐ N/A	☐	☐	[15]Threshold time_____ minutes [15]Maximum Diversion Time______minutes	
AIR navigation specifications for PBN operations	☐	☐	[16]	
Continuing Airworthiness			[17]	
EFB	☐	☐	[18]	
[19]Other	☐	☐		

Note: See overleaf for the details of Operations Specification

Filling Instructions: -

1. *Telephone and fax contact details of the authority, including the country code. Email and fax to be provided if available.*
2. *Insert the associated AOC number.*
3. *Insert the operator's registered name and the operator's trading name, if different. Insert "dba" before the trading name (for "doing business as").*
4. *Issuance date of the operations specifications (dd-mm-yyyy) and signature of the authority representative.*
5. *Insert the ICAO designation of the aircraft make, model and series, or master series, if a series has been designated (e.g. Boeing-737-3K2 or Boeing-777-232). The CAST/ICAO taxonomy is available at: http://www.intlaviationstandards.org/.*
6. *Other types of transportation to be specified (e.g. emergency medical service).*
7. *List the geographical area(s) of authorized operation (by geographical coordinates or specific routes, flight information region or national or regional boundaries). as defined by the issuing authority.*
8. *List the applicable special limitations (e.g. VFR only, day only).*
9. *List in this column the most permissive criteria for each specific approval or the approval type (with appropriate criteria).*
10. *Insert the applicable precision approach category (CAT II or III). Insert the minimum RVR in metres and decision height in feet. One line is used per listed approach category.*
11. *Insert the approved minimum take-off RVR in metres, or the equivalent horizontal visibility if RVR is not used. One line per approval may be used if different approvals are granted.*
12. *List the airborne capabilities (eg. automatic landing, HUD, EVS, SVS, CVS) and associated operational credit(s) granted.*
13. *"Not applicable (N/A)" box may be checked only if the aircraft maximum ceiling is below FL 290.*
14. *If extended diversion time operations (EDTO) specific approval does not apply based on the provisions in ANTR OPS 1, 1.245 and 1.246 select "N/A". Otherwise a threshold time and maximum diversion time must be specified.*
15. *The threshold time and maximum diversion time may also be listed in distance (NM). Details of each particular aeroplane-engine combination for which the threshold time is established, and maximum diversion time has been granted may be listed under 'remarks'. One line per approval may be used if different approvals are granted.*
16. *Performance-based navigation (PBN): one line is used for each PBN AR navigation specification approval (e.g. RNP AR APCH), with appropriate limitations listed in the "Description" column.*
17. *Insert the name of the person/organization responsible for ensuring that the continuing airworthiness of the aircraft is maintained and the regulation that requires the work, i.e. within the AOC regulation or a specific approval (e.g. Name of the Continuing Airworthiness Management Organisation: e.g. XYX…., Approval Reference No:. e.g. ANTR-M/8/12.2, & Scope: e.g.. ANTR-M, Subpart G).*
18. *List the EFB functions used for the safe operation of aeroplanes and any applicable limitations.*
19. *Other authorizations or data can be entered here, using one line (or one multi-line block) per authorization (e.g. special approach authorization, NAT HLA, approved navigation performance).*

SUBPART D – OPERATIONAL PROCEDURES

ANTR OPS 1.192 Terminology

(a) The terms which are listed here are used in Subpart D, but not defined in ANTR Part 1. They have the following meaning:

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

(2) Adequate EDTO: En Route Alternate Aerodrome: An adequate aerodrome, which additionally at the expected time of use has an ATC facility and at least one instrument approach procedure.

(3) En-Route Alternate (ERA) Aerodrome: An adequate aerodrome along the route, which may be required at the planning stage.

(4) 3% ERA: An en-route alternate aerodrome selected for the purposes of reducing contingency fuel to 3%.

(5) Isolated Aerodrome: If acceptable to the authority the destination aerodrome can be considered as an Isolated Aerodrome, if the fuel required (diversion plus final) to the nearest adequate destination alternate aerodrome is more than:

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

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

(6) Equivalent Position: a position that can be established by means of a DME distance, a suitably located NDB or VOR, SRE or PAR fix or any other suitable fix between 3 and 5 miles from threshold that independently establishes the position of the aeroplane.

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

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

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

(10) Extended diversion time operations (EDTO). Any operation by an aeroplane with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established by the BCAA.

(11) Dispatch. EDTO planning minima apply until dispatch. Dispatch is when the aircraft first moves under its own power for the purpose of taking off.

ANTR OPS 1.195 Operational Control
(See AC OPS 1.195)

(a) The operator shall:

(1) Establish and maintain a method of exercising operational control approved by the BCAA; and

(2) Exercise operational control over any flight operated under the terms of his AOC/Authorisation.

(b) Responsibility for operational control shall be delegated only to the pilot-in-command and to a flight dispatcher if the operator's approved method of control and supervision of flight operations requires the use of flight dispatcher personnel.

(c) If an emergency situation which endangers the safety of the aeroplane or persons becomes known first to the flight dispatcher, action by that person shall include, where necessary, notification to the appropriate authorities of the nature of the situation without delay, and requests for assistance if required. In the event of an emergency, a flight dispatcher shall:

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

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

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

(d) If an emergency situation which endangers the safety of the aeroplane or persons necessitates the taking of action which involves a violation of local regulations or procedures, the pilot-in-command shall notify the appropriate local authority without delay. If required by the State in which the incident occurs, the pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the pilot-in-command shall also submit a copy of it to the BCAA. Such reports shall be submitted as soon as possible and normally within ten days.

ANTR OPS 1.200 Operations manual

The operator shall provide an Operations Manual in accordance with Subpart P for the use and guidance of operations personnel.

ANTR OPS 1.205 Competence of operations personnel
(See AC OPS 1.205)

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.

ANTR OPS 1.207 Flight Dispatcher

(a) When the BCAA requires that a flight dispatcher, employed in conjunction with an approved method of control and supervision of flight operations, be licensed, that flight dispatcher shall be licensed in accordance with the provisions of ANTR Part II, Chapter 4.

(b) In accepting proof of qualifications other than the option of holding of a flight dispatcher licence, the BCAA, in accordance with the approved method of control and supervision of flight operations, shall require that, as a minimum, such persons meet the requirements specified in ANTR Part II, Chapter 4 for the flight dispatcher licence.

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

(1) assist the commander in flight preparation and provide the relevant information;

(2) assist the commander in preparing the operational and ATS flight plans (including identification of en-route alternates where appropriate), sign when applicable and file the ATS flight plan with the appropriate ATS unit; and

(3) furnish the commander while in flight, by appropriate means, with information which may be necessary for the safe conduct of the flight.

(4) The information provided in (3) shall, for operations beyond 60 minutes from a point on a route to an en-route alternate aerodrome, include information on availability and meteorological conditions at such aerodromes for their estimated time of use.

(5) notify the appropriate ATS unit when the position of the aeroplane cannot be determined by an aircraft tracking capability and attempts to establish communication are unsuccessful.

(d) A flight dispatcher shall not be assigned to duty unless that person has:

(1) satisfactorily completed the operator-specific training course that addresses all the specific components of its approved method of control and supervision of flight operations specified in ANTR OPS 1.175 and 1.180;

Note: Guidance on the composition of such training syllabi is provided in the Training Manual (ICAO DOC 7192), Part D-3 – Flight Operations Officers / Flight Dispatchers

(2) made, within the preceding 12 months, at least a one way qualification flight in the flight crew compartment of an aeroplane over any area for which that individual is authorised to exercise flight supervision. The flight should include landings at as many aerodromes as practicable;

Note: For the purpose of the qualification flight, the flight dispatcher must be able to monitor the flight crew intercommunication system and radio communications, and be able to observe the actions of the flight crew.

(3) demonstrated to the operator a knowledge of:

(i) the contents of the operations manual;

(ii) the radio equipment in the aeroplanes used; and

(iii) the navigation equipment in the aeroplanes used;

(4) demonstrated to the operator a knowledge of the following details concerning operations for which the officer is responsible and areas in which that individual is authorised to exercise flight supervision:

(i) the seasonal meteorological conditions and the sources of meteorological information;

(ii) the effects of meteorological conditions on radio reception in the aeroplanes used;

(iii) the peculiarities and limitations of each navigation system which is used by the operation; and

(iv) the aeroplane loading instructions;

(5) demonstrated to the operator knowledge and skills related to human performance relevant to dispatch duties; and

(6) demonstrated to the operator the ability to perform the duties specified in ANTR OPS 1.195.

(7) maintained complete familiarization with all features of the operation which are pertinent to such duties, including knowledge and skills related to human performance.

Note: Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factor Training Manual (ICAO DOC 9683)

(e) A flight dispatcher should not be assigned to duty after 12 consecutive months of absence from such duty, unless the provisions of paragraph (d) above are met.

ANTR OPS 1.210 Establishment of procedures

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

(b) The operator shall establish a check-list system to be used by crew members for all phases of operation of the aeroplane under normal, abnormal and emergency conditions as applicable, to ensure that the operating procedures in the Operations Manual are followed. (See IEM OPS 1.210 (b).)

(c) The operator shall not require a crew member to perform any activities during critical phases of the flight other than those required for the safe operation of the aeroplane. (See ANTR OPS 1.192))

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

(e) The design and utilisation of checklists required in (b) above shall observe Human Factors principles.

ANTR OPS 1.215 Use of Air Traffic Services

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

ANTR OPS 1.216 In-flight Operational Instructions

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

Note: When the above coordination has not been possible, operational instructions do not relieve a pilot of the responsibility for obtaining an appropriate clearance from an ATS unit, if applicable, before making a change in flight plan.

ANTR OPS 1.220 Authorisation of Aerodromes by the Operator

(See ANTR OPS 1.192)
(See IEM OPS 1.220 Authorisation of aerodromes)

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

ANTR OPS 1.225 Aerodrome Operating Minima

(a) The operator shall specify aerodrome operating minima, established in accordance with ANTR OPS 1.430 for each departure, destination or alternate aerodrome authorised to be used in accordance with ANTR OPS 1.220. Such minima shall be approved by the BCAA and not be lower than any that may be established for such aerodromes by the State of the Aerodrome, except when specifically approved by that State.

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

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

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

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

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

  (4) the crew is qualified accordingly.

ANTR OPS 1.230 Instrument departure and approach procedures

(a) The operator shall ensure that instrument departure and approach procedures established by the State of the aerodrome are used.

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

(c) Different procedures to those required to be used in accordance with sub-paragraph (a) above may only be implemented by the operator provided they have been approved by the State of the aerodrome, and are specified in the operations manual.

Note: 1 See ANTR OPS 1.430 for instrument approach operation classifications

Note: 2 Information for pilots on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of instrument flight procedures for the guidance of procedure specialists are provided in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

ANTR OPS 1.235 Noise abatement procedures

(a) The operator shall establish operating procedures for noise abatement during instrument flight operations in compliance with ICAO PANS OPS Volume 1 (Doc 8168–OPS/611).

(b) Take-off climb procedures for noise abatement specified by the operator for any one aeroplane type should be the same for all aerodromes.

Note: A single procedure may not satisfy requirements at some aerodromes.

ANTR OPS 1.240 Routes and areas of operation

(a) The operator shall ensure that operations are only conducted along such routes or within such areas, for which:

(1) Ground and/or water facilities and services, including meteorological services, are provided which are adequate for the planned operation;

(2) The performance of the aeroplane intended to be used is adequate to comply with minimum flight altitude requirements;

(3) The equipment of the aeroplane intended to be used meets the minimum requirements for the planned operation;

(4) Appropriate maps and charts are available (ANTR OPS 1.135(a)(9) refers);

(5) If two-engined aeroplanes are used, adequate aerodromes are available within the time/distance limitations of ANTR OPS 1.245.

(6) Except for aircraft approved under ANTR OPS 1.526, if single-engine aeroplanes are used surfaces are available which permit a safe forced landing to be executed.

(b) The operator shall ensure that operations are conducted in accordance with any restriction on the routes or the areas of operation, imposed by the BCAA.

ANTR OPS 1.241 Operation in defined airspace with Reduced Vertical Separation Minima (RVSM)

(See AC OPS 1.241)

(a) The operator shall not operate an aeroplane in defined portions of airspace where, based on Regional Air Navigation Agreement, a vertical separation minimum of 300m (1 000ft) is applied between FL 290 and FL 410 inclusive, applies unless approved to do so by the BCAA. (See also ANTR OPS 1.872.) An aeroplane shall be provided with equipment which is capable of:

(1) indicating to the flight crew the flight level being flown;

(2) automatically maintaining a selected flight level;

(3) providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ± 90 m (300 ft); and

(4) automatically reporting pressure-altitude; and

(5) BCAA shall issue a specific approval for RVSM operations in the airspace concerned;

(b) Prior to granting the RVSM specific approval, the BCAA shall be satisfied that:

(1) the vertical navigation performance capability of the aeroplane satisfies the requirements specified. (See AC OPS 1.241);

(2) the operator has instituted appropriate procedures in respect of continued airworthiness (maintenance and repair) practices and programmes; and

(3) the operator has established a requirement which ensures that a minimum of two aeroplanes of each aircraft type grouping of the operator have their height-keeping performance monitored, at least once every two years or within intervals of 1 000 flight hours per aeroplane, whichever period is longer. If the operator aircraft type grouping consists of a single aeroplane, monitoring of that aeroplane shall be accomplished within the specified period.

Note: Monitoring data from any regional monitoring programme established in accordance with Annex 11, 3.3.5.2, may be used to satisfy the requirement.

(4) the operator has instituted appropriate flight crew procedures for operations in RVSM airspace.

Note: An RVSM specific *approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.*

(5) The BCAA, in consultation with the State of Registry if appropriate, shall ensure that, in respect of those aeroplanes approved for RVSM operations, adequate provisions exist for:

(i) receiving the reports of height-keeping performance issued by the monitoring agencies; and

(ii) taking immediate corrective action for individual aircraft, or aircraft type groups, identified in such reports as not complying with the height-keeping requirements for operation in airspace where RVSM is applied.

Note: An RVSM approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate crew guidance.

(c) The BCAA, where responsible for airspace where RVSM has been implemented, or has issued RVSM specific approvals to operators within the Kingdom of Bahrain, shall establish provisions and procedures which ensure that appropriate action will be taken in respect of aircraft and operators found to be operating in RVSM airspace without a valid RVSM specific approval.

Note 1: These provisions and procedures need to address both the situation where the aircraft in question is operating without a specific *approval in the airspace of the State, and the situation where the operator for which the State has regulatory oversight responsibility is found to be operating without the required* specific *approval in the airspace of another State.*

Note 2: Guidance material relating to the approval for operation in RVSM airspace is contained in the Manual on a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive (Doc 9574).

(d) The aeroplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate to proceed:

(1) in accordance with its operational flight plan; and

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

(3) where a navigation specification for performance-based navigation (PBN) has been prescribed, an aeroplane shall, in addition to the requirements above

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

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

(iii) have information relevant to the aeroplane navigation specification capabilities included in the MEL.

Note: Guidance on aeroplane documentation is contained in the Performance-based Navigation (PBN) Manual (Doc 9613).

(e) For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance North Atlantic High Level Airspace (NAT HLA) are prescribed, an aeroplane shall be provided with navigation equipment which:

(1) continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and

(2) has been authorized by the State of the Operator for operations concerned.

Note: The prescribed minimum navigation performance specifications and the procedures governing their application are published in the Regional Supplementary Procedures (Doc 7030).

ANTR OPS 1.243 Operations in areas with specified navigation performance requirements
(See AC OPS 1.243)

(a) The operator shall ensure that an aeroplane operated in areas, or through portions of airspace, or on routes where a navigation specification for performance-based navigation has been prescribed, is certified according to these regulations.

(b) The operator of an aeroplane operating in areas referred to in (a) shall establish and document:

(1) normal and abnormal procedures including contingency procedures;

Note: Electronic navigation data management is an integral part of normal and abnormal procedures.

(2) flight crew qualification and proficiency requirements in accordance with the appropriate navigation specifications;

(3) a training programme for relevant personnel consistent with the intended operations; and

(4) appropriate maintenance procedures to ensure continued airworthiness in accordance with the appropriate navigation specifications.

(c) The BCAA shall issue a specific approval for operations based on PBN authorization required (AR) navigation specifications (See OPS 1.865(d)(2) and 1.870).

ANTR OPS 1.245 Maximum distance from an adequate aerodrome without an EDTO Approval

(See ANTR OPS 1.192)
(See IEM OPS 1.245(a))

(a) Unless the BCAA has issued specific approval for EDTO in accordance with ANTR OPS 1.246(a) (EDTO Approval), an aeroplane with two or more turbine engines shall not be operated on a route where the diversion time to an en-route alternate aerodrome from any point on the route, calculated in ISA and still air conditions at the one-engine inoperative cruise speed for aeroplanes with two turbine engines and at the all-engine operating cruise speed for aeroplanes with more than two turbine engines, exceeds the threshold times established for such operations by BCAA. The specific approval shall identify the applicable threshold time established for each particular aeroplane and engine combination.

On issuing the specific approval for extended diversion time operations, the State of the Operator shall specify the maximum diversion time granted to the operator for each particular aeroplane and engine combination.

Note 1: When the diversion time exceeds the threshold time, the operation is considered to be an extended diversion time operation (EDTO).

Note 2: Guidance on the establishment of an appropriate threshold time and on specific approval of extended diversion time operations is contained in the Extended Diversion Time Operations Manual (Doc 10085).

Note 3: Guidance on the conditions to be used when converting EDTO maximum diversion times to distances is contained in the Extended Diversion Time Operations Manual (Doc 10085).

The threshold time as established by BCAA are as follows:

(1) Performance Class A aeroplanes with a maximum approved passenger seating configuration of 20 or more:

(i) for aeroplanes with two turbine engines, a threshold distance flown in 60 minutes at the one-engine-inoperative cruise speed determined in accordance with subparagraph (b) below; or

(ii) for aeroplanes with more than two turbine engines, the threshold distance flown in 120 minutes at the all-engine operating cruise speed.

(2) Performance Class A aeroplanes with a maximum approved passenger seating configuration of 19 or less; and:

(i) for aeroplanes with two turbine engines, the threshold distance flown in 120 minutes at the one-engine-inoperative cruise speed determined in accordance with subparagraph (b) below (See AMC OPS 1.245(a)(2)); or

(ii) for aeroplanes with more than two turbine engines, the threshold distance flown in 120 minutes at the all-engine operating cruise speed.

(3) Performance Class B or C aeroplanes:

(i) The distance flown in 120 minutes at the one-engine-inoperative cruise speed determined in accordance with subparagraph (b) below; or

(ii) 300 nautical miles, whichever is less. (See IEM OPS 1.245(a).)

(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}, based upon the true airspeed that the aeroplane can maintain with one-engine-inoperative.

(c) The operator must ensure that the following data, specific to each type or variant, is included in the Operations Manual:

(1) The one-engine-inoperative cruise speed determined in accordance with subparagraph (b) above; and

(2) The maximum distance from an adequate aerodrome determined in accordance with subparagraphs (a) and (b) above.

Note: The speeds and altitudes (flight levels) specified above are only intended to be used for establishing the maximum distance from an adequate aerodrome.

(d) Operators conducting operations beyond 60 minutes, from a point on a route to an en-route alternate aerodrome shall ensure that:

(1) for all aeroplanes:

(i) en-route alternate aerodromes are identified; and

(ii) the most up-to-date information is provided to the flight crew on identified en-route alternate aerodromes, including operational status and meteorological conditions;

(e) Notwithstanding the provisions above, the BCAA may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operations beyond the time limits of the most time-limited system. The specific safety risk assessment shall include at least the:

(1) capabilities of the operator;

(2) overall reliability of the aeroplane;

(3) reliability of each time limited system;

(4) relevant information from the aeroplane manufacturer; and

(5) specific mitigation measures.

(f) Time capability of cargo compartment fire suppression system

All flights should be planned so that the diversion time to an aerodrome where a safe landing could be made does not exceed the cargo compartment fire suppression time capability of the aeroplane, when one is identified in the relevant aeroplane documentation, reduced by an operational safety margin of 15 minutes.

Note: Guidance on the specific safety risk assessment is contained in the Extended Diversion Time Operations Manual *(Doc 10085).*

ANTR OPS 1.246 Extended Diversion Time Operations (EDTO)
(See ANTR OPS 1.192)
(See IEM OPS 1.246)

(a) The operator shall not conduct operations beyond the threshold distance determined in accordance with ANTR OPS 1.245 unless it has established and obtained approval from BCAA to do so (EDTO Approval) for the procedures given hereunder at clause (e).

(b) Prior to conducting an EDTO flight, the operator shall ensure that a suitable EDTO en-route alternate is available, within either the approved diversion time or a diversion time based on the MEL generated serviceability status of the aeroplane, whichever is shorter. (See also ANTR OPS 1.297(d).)

(c) When specifying the appropriate maximum diversion time for the operator of a particular aeroplane type engaged in extended diversion time operations, for the aeroplanes with two turbine engines, the BCAA shall ensure that:

(1) for all aeroplanes, the operator has in place procedures to prevent the aeroplane being dispatched on a route with diversion times beyond the capability of EDTO significant system time limitation, if any, indicated in the aeroplane flight manual (directly or by reference); and

(2) for aeroplanes with two turbine engines, the aeroplane is EDTO certified; and

Note: Guidance on the conditions to be used when converting EDTO maximum diversion times to distances and on the consideration of EDTO system time limitations at dispatch is contained in the Extended Diversion Time Operations Manual (Doc 10085).

(3) the reliability of the propulsion system is acceptable; and

Note 2: The Airworthiness Manual (Doc 9760) and the CAP 04 of BCAA contains guidance on the level of performance and reliability of aeroplane systems.

(4) the EDTO maintenance programme, operator’s maintenance procedures, operating practices, flight dispatch procedures and crew training programmes are acceptable; and provide the overall level of safety intended by the provisions of ANTR Parts IV and V. In making this assessment, account shall be taken of the route to be flown, the anticipated operating conditions and the location of adequate en-route alternate aerodromes.

(d) Operators conducting operations beyond 60 minutes, from a point on a route to an en-route alternate aerodrome shall ensure that:

(1) for all aeroplanes:

(i) en-route alternate aerodromes are identified; and

(ii) the most up-to-date information is provided to the flight crew on identified en-route alternate aerodromes, including operational status and meteorological conditions; and

(iii) operational control, flight dispatch procedures, operating procedures and training programmes are considered.

(2) for aeroplanes with two turbine engines, the most up-to-date information provided to the flight crew indicates that conditions at identified en-route alternate aerodromes will be at or above the operator’s established aerodrome operating minima for the operation at the estimated time of use.

Note: Guidance on compliance with the requirements of these provisions is contained in the Extended Diversion Time Operations Manual (Doc 10085).

(e) In addition to the requirements in ANTR OPS 1.245, all operators shall ensure that the following are taken into account and provide the overall level of safety intended by the this regulation:

1) operational control and flight dispatch procedures;

2) operating procedures; and

3) training programmes

4) reliability of the propulsion system

5) EDTO maintenance programme

(f) A flight shall not proceed beyond the threshold time in accordance with ANTR OPS 1.245 unless the identified en-route alternate aerodromes have been re-evaluated for availability and the most up to date information indicates that, during the estimated time of use, conditions at those aerodromes will be at or above the operator’s established aerodrome operating minima for the operation. If any conditions are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action shall be determined.

(g) In establishing the appropriate threshold time and to maintain the required level of safety, it is necessary to consider that

(1) The airworthiness certification of aeroplane type does not restrict operations beyond the threshold time, taking into account the aeroplane system design and reliability aspects,

(2) Specific flight dispatch requirements are met,

(3) Necessary in-flight operational procedures are established, and

(4) The operator's previous experience on similar aircraft types and routes is satisfactory.

(h) For aeroplanes engaged in EDTO, the additional fuel required by ANTR OPS 1.255 shall include the fuel necessary to comply with the EDTO critical fuel scenario as established by the State of the Operator.

Note: Guidance on compliance with the requirements of this provision is in the Extended Diversion Time Operations Manual (Doc 10085).

(i) Notwithstanding the provisions in (d) above, the BCAA, as the State of the Operator, may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operations beyond the time limits of the most time-limited system. The specific safety risk assessment shall include at least the:

(1) capabilities of the operator;

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

(3) reliability of each time-limited system;

(4) relevant information from the aeroplane manufacturer; and;

(5) specific mitigation measures.

Note1: For the purpose of EDTO, the destination aerodrome may be considered as an en-route alternate aerodrome.

Note2: Guidance on the specific safety risk assessment is contained in the Extended Diversion Time Operations (EDTO) Manual (Doc 10085).

(j) The operator shall show compliance to the BCAA, the State of the Operator, to enable specifying the maximum diversion times for aeroplanes with two turbine engines, that the following are taken into account in providing the overall level of safety intended by the regulation:

a) reliability of the propulsion system;

b) airworthiness certification for EDTO of the aeroplane type; and

c) EDTO maintenance programme.

Note1: EDTO may be referred to as ETOPS in some documents.

Note2: The Airworthiness Manual (Doc 9760) contains guidance on the level of performance and reliability of aeroplane systems intended, as well as guidance on continuing airworthiness aspects of the requirements.

(k) Maintaining operational approval – Continued validity of the granted EDTO approval:

(1) In order to maintain the required level of safety on routes where these aeroplanes are permitted to operate beyond the established threshold time under the EDTO approval, it is necessary that:

(i) the airworthiness certification of the aeroplane type specifically permits continued operations beyond the threshold time, taking into account the aeroplane's system design and reliability aspects;

(ii) the reliability of the propulsion system is such that the risk of double engine failure from independent causes is extremely remote, assessed as provided for in the Airworthiness Manual (Doc 9760) and found acceptable to support the diversion time being approved;

(iii) any special maintenance requirements are fulfilled;

(iv) specific flight dispatch requirements are met;

(v) the necessary in-flight operational procedures are established; and

(vi) specific operational approval is granted by the State of the Operator.

(2) Maintaing the Airworthiness modifications and maintenance programme requirements:

Each operator's maintenance programme should continue to ensure that:

(i) the titles and numbers of all airworthiness modifications, additions and changes which were made to qualify aeroplane systems for extended diversion time operations are maintained in real time basis and provided to the BCAA.

(ii) any changes to maintenance and training procedures, practices or limitations established in the qualification for extended diversion time operations are submitted to the BCAA for approval before such changes are adopted;

(iii) a reliability monitoring and reporting programme developed is continued to be implemented to hold the continued approval;

(iv) continued to prompt implementation of required modifications and inspections which could affect propulsion system reliability;

(v) established procedures continue to prevent an aeroplane from being dispatched for an extended diversion time;

(vi) established system of preventing operation an aeoplane after engine shutdown or EDTO significant system failure on a previous flight until the cause of such failure has been positively identified and the necessary corrective action has been completed including that of confirmation flight prior to dispatch on EDTO operation, is running satisfactory.

(vii) established procedure to ensure that the airborne equipment is continued to be maintained at the level of performance and reliability required for extended diversion time operations; and

(viii) established procedure to minimize scheduled or unscheduled maintenance during the same maintenance visit on more than one parallel or similar EDTO significant system is effective. Minimization of staggering to accomplish maintenance tasks, performing and/or supervising maintenance by a different technician, or verifying maintenance correction actions prior to the aeroplane entering an EDTO threshold is effective.

Note: EDTO may be referred to as ETOPS in some documents.

ANTR OPS 1.250 Establishment of minimum flight altitudes
(See IEM OPS 1.250)

(a) The operator shall establish minimum flight altitudes and the methods to determine those altitudes for all route segments to be flown which provide the required terrain clearance taking into account the requirements of Subparts F to I.

(b) Every method for establishing minimum flight altitudes must be approved by the BCAA.

(c) Where minimum flight altitudes established by States over-flown are higher than those established by the operator, the higher values shall apply.

(d) The operator shall take into account the probable effects of the following factors on the safety of the operation in question when establishing minimum flight altitudes:

(1) The accuracy and reliability with which the position of the aeroplane can be determined;

(2) The inaccuracies in the indications of the altimeters used;

(3) The characteristics of the terrain (e.g. sudden changes in the elevation) along the routes or in the areas where operations are to be conducted;

(4) The probability of encountering unfavourable meteorological conditions (e.g. severe turbulence and descending air currents);

(5) Possible inaccuracies in aeronautical charts; and

(6) airspace restrictions.

(e) In fulfilling the requirements prescribed in sub-paragraph (d) above due consideration shall be given to:

(1) Corrections for temperature and pressure variations from standard values;

(2) The ATC requirements; and

(3) Any foreseeable contingencies along the planned route.

ANTR OPS 1.255 Fuel policy
(See Appendix 1 to ANTR-OPS 1.255)
(See Appendix 2 to ANTR-OPS 1.255)
(See AC OPS 1.255)

(a) The operator shall establish a fuel policy for the purpose of flight planning and in-flight re-planning to ensure that every flight carries sufficient fuel for the planned operation and reserves to cover deviations from the planned operation.

(b) The operator shall ensure that the planning of flights is at least based upon (1) and (2) below:

(1) Procedures contained in the Operations Manual and data derived from:

(i) Current aeroplane-specific data derived from a fuel consumption monitoring system, if available; or

(ii) if current aeroplane-specific data are not available, data provided by the aeroplane manufacturer; and

(2) The operating conditions under which the planned flight is to be conducted including:

(i) Anticipated masses;

(ii) Notices to Airmen

(iii) Current meteorological reports or a combination of current reports and forecasts;

(iv) Air Navigation Services Provider(s) procedures, restrictions and anticipated delays; and

(v) The effects of deferred maintenance items and/or configuration deviations.

(c) The pre-flight calculation of usable fuel required shall include:

(1) *taxi fuel*, which shall be the amount of fuel expected to be consumed before take-off, taking into account local conditions at the departure aerodrome and auxiliary power unit (APU) fuel consumption;

(2) *trip fuel*, which shall be the amount of fuel required to enable the aeroplane to fly from take-off, or the point of inflight re-planning, until landing at the destination aerodrome taking into account the operating conditions of para (b) above.

(3) *contingency fuel*, which shall be the amount of fuel required to compensate for unforeseen factors. It shall be five per cent of the planned trip fuel or of the fuel required from the point of in-flight re-planning based on the consumption rate used to plan the trip fuel but, in any case, shall not be lower than the amount required to fly for five minutes at holding speed at 450 m (1 500 ft) above the destination aerodrome in standard conditions;

Note: Unforeseen factors are those which could have an influence on the fuel consumption to the destination aerodrome, such as deviations of an individual aeroplane from the expected fuel consumption data, deviations from forecast meteorological conditions, extended delays and deviations from planned routings and/or cruising levels.

(d) *destination alternate fuel*, which shall be:

(1) where a destination alternate aerodrome is required, the amount of fuel required to enable the aeroplane to:

(i) perform a missed approach at the destination aerodrome;

(ii) climb to the expected cruising altitude;

(iii) fly the expected routing;

(iv) descend to the point where the expected approach is initiated; and

(v) conduct the approach and landing at the destination alternate aerodrome; or

(2) where two destination alternate aerodromes are required, the amount of fuel, as calculated in Para (d) (1) above, required to enable the aeroplane to proceed to the destination alternate aerodrome which requires the greater amount of alternate fuel; or

(3) where a flight is operated without a destination alternate aerodrome, the amount of fuel required to enable the aeroplane to fly for 15 minutes at holding speed at 450 m (1 500 ft) above destination aerodrome elevation in standard conditions; or

(4) where the aerodrome of intended landing is an isolated aerodrome:

(i) for a reciprocating engine aeroplane, the amount of fuel required to fly for 45 minutes plus 15 per cent of the flight time planned to be spent at cruising level, including final reserve fuel, or two hours, whichever is less; or

(ii) for a turbine-engined aeroplane, the amount of fuel required to fly for two hours at normal cruise consumption above the destination aerodrome, including final reserve fuel;

(e) *final reserve fuel*, which shall be the amount of fuel calculated using the estimated mass on arrival at the destination alternate aerodrome, or the destination aerodrome when no destination alternate aerodrome is required:

(1) for a reciprocating engine aeroplane, the amount of fuel required to fly for 45 minutes, under speed and altitude conditions specified by the State of the Operator; or

(2) for a turbine-engined aeroplane, the amount of fuel required to fly for 30 minutes at holding speed at 450 m (1 500 ft) above aerodrome elevation in standard conditions;

(f) *additional fuel*, which shall be the supplementary amount of fuel required if the minimum fuel calculated in accordance with Para (b), (c), (d) and (e) above is not sufficient to:

(1) allow the aeroplane to descend as necessary and proceed to an alternate aerodrome in the event of engine failure or loss of pressurization, whichever requires the greater amount of fuel based on the assumption that such a failure occurs at the most critical point along the route;

(i) fly for 15 minutes at holding speed at 450 m (1 500 ft) above aerodrome elevation in standard conditions; and

(ii) make an approach and landing;

(2) allow an aeroplane engaged in EDTO to comply with the EDTO critical fuel scenario as established by the State of the Operator;

(3) meet additional requirements not covered above;

Note 1: Fuel planning for a failure that occurs at the most critical point along a route (Para (e)) may place the aeroplane in a fuel emergency situation based on ANTR-OPS 1.375 (In-Flight Fuel Management).

Note 2: Guidance on EDTO critical fuel scenarios is contained in EDTO Manual (Doc 10085) / BCAA Established Guidance.

(g) *discretionary fuel*, which shall be the extra amount of fuel to be carried at the discretion of the pilot-in-command.

(h) *Operators should determine one final reserve fuel value for each aeroplane type and variant in their fleet rounded up to an easily recalled figure.*

(i) A flight shall not commence unless the usable fuel on board meets the requirements in ANTR OPS 1.255 (a), (b), (c), (d), (e) and (f), if required and shall not continue from the point of in-flight re-planning unless the usable fuel on board meets the requirements in ANTR OPS 1.255 (b), (c), (d), (e) and (f) if required.

(j) Notwithstanding the provisions in ANTR OPS 1.255 (a), (b), (c), (d), and (f), the BCAA may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve variations to the pre-flight fuel calculation of taxi fuel, trip fuel, contingency fuel, destination alternate fuel, and additional fuel. The specific safety risk assessment shall include at least the:

(1) flight fuel calculations; and

(2) capabilities of the operator to include a data-driven method that includes a fuel consumption monitoring programme and/or the advanced use of alternate aerodromes; and

(3) specific mitigation measures.

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

Note: Guidance on procedures for in-flight fuel management including re-analysis, adjustment and/or re-planning considerations when a flight begins to consume contingency fuel before take-off is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

ANTR OPS 1.260 Carriage of Persons with Reduced Mobility
(See IEM OPS 1.260)

(a) The operator shall establish procedures for the carriage of Persons with Reduced Mobility (PRMs).

(b) The operator shall ensure that PRMs are not allocated, nor occupy, seats where their presence could:

(1) Impede the crew in their duties;

(2) Obstruct access to emergency equipment; or

(3) Impede the emergency evacuation of the aeroplane.

(c) The commander must be notified when PRMs are to be carried on board.

ANTR OPS 1.265 Carriage of inadmissible passengers, deportees or persons in custody

The operator shall establish procedures for the transportation of inadmissible passengers, deportees or persons in custody to ensure the safety of the aeroplane and its occupants. The commander must be notified when the above-mentioned persons are to be carried on board.

ANTR OPS 1.270 Stowage of baggage and cargo
(See Appendix 1 to ANTR OPS 1.270 & AMC OPS 1.270)

(a) The operator shall establish procedures to ensure that only such hand baggage is taken into the passenger cabin as can be adequately and securely stowed.

(b) The operator shall establish procedures to ensure that all baggage and cargo on board, which might cause injury or damage, or obstruct aisles and exits if displaced, is placed in stowages designed to prevent movement.

ANTR OPS 1.275 *Intentionally blank*

ANTR OPS 1.280 Passenger Seating

(See IEM OPS 1.280)

The operator shall establish procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aeroplane.

ANTR OPS 1.285 Passenger briefing

The operator shall ensure that:

(a) *General.*

(1) Passengers are given a verbal briefing about safety matters. Parts or all of the briefing may be provided by an audio-visual presentation.

(2) Passengers are provided with a safety briefing card on which picture type instructions indicate the operation of emergency equipment and exits likely to be used by passengers.

(b) *Before take-off*

(1) Passengers are briefed on the following items (but not limited to) if applicable:

(i) Smoking regulations;

(ii) Back of the seat to be in the upright position and tray table stowed;

(iii) Location and method of opening 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,

(viii) Window blinds are in position to see outside,

(2) Passengers receive a demonstration (but not limited to) of the following:

(i) The use of safety belts and/or safety harnesses, including how to fasten and unfasten the safety belts and/or safety harnesses;

(ii) The location and use of oxygen equipment if required (ANTR OPS 1.770 and ANTR OPS 1.775 refer). Passengers must also be briefed to extinguish all smoking materials when oxygen is being used; and

(iii) The location and use of life jackets if required (ANTR OPS 1.825 refers).

(c) *After take-off*

(1) Passengers are reminded of the following (but not limited to) if applicable:

(i) Smoking regulations; and

(ii) Use of safety belts and/or safety harnesses including the safety benefits of having safety belts fastened when seated irrespective of seat belt sign illumination.

(d) *Before landing*

(1) Passengers are reminded of the following (but not limited to) if applicable:

(i) Smoking regulations;

(ii) Use of safety belts and/or safety harnesses;

(iii) Back of the seat to be in the upright position and tray table stowed;

(iv) Re-stowage of hand baggage;

(v) Window blinds are in position to see outside and,

(vi) Restrictions on the use of portable electronic devices.

(e) *After landing*

(1) Passengers are reminded of the following (but not limited to):

(i) Smoking regulations; and

(ii) Use of safety belts and/or safety harnesses.

(f) In an emergency during flight, passengers are instructed in such emergency action as may be appropriate to the circumstances.

Note : Guidance on passenger safety briefing can be found in the Manual on Information and Instructions for Passenger Safety (ICAO Doc 10086).

ANTR OPS 1.290 Flight preparation

(a) The operator shall ensure that an operational flight plan is completed for each intended flight.

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

Note 1: "Reasonable means" in this Standard is intended to denote the use, at the point of departure or while the aircraft is in flight, of information available to the operator either through official information published by the aeronautical information services or readily obtainable from other sources.

Note 2: Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (ICAO Doc 9859).

Note 3: The Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones (ICAO Doc 10084) contains further guidance on risk assessment for air operators when flying over or near conflict zones.

(c) The commander shall not commence a flight unless he is satisfied that:

(1) The aeroplane is airworthy, and the appropriate certificates as given in ANTR OPS 1.125, 1.135 (i.e. airworthiness, registration) are on board the aeroplane;

(2) a maintenance release as prescribed in ANTR 145.A.50 has been issued in respect of the aeroplane;

(3) The aeroplane is not operated contrary to the provisions of the Configuration Deviation List (CDL);

(4) The instruments and equipment required for the particular type of operation to be conducted, in accordance with Subparts K and L, are available;

(5) The instruments and equipment are in operable condition except as provided in the MEL;

(6) Those parts of the operations manual which are required for the conduct of the flight are available;

(7) The documents, additional information and forms required to be available by ANTR OPS 1.125 and ANTR OPS 1.135 are on board;

(8) Current maps, charts and associated documentation or equivalent data are available to cover the intended operation of the aeroplane including any diversion which may reasonably be expected. This shall include any conversion tables necessary to support operations where metric heights, altitudes and flight levels must be used;

(9) Ground and/or water facilities and services required for the planned flight are available and adequate;

(10) The provisions specified in the operations manual in respect of fuel, oil and oxygen requirements, minimum safe altitudes, aerodrome operating minima and availability of alternate aerodromes, where required, can be complied with for the planned flight (Refer to ANTR OPS 1.1060);

(11) The load is properly distributed and safely secured;

(12) The mass and centre of gravity of the aeroplane, at the commencement of take-off roll, will be such that the flight can be conducted in compliance with Subparts F to I as applicable; and

(13) Any operational limitation in addition to those covered by sub-paragraphs (9) and (11) above can be complied with.

Completed flight preparation forms shall be kept by the operator for a period of three months since the last entry.

ANTR OPS 1.295 Selection of aerodromes

(a) The operator shall establish procedures for the selection of destination and/or alternate aerodromes in accordance with ANTR–OPS 1.220 when planning a flight.

(b) Take-off Alternate. The operator must select and specify in the operational flight plan a take-off alternate aerodrome if either the meteorological conditions at the aerodrome of departure are below the operator's established aerodrome landing minima for that operation or if it would not be possible to return to the departure aerodrome for other reasons. The take-off alternate aerodrome shall be located within the following flight time from the aerodrome of departure:

(1) For two-engined aeroplanes, one hour flight time at a one-engine-inoperative cruising speed determined from the Aircraft Flight Manual (AFM) calculated in ISA and still air conditions based on the actual take-off mass or. If the AFM does not contain a one-engine-inoperative cruising speed, the speed to be used for calculation must be that which is achieved with the remaining engine(s) set at maximum continuous power.

(2) For aeroplanes with three engines or more, two hours of flight time at an all-engine operating cruising speed determined from the AFM calculated in ISA and still air standard conditions based on the actual take-off mass or;

(3) For aeroplanes engaged in extended diversion time operations (EDTO) where an alternate aerodrome meeting the distance criteria of (1) or (2) is not available, the first available alternate aerodrome located within the distance of the operator's specified maximum diversion time considering the actual take-off mass.

(c) For an aerodrome to be selected as a take-off alternate the available information shall indicate that, at the estimated time of use, the conditions will be at or above the operator's established aerodrome operating minima for that operation.

(d) En-route alternate aerodromes, required by 1.246 for extended diversion time operations by aeroplanes with two turbine engines, shall be selected and specified in the operational and air traffic services (ATS) flight plans

(e) Destination Alternate. For a flight to be conducted in accordance with IFR, at least one destination alternate aerodrome shall be selected and specified in the operational and ATS flight plans, unless:

1) the duration of the flight from the departure aerodrome, or from the point of in-flight re-planning, to the destination aerodrome is such that, taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use, a reasonable certainty exists that:

i) the approach and landing may be made under visual meteorological conditions; and
ii) separate runways are usable at the estimated time of use of the destination aerodrome with at least one runway having an operational instrument approach procedure; or

(2) the aerodrome is isolated. Operations into isolated aerodromes do not require the selection of a destination alternate aerodrome(s) and shall be planned in accordance with ANTR OPS 1.255(d)(4);

i) for each flight into an isolated aerodrome a point of no return shall be determined; and
ii) a flight to be conducted to an isolated aerodrome shall not be continued past the point of no return unless a current assessment of meteorological conditions, traffic and other operational conditions indicate that a safe landing can be made at the estimated time of use.

Note 1: Separate runways are two or more runways at the same aerodrome configured such that if one runway is closed, operations to the other runway(s) can be conducted.

Note 2: Guidance on planning operations to isolated aerodromes is contained in the Flight Planning and Fuel Management (FPFM) Manual (ICAO Doc 9976).

(f) Two destination alternate aerodromes shall be selected and specified in the operational and ATS flight plans when, for the destination aerodrome:

(1) The meterological conditions will be below the operator's established aerodrome operating minima for that operation applicable (See ANTR-OPS 1.297(b); or

(2) No meteorological information is available.

(g) The operator shall select and specify any required alternate aerodrome(s), including enroute alternate aerodromes required for EDTO by aeroplanes with two turbine engines, in the operational and ATS flight plans.

(h) Notwithstanding the provisions in ANTR OPS 1.295, the State of the Operator may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operational variations to alternate aerodrome selection criteria. The specific safety risk assessment shall include at least the:

a) capabilities of the operator;
b) overall capability of the aeroplane and its systems;
c) available aerodrome technologies, capabilities and infrastructure;
d) quality and reliability of meteorological information;
e) identified hazards and safety risks associated with each alternate aerodrome variation; and
f) specific mitigation measures.

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

ANTR OPS 1.297 Planning minima for IFR flights

(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 meteorological reports or forecasts or any combination thereof indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the meteorological conditions will be at or above the applicable operator's established landing minima specified in accordance with ANTR–OPS 1.225. The ceiling must be taken into account when the only approaches available are non-precision and/or circling approaches. Any limitation related to one engine inoperative operations must be taken into account.

(b) *Planning minima for a destination aerodrome (Except isolated destination aerodromes).* The operator shall only select the destination aerodrome when;

(1) the appropriate meteorological reports or forecasts, or any combination thereof, indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the meteorological conditions will be at or above the applicable planning minima as follows:

(i) RVR/visibility specified in accordance with ANTR–OPS 1.225; and

(ii) For a non-precision approach or a circling approach, the ceiling at or above MDH; or

(2) Two destination alternate aerodromes are selected under ANTR-OPS 1.295(d).

(c) Planning minima for a:

(1) Destination alternate aerodrome,
(2) Isolated aerodrome,
(3) 3% ERA Aerodrome,
(4) En-route alternate aerodrome required at the planning stage

The operator shall only select an aerodrome for one of those purposes when the appropriate meteorological reports or forecasts, or any combination thereof, indicate that, during a period commencing one hour before and ending one hour after the estimated time of arrival at the aerodrome, the meteorological conditions will be at or above the planning minima in Table 1 on the following page.

Table 1 Planning minima – Destination alternate aerodrome, isolated destination aerodrome, 3% ERA and en-route alternate aerodrome

Type of approach	**Planning Minima**
Cat II and III	Cat I (Note 1)
Cat I	Non-precision (Notes 1 & 2)
Non-precision	Non-precision (Notes 1 & 2) plus 200 ft/1 000 m
Circling	Circling

Note 1: *RVR.*

Note 2: *The ceiling must be at or above the MDH.*

(d) *Planning minima for an EDTO en-route alternate aerodrome.* The operator shall only select an aerodrome as an EDTO en-route alternate aerodrome when the appropriate meteorological reports or forecasts, or any combination thereof, indicate that, during a period commencing one hour before and ending one hour after the expected time of arrival at the aerodrome, conditions calculated by adding the additional limits of Table 2 will exist. The operator shall include in his Operations Manual the method for determining the operating minima at the planned EDTO en-route alternate aerodrome.

Table 2 Planning minima – EDTO

Approach Facility	**Alternate Airfield Ceiling**	**Weather Minima Visibility/RVR**
Precision approach procedure.	Authorised DH/DA plus an increment of 200 ft	Authorised visibility plus an increment of 800 metres
Non-precision approach or circling approach	Authorised MDH/MDA plus an increment of 400 ft	Authorised visibility plus an increment of 1500 metres

(e) Notwithstanding the provisions in Tables 1 and 2 above, the BCAA shall approve a margin of time established by the operator for the estimated time of use of an aerodrome provided that the operator specifies appropriate incremental values, acceptable to the BCAA, for height of cloud base and visibility to be added to the operator's established aerodrome operating minima, and can ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate aerodrome.

ANTR OPS 1.300 Submission of ATS Flight Plan

(See AMC OPS 1.300)

The operator shall ensure that a flight is not commenced unless an ATS flight plan has been submitted, or adequate information has been deposited in order to permit alerting services to be activated if required.

ANTR OPS 1.305 Refuelling/defueling with passengers embarking, on board or disembarking

(See Appendix 1 to ANTR OPS 1.305) (See IEM OPS 1.305)

(a) An aeroplane shall not be refuelled when passengers are embarking, on board or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aeroplane by the most practical and expeditious means available.

(b) When refuelling with passengers embarking, on board or disembarking, two-way communication shall be maintained by the aeroplane's inter-communication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the aeroplane.

Note 1: The provisions of ANTR OPS 1.305(a) do not necessarily require the deployment of integral aeroplane stairs or the opening of emergency exits as a prerequisite to refuelling.

Note 2: Provisions concerning aircraft refuelling are contained in Annex 14, Volume I, and guidance on safe refuelling practices is contained in the Airport Services Manual, *(Doc 9137), Parts 1 and 8.*

Note 3: Additional precautions are required when refuelling with fuels other than aviation kerosene or when refueling results in a mixture of aviation kerosene with other aviation turbine fuels, or when an open line is used.

ANTR OPS 1.307 Refuelling/Defueling with wide-cut fuel

(See IEM OPS 1.307)

The operator shall establish procedures for refuelling/defueling with wide-cut fuel (e.g. Jet-B or equivalent) if this is required.

ANTR OPS 1.308 Push back and Towing

(See AC OPS 1.308)

(a) The operator shall ensure that all push back and towing procedures comply with appropriate aviation standards and procedures.

(b) The operator shall ensure that pre- or post taxi positioning of the aeroplane is not executed by towbarless towing unless

(1) an aeroplane is protected by its own design from damage to the nose wheel steering system due to towbarless towing operation, or

(2) a system/procedure is provided to alert the flight crew that such damage may have or has occurred, or

(3) the towbarless towing vehicle is designed to prevent damage to the aeroplane type.

ANTR OPS 1.310 Crew Members at stations

(a) *Flight crew members*

(1) During take-off and landing each flight crew member required to be on flight deck duty shall be at his station.

(2) During all other phases of flight each flight crew member required to be on flight deck duty shall remain at his station unless his absence is necessary for the performance of his duties in connection with the operation, or for physiological needs provided at least one suitably qualified pilot remains at the controls of the aeroplane at all times.

(3) During all phases of flight each flight crew member required to be on flight deck duty shall remain alert. If a lack of alertness is encountered, appropriate countermeasures shall be used. If unexpected fatigue is experienced a controlled rest procedure, organised by the commander, can be used if workload permits (see AC OPS 1.310(a)(3)). Controlled rest taken in this way may never be considered to be part of a rest period for purposes of calculating flight time limitations nor used to justify any duty period.

(b) Cabin crew members. Each cabin crew member assigned to emergency evacuation duties shall occupy a seat provided in accordance with ANTR OPS 1.730, during take-off and landing and whenever the pilot-in-command so directs, on all the decks of the aeroplane that are occupied by passengers, (See IEM OPS 1.310(b).)

ANTR-OPS 1.313 Use of Headset

(a) Each flight crew member required to be on flight deck duty shall wear the headset with boom microphone or equivalent required by ANTR-OPS 1.650(p) and/or 1.652(s) and use it as the primary device to listen to the voice communications with Air Traffic Services:

(1) on the ground:

(i) when receiving the ATC departure clearance via voice communication,

(ii) when engines are running,

(2) in flight below transition altitude or 10,000 feet, whichever is higher, and

(3) whenever deemed necessary by the commander.

(b) In the conditions of paragraph (a) above, the boom microphone or equivalent shall be in a position which permits its use for two-way radio communications.

ANTR OPS 1.315 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, an assisting means for emergency evacuation that deploys automatically, is armed.

ANTR OPS 1.320 Seats, safety belts and harnesses

(a) *Crew members*

(1) During take-off and landing, and whenever deemed necessary by the commander in the interest of safety, each crew member shall be properly secured by all safety belts and harnesses provided.

Note: The foregoing does not preclude the pilot-in-command from directing the fastening of the seat belt only, at times other than during take-off and landing.

Any flight crew member occupying a pilot's seat shall keep the safety harness fastened during the take-off and landing phases; all other flight crew members shall keep their safety harnesses fastened during the take-off and landing phases unless the shoulder straps interfere with the performance of their duties, in which case the shoulder straps may be unfastened but the seat belt must remain fastened.

(2) During other phases of the flight each flight crew member on the flight deck shall keep his safety belt fastened while at his station.

Note: Safety harness includes shoulder straps and a seat belt which may be used independently.

(b) *Passengers*

(1) Before take-off and landing, and during taxiing, and whenever deemed necessary in the interest of safety, the commander shall ensure that each passenger on board occupies a seat or berth with his safety belt, or harness where provided, properly secured.

(2) The operator shall make provision for, and the commander shall ensure that multiple occupancy of aeroplane seats may only be allowed on specified seats and does not occur other than by one adult and one infant who is properly secured by a supplementary loop belt or other restraint device.

ANTR OPS 1.325 Securing of passenger cabin 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 is properly secured.

ANTR OPS 1.330 Accessibility of emergency equipment

The commander shall ensure that relevant emergency equipment remains easily accessible for immediate use.

ANTR OPS 1.335 Smoking on board

(a) The commander shall ensure that no person on board is allowed to smoke:

(1) Whenever deemed necessary in the interest of safety;

(2) While the aeroplane is on the ground unless specifically permitted in accordance with procedures defined in the Operations Manual;

(3) Outside designated smoking areas, in the aisle(s) and in the toilet(s);

(4) In cargo compartments and/or other areas where cargo is carried which is not stored in flame resistant containers or covered by flame resistant canvas; and

(5) In those areas of the cabin where oxygen is being supplied.

ANTR OPS 1.340 Meteorological Conditions

(a) On an IFR flight a commander shall only:

(1) Commence take-off; or

(2) Continue beyond the point from which a revised flight plan applies in the event of in-flight replanning,

when information is available indicating that the expected meteorological conditions will, at the estimated time of arrival at the destination and/or required alternate aerodrome(s) prescribed in ANTR–OPS 1.295 are at or above the planning minima, prescribed in ANTR–OPS 1.297.

(b) On an IFR flight, a commander shall only continue towards the planned destination aerodrome when the latest information available indicates that, at the estimated time of arrival, the meteorological conditions at the destination, or at least one destination alternate aerodrome, are at or above the applicable operator's established aerodrome operating minima

(c) On an IFR flight a commander shall only continue beyond:

(1) The decision point when using the Reduced Contingency Fuel Procedure (See Appendix 1 to ANTR-OPS 1.255 paragraph (b); or

(2) The pre-determined point when using the pre-determined point procedure (See Appendix 1 to ANTR-OPS 1.255 paragraph (c)),

when information is available indicating that the expected meteorological conditions, at the estimated time of arrival at the destination and/or required alternate aerodrome(s) prescribed in ANTR–OPS 1.295 are at or above the applicable operator's established aerodrome operating minima prescribed in ANTR–OPS 1.225.

(d) On a VFR flight a commander shall only commence take-off when the meteorological reports or forecasts, or any combination thereof, indicate that the meteorological conditions along the route or that part of the route to be flown under VFR will, at the appropriate time, be such as to enable compliance with these rules.

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

(f) The BCAA, as the State of the Operator, shall approve a margin of time established by the operator for the estimated time of use of an aerodrome.

ANTR OPS 1.345 Ice and other contaminants – ground procedures

(See AC OPS 1.345)

(a) The operator shall establish procedures to be followed when ground de-icing and anti-icing and related inspections of the aeroplane(s) are necessary. The Commander shall ensure that the flight planned to be operated or expected to operate in suspected or known ground icing conditions and shall not take off unless the airplane has been inspected for icing and, if necessary, has been given appropriate de-icing/anti-icing treatment. Accumulation of ice or other naturally occurring contaminants shall be removed so that the airplane is kept in an airworthy condition prior to take-off.

(b) A commander shall not commence take-off unless the external surfaces are clear of any deposit which might adversely affect the performance and/or controllability of the aeroplane except as permitted in the Aeroplane Flight Manual.

ANTR OPS 1.346 Ice and other contaminants – flight procedures

(a) The operator shall establish procedures for flights in expected or actual icing conditions. (See AC OPS 1.346 and ANTR OPS 1.675)

(b) A commander shall not commence a flight nor intentionally fly into expected or actual icing conditions unless the aeroplane is certificated and equipped to cope with such conditions.

ANTR OPS 1.350 Fuel and oil supply

A commander shall only commence a flight, or continue in the event of in-flight replanning, when he is satisfied that the aeroplane carries at least the planned amount of usable fuel and oil to complete the flight safely, taking into account the expected operating conditions.

ANTR OPS 1.355 Take-off conditions

Before commencing take-off, a commander must satisfy himself that, according to the information available to him, the weather at the aerodrome and the condition of the runway intended to be used should not prevent a safe take-off and departure.

ANTR OPS 1.360 Application of take-off minima

Before commencing take-off, a commander must satisfy himself that the RVR or visibility in the take-off direction of the aeroplane is equal to or better than the applicable minimum.

ANTR OPS 1.365 Minimum flight altitudes

(See IEM OPS 1.250)

The commander or the pilot to whom conduct of the flight has been delegated shall not fly below specified minimum altitudes except when necessary for take-off or landing.

ANTR OPS 1.370 Simulated abnormal situations in flight

The operator shall establish procedures to ensure that abnormal or emergency situations requiring the application of part or all of abnormal or emergency procedures and simulation of IMC by artificial means, are not simulated when passenger or cargo carried on board either during commercial air transportation flights or private flight operations.

ANTR OPS 1.375 In-flight fuel management

The operator must establish policies and procedures to ensure that in-flight fuel checks and fuel management are carried out according to following criteria:

(a) In-flight fuel checks.

(1) A commander must ensure that fuel checks are carried out in-flight at regular intervals. The usable remaining fuel must be recorded and evaluated to:

(i) compare actual consumption with planned consumption;

(ii) check that the usable remaining fuel is sufficient to complete the flight, in accordance with paragraph (b) 'In-flight fuel management' below; and

(iii) determine the expected usable fuel remaining on arrival at the destination aerodrome.

(2) The relevant fuel data must be recorded.

(b) In-flight fuel management.

(1) The flight must be conducted so that the expected usable fuel remaining on arrival at the destination aerodrome is not less than:

(i) the required alternate fuel plus planned final reserve fuel, or

(ii) the planned final reserve fuel if no alternate aerodrome is required

(2) However, if, as a result of an in-flight fuel check, the expected usable fuel remaining on arrival at the destination aerodrome is less than:

(i) the required alternate fuel plus final reserve fuel, the commander must 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 must take appropriate action and proceed to an adequate aerodrome so as to perform a safe landing with not less than final reserve fuel.

Note: The protection of final reserve fuel is intended to ensure a safe landing at any aerodrome when unforeseen occurrences may not permit safe completion of an operation as originally planned. Guidance on flight planning, including the circumstances that may require re-analysis, adjustment and/or re-planning of the planned operation before take-off or en-route, is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

(3) The commander shall request delay information from ATC when unanticipated circumstances may result in landing at the destination aerodrome with less than the final reserve fuel plus any fuel required to proceed to an alternate aerodrome or the fuel required to operate to an isolated aerodrome.

(4) The commander shall advise ATC of a minimum fuel state by declaring "MINIMUM FUEL" when, having committed to land at a specific aerodrome, the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel.

Note 1: The declaration of "MINIMUM FUEL" informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than planned reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

Note 2: Guidance on declaring minimum fuel is contained in the Flight Planning and Fuel Management Manual (ICAO Doc. 9976).

(5) The commander shall declare a situation of fuel emergency by broadcasting "MAYDAY MAYDAY MAYDAY FUEL" when calculated usable fuel on landing, at the nearest adequate aerodrome where a safe landing can be performed, is less than the planned final reserve fuel.

Note 1: The planned final reserve fuel refers to the value calculated in ANTR OPS 1.255(e) & Appendix 1 to ANTR OPS 1.255(a)(5).

Note 2: The words "MAYDAY FUEL" describe the nature of the distress conditions as required in Annex 10, Volume II, 5.3.2.1.1 b) 3.

Note 3: Guidance on procedures for in-flight fuel management is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).

(6) Additional conditions for specific procedures.

(i) On a flight using the RCF procedure, in order to proceed to the Destination 1 aerodrome, the commander must ensure that the usable fuel remaining at the decision point is at least the total of:

(A) Trip fuel from the decision point to the Destination 1 aerodrome; and

(B) Contingency fuel equal to 5% of trip fuel from the decision point to the Destination 1 aerodrome; and

(C) Destination 1 aerodrome alternate fuel, if a Destination 1 alternate aerodrome is required; and

(D) Final reserve fuel

(ii) On a flight using the PDP procedure in order to proceed to the destination aerodrome, the commander must ensure that the usable fuel remaining at the PDP is at least the total of:

(A) Trip fuel from the PDP to the destination aerodrome; and

(B) Contingency fuel from the PDP to the destination aerodrome calculated in accordance with Appendix 1 to ANTR-OPS 1.255 paragraph (a)(3); and

(C) Fuel required according to Appendix 1 to ANTR-OPS 1.255 paragraph (c)(1)(iv).

ANTR OPS 1.380 *Intentionally blank*

ANTR OPS 1.385 Use of supplemental oxygen

A commander shall ensure that flight crew members engaged in performing duties essential to the safe operation of an aeroplane in flight use supplemental oxygen continuously whenever cabin altitude exceeds 10 000 ft for a period in excess of 30 minutes and whenever the cabin altitude exceeds 13 000 ft.

ANTR OPS 1.390 Cosmic radiation

(a) The operator shall take account of the in-flight exposure to cosmic radiation of all crew members while on duty (including positioning) and shall take the following measures for those crew liable to be subject to exposure of more than 1 mSv per year (See AC OPS 1.390(a)(1));

(1) Assess their exposure

(2) Take into account the assessed exposure when organising working schedules with a view to reduce the doses of highly exposed crew members (See AC OPS 1.390(a)(2));

(3) Inform the crew members concerned of the health risks their work involves (See AC OPS 1.390(a)(3));

(4) Ensure that the working schedules for female crew members, once they have notified the operator that they are pregnant, keep the equivalent dose to the foetus as low as can reasonably be achieved and in any case ensure that the dose does not exceed 1 mSv for the remainder of the pregnancy;

(5) Ensure that individual records are kept for those crew members who are liable to high exposure. These exposures are to be notified to the individual on an annual basis, and also upon leaving the operator.

(b) The operator shall not operate an aeroplane above 15 000m (49 000ft) unless the equipment specified in ANTR OPS 1.680(a)(1) is serviceable, or the procedure prescribed in ANTR OPS 1.680(a)(2) is complied with.

(c) The commander or the pilot to whom conduct of the flight has been delegated shall initiate a descent as soon as practicable when the limit values of cosmic radiation dose rate specified in the Operations Manual are exceeded. (See ANTR OPS 1.680(a)(1))

ANTR OPS 1.395 Ground proximity detection

When undue proximity to the ground is detected by any flight crew member or by a ground proximity warning system, the commander or the pilot to whom conduct of the flight has been delegated shall ensure that corrective action is initiated immediately to establish safe flight conditions.

ANTR OPS 1.398 Use of Airborne Collision Avoidance System (ACAS)

(See AC OPS 1.398)

The operator shall establish procedures to ensure that:

(a) When ACAS is installed and serviceable, it shall be used in flight in a mode that enables Resolution Advisories (RA) to be produced unless to do so would not be appropriate for conditions existing at the time.

(b) When undue proximity to another aircraft (RA) is detected by ACAS, the commander or the pilot to whom conduct of the flight has been delegated must ensure that any corrective action indicated by the RA is initiated immediately, unless doing so would jeopardize the safety of the aeroplane;

The corrective action must:

(i) Never be in a sense opposite to that indicated by the RA.

(ii) Be in the correct sense indicated by the RA even if this is in conflict with the vertical element of an ATC instruction.

(iii) Be the minimum possible to comply with the RA indication.

(c) Prescribed ACAS ATC communications are specified.

(d) When the conflict is resolved the aeroplane is promptly returned to the terms of the ATC instructions or clearance.

(i) Unless otherwise specified in an air traffic control instruction, to avoid unnecessary airborne collision avoidance system (ACAS II) resolution advisories in aircraft at or approaching adjacent altitudes or flight levels, an aeroplane climbing or descending to an assigned altitude or flight level, especially with an autopilot engaged, may do so at a rate less than 8 m/sec or 1 500 ft/min (depending on the instrumentation available) throughout the last 300 m (1 000 ft) of climb or descent to the assigned level when the pilot is made aware of another aircraft at or approaching an adjacent altitude or flight level.

ANTR OPS 1.400 Approach and landing conditions

(See IEM OPS 1.400)

Before commencing an approach to land, the commander must satisfy himself that, according to the information available to him, the weather at the aerodrome and the condition of the runway intended to be used should not prevent a safe approach, landing or missed approach, having regard to the performance information contained in the Operations Manual.

ANTR OPS 1.405 Commencement and continuation of approach

(a) The commander or the pilot to whom conduct of the flight has been delegated may commence an instrument approach regardless of the reported runway visual range/visibility (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 decision altitude/height (DA/H) or minimum descent altitude/height (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 in accordance with Appendix 1 to ANTR OPS 1.430, sub- paragraph (h).

(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 mid point and stop end RVR are also controlling. The minimum RVR value for the mid-point is 125 m or the RVR required for the touch-down zone if less, and 75 m for the stop-end. For aeroplanes equipped with a roll-out guidance or control system, the minimum RVR value for the mid-point is 75 m.

Note: “Relevant”, in this context, means that part of the runway used during the high speed phase of the landing down to a speed of approximately 60 knots.

ANTR OPS 1.410 Operating procedures – Threshold crossing height 3D instrument approach operations

The operator must establish operational procedures designed to ensure that an aeroplane being used to conduct 3D instrument approach operations crosses the threshold by a safe margin, with the aeroplane in the landing configuration and attitude.

ANTR OPS 1.415 Journey log

A commander shall ensure that the Journey log is completed.

ANTR OPS 1.420 Occurrence reporting

(See CAP 05 - Occurrence Reporting)

(a) *Terminology*

(1) *Incident* An occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

(2) *Serious Incident* An incident involving circumstances indicating that an accident nearly occurred.

(3) *Accident* An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all persons have disembarked, in which:

(i) a person is fatally or seriously injured as a result of:

(A) being in the aircraft;

(B) direct contact with any part of the aircraft, including parts which have become detached from the aircraft; or,

(C) direct exposure to jet blast;

except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew: or

(ii) the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft; and would normally require major repair or replacement of the affected component; except for engine failure or damage, when the damage is limited to the engine, its cowlings or accessories; or for damage limited to propellers, wing tips, antennas, tyres, brakes, fairings, small dents or puncture holes in the aircraft skin: or

(iii) the aircraft is missing or is completely inaccessible.

(b) *Incident Reporting* The operator shall establish procedures for reporting incidents taking into account responsibilities described below and circumstances described in sub-paragraph (d) below.

(1) ANTR OPS 1.085(b) specifies the responsibilities of crew members for reporting incidents that endanger, or could endanger, the safety of operation.

(2) The commander or the operator of an aeroplane shall submit a report to the BCAA of any incident that endangers or could endanger the safety of operation.

(3) Reports must be despatched within 72 hours of the time when the incident was identified unless exceptional circumstances prevent this.

(4) A commander shall ensure that all known or suspected technical defects and all exceedances of technical limitations occurring while he was responsible for the flight are recorded in the aircraft technical log. If the deficiency or exceedance of technical limitations endangers or could endanger the safety of operation, the commander must in addition initiate the submission of a report to the BCAA in accordance with paragraph (b)(2) above.

(5) In the case of incidents reported in accordance with sub- paragraphs (b)(1), (b)(2) and (b)(3) above, arising from, or relating to, any failure, malfunction or defect in the aeroplane, its equipment or any item of ground support equipment, or which cause or might cause adverse effects on the continuing airworthiness of the aeroplane, the operator must also inform the organisation responsible for the design or the supplier or, if applicable, the organisation responsible for continued airworthiness, at the same time as a report is submitted to the BCAA.

(c) *Accident and Serious Incident Reporting* The operator shall establish procedures for reporting accidents and serious incidents taking into account responsibilities described below and circumstances described in sub-paragraph (d) below.

(1) A commander shall be responsible for notifying the nearest appropriate authority and the operator by the quickest available means of any accident or serious incident involving the aeroplane, resulting in serious injury or death of any person or substantial damage to the aeroplane or property while he was responsible for the flight. In the event that the commander is incapable of providing such notification, this task shall be undertaken by any other member of the crew if they are able to do so, note being taken of the succession of command specified by the operator.

(2) The operator shall ensure that the Authority in the State of the operator, the nearest appropriate Authority (if not the Authority in the State of the operator), and any other organisation required by the State of the operator to be informed, are notified by the quickest means available of any accident or serious incident and - in the case of accidents only - at least before the aeroplane is moved unless exceptional circumstances prevent this.

(3) The commander or the operator of an aeroplane shall submit a report to the Authority in the State of the operator within 72 hours of the time when the accident or serious incident occurred.

(d) *Specific Reports.* Occurrences for which specific notification and reporting methods must be used are described below;

(1) *Air Traffic Incidents* A commander shall without delay notify the air traffic service unit concerned of the incident and shall inform them of his intention to submit an air traffic incident report after the flight has ended whenever an aircraft in flight has been endangered by:

(i) A near collision with any other flying device;

(ii) Faulty air traffic procedures or lack of compliance with applicable procedures by air traffic services or by the flight crew;

(iii) Failure of air traffic services facilities.

In addition, the commander shall notify the BCAA of the incident.

(2) *Airborne Collision Avoidance System Resolution Advisory* A commander shall notify the air traffic service unit concerned and submit an ACAS report to the BCAA whenever an aircraft in flight has manoeuvred in response to an ACAS Resolution Advisory.

(3) *Bird Hazards and Strikes*

(i) A commander shall immediately inform the local air traffic service unit whenever a potential bird hazard is observed.

(ii) If he is aware that a bird strike has occurred, a commander shall submit a written bird strike report after landing to the BCAA whenever an aircraft for which he is responsible suffers a bird strike that results in significant damage to the aircraft or the loss or malfunction of any essential service. If the bird strike is discovered when the commander is not available, the operator is responsible for submitting the report.

(4) Dangerous Goods Incidents and Accidents. The operator shall report dangerous goods incidents and accidents to the BCAA and the appropriate Authority in the State where the accident or incident occurred, as provided for in Appendix 1 to ANTR OPS 1.1225. The first report shall be despatched within 72 hours of the event unless exceptional circumstances prevent this and include the details that are known at that time. If necessary, a subsequent report must be made as soon as possible giving whatever additional information has been established. (See also ANTR OPS 1.1225)

(5) *Unlawful Interference* Following an act of unlawful interference on board an aircraft, the commander or, in his absence, the operator shall submit a report as soon as practicable to the local Authority and to the Authority in the State of the operator. (See also ANTR OPS 1.1245)

(6) *Encountering Potential Hazardous Conditions* A commander shall notify the appropriate air traffic services unit as soon as practicable whenever a potentially hazardous condition such as an irregularity in a ground or navigational facility, a meteorological phenomenon or a volcanic ash cloud is encountered during flight.

(e) *Meteorological observations*. The procedures for making meteorological observations on board aircraft in flight and for recording and reporting them are contained in Annex 3, the PANS-ATM (Doc 4444) and the appropriate Regional Supplementary Procedures (Doc 7030).

(f) The pilot-in-command shall report the runway braking action special air-report (AIREP) when the runway braking action encountered is not as good as reported by the Aerodrome Operator.

Note: The procedures for making special air-reports regarding runway braking action are contained in the PANSATM (Doc 4444), Chapter 4 and Appendix 1.

Reporting on runway braking action

Whenever the runway braking action encountered during the landing roll is not as good as that reported by the aerodrome operator in the runway condition report (RCR), the commander shall notify the air traffic services (ATS) by means of a special air-report (AIREP) as soon as practicable.

ANTR OPS 1.425 *Reserved*

Appendix 1 to ANTR OPS 1.241

Operation in defined airspace with Reduced Vertical Separation Minima (RVSM)

To obtain an RVSM operational approval from the BCAA, 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.

CONTENT OF OPERATOR RVSM APPLICATION

The following material should be made available to the competent 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) Manuals 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 competent 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 competent authority. This plan should include, as a minimum, a check on a sample of the operator's fleet by a regional monitoring agency (RMA)’s independent height-monitoring system.

(h) Continuing airworthiness

Aircraft maintenance programme and continuing airworthiness procedures in support of the RVSM operations.

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 crew 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.
The usual scan of flight deck instruments should suffice for altimeter cross-checking on most flights.

(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 to the guidance on contingency procedures is 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 system. 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.

CONTINUING AIRWORTHINESS

(a) Maintenance programme

The aircraft maintenance programme should include the instructions for continuing airworthiness issued by the type certificate holder in relation to the RVSM operations certification.

(b) Continuing airworthiness procedures

The continuing airworthiness procedures should establish a process to:

(1) assess any modification or design change which in any way affects the RVSM approval;

(2) evaluate any repairs that may affect the integrity of the continuing RVSM approval, e.g. those affecting the alignment of pitot/static probes, repairs to dents, or deformation around static plates;

(3) ensure the proper maintenance of airframe geometry for proper surface contours and the mitigation of altimetry system error, surface measurements or skin waviness as specified in the instructions for continued airworthiness (ICA), to ensure adherence to RVSM

tolerances. These checks should be performed following repairs or alterations having an effect on airframe surface and airflow.

(c) Additional training may be necessary for continuing airworthiness and maintenance staff to support RVSM approval. Areas that may need to be highlighted for the initial and recurrent training of relevant personnel are:

(1) Aircraft geometric inspection techniques;

(2) Test equipment calibration and use of that equipment; and

(3) Any special instructions or procedures introduced for RVSM approval.

(d) Test equipment

The operator should ensure that maintenance organisations use test equipment adequate for maintenance of the RVSM systems. The adequacy of the test equipment should be established in accordance with the type certificate holder recommendations and taking into consideration the required test equipment accuracy and the test equipment calibration.

Appendix 1 to ANTR-OPS 1.255
Fuel Policy

(See ANTR-OPS 1.255)

The operator must base the company fuel policy, including calculation of the amount of fuel to be on board for departure, on the following planning criteria:

(a) Basic Procedure

The usable fuel to be on board for departure must be the amount of:

(1) Taxi fuel, which shall not be less than the amount, expected to be used prior to take-off. Local conditions at the departure aerodrome and APU consumption shall be taken into account.

(2) Trip fuel, which shall include:

(i) Fuel for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing; and

(ii) Fuel from top of climb to top of descent, including any step climb/descent; and

(iii) Fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

(iv) Fuel for approach and landing at the destination aerodrome.

(3) Contingency fuel, except as provided for in Paragraph (b) ‘Reduced Contingency Fuel’, which shall be the higher of (3)(i) or (3)(ii) below:

(i) Either:

(A) 5% of the planned trip fuel or, in the event of in-flight re-planning, 5% of the trip fuel for the remainder of the flight; or

(B) Not less than 3% of the planned trip fuel or, in the event of in-flight re-planning, 3% of the trip fuel for the remainder of the flight, provided that an en-route alternate aerodrome is available in accordance with Appendix 2 to ANTR-OPS 1.255; or

(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 approved by the BCAA which ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel. This method is used to monitor the fuel consumption on each city pair/aeroplane combination and the operator uses this data for a statistical analysis to calculate contingency fuel for that city pair/aeroplane combination. (See AC OPS 1.255).

(ii) 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 shall:

(i) include:

(A) Fuel for a missed approach from the applicable MDA/DH at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure; and

(B) Fuel for climb from missed approach altitude to cruising level/altitude, taking into account the expected departure routing; and

(C) Fuel for cruise from top of climb to top of descent, taking into account the expected routing; and

(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 selected in accordance with ANTR-OPS 1.295.

(ii) where two destination alternate aerodromes are required in accordance with ANTR-OPS 1.295(d), be sufficient to proceed to the alternate aerodrome which requires the greater amount of alternate fuel.

(5) Final reserve fuel, which shall 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 shall permit:

(i) The aeroplane to descend as necessary and proceed to an adequate alternate aerodrome in the event of engine failure or loss of pressurisation, whichever requires the greater amount of fuel based on the assumption that such a failure occurs at the most critical point along the route, and

(A) hold there for 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 sub-paragraphs (a)(2) to (a)(5) above 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;

(iii) an aeroplane engaged in EDTO to comply with the EDTO critical fuel scenario as established by the BCAA; and (See ANTR OPS 1.255)

(7) Extra fuel, which shall 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 a reduced contingency fuel procedure using a decision point along the route and a Destination 2 aerodrome (optional refuel destination), the amount of usable fuel, on board for departure, shall be the greater of (b)(1) or (b)(2) below:

(1) The sum of:

(i) Taxi fuel; and

(ii) Trip fuel to the Destination 1 aerodrome, via the decision point; and

(iii) Contingency fuel equal to not less than 5% of the estimated fuel consumption from the decision point to the Destination 1 aerodrome; and

(iv) Alternate fuel or no alternate fuel if the decision point is at less than six hours from the Destination 1 aerodrome and the requirements of ANTR-OPS 1.295(c)(1)(ii) are fulfilled; and

(v) Final reserve fuel; and

(vi) Additional fuel; and

(vii) Extra fuel if required by the commander.

(2) The sum of:

(i) Taxi fuel; and

(ii) Trip fuel to the Destination 2 aerodrome, via the decision point; and

(iii) Contingency fuel equal to not less than the amount calculated in accordance with subparagraph (a)(3) above from departure aerodrome to the Destination 2 aerodrome; and

(iv) Alternate fuel, if a Destination 2 alternate aerodrome is required; and

(v) Final reserve fuel; and

(vi) Additional fuel; and

(vii) Extra fuel if required by the commander.

(c) Pre-Determined 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, shall be the greater of (c)(1) or (c)(2) below:

(1) The sum of:

(i) Taxi fuel; and

(ii) Trip fuel from the departure aerodrome to the destination aerodrome, via the predetermined point; and

(iii) Contingency fuel calculated in accordance with sub-paragraph (a)(3) above; and

(iv) Additional fuel if required, but not less than:

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

(B) For aeroplanes with turbine engines, fuel to fly for two hours at normal cruise consumption above the destination aerodrome,

This shall not be less than final reserve fuel; and

(v) Extra fuel if required by the commander; or

(2) The sum of:

(i) Taxi fuel; and

(ii) Trip fuel from the departure aerodrome to the destination alternate aerodrome, via the predetermined point; and

(iii) Contingency fuel calculated in accordance with sub-paragraph (a)(3) above; and

(iv) Additional fuel if required, but not less than:

(A) For aeroplanes with reciprocating engines, fuel to fly for 45 minutes; 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 shall not be less than final reserve fuel; and

(v) Extra fuel if required by the commander.

(d) Isolated Aerodrome Procedure

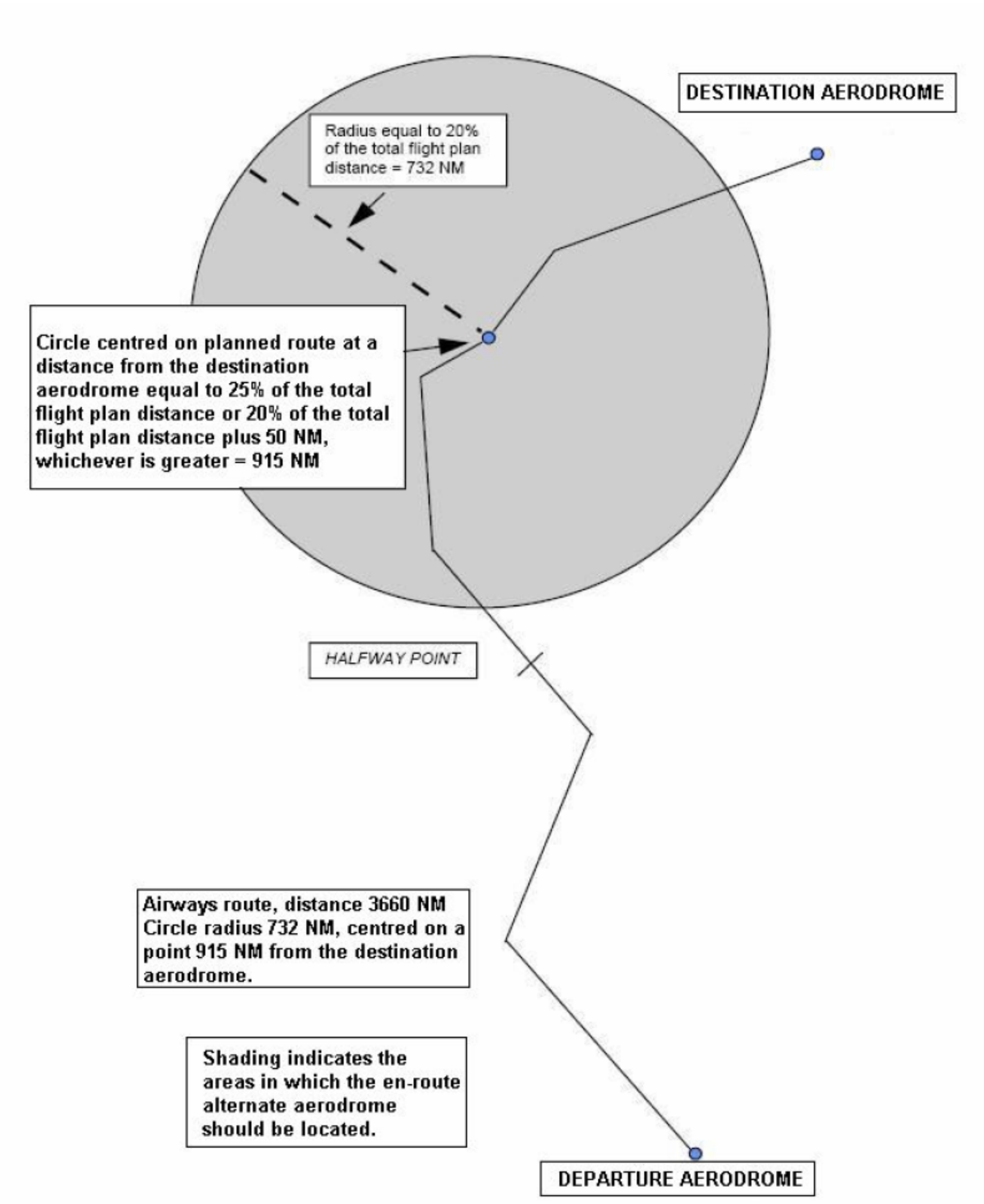
If the operator’s fuel policy includes planning to an isolated aerodrome, the last possible point of diversion to any available en-route alternate aerodrome shall be used as the pre-determined point. See paragraph (c) above.

Appendix 2 to ANTR-OPS 1.255

Location of the 3% En-Route Alternate (3% ERA) aerodrome for the purpose of reducing contingency fuel to 3%
(See Appendix 1 to ANTR-OPS 1.255)
(See ANTR-OPS 1.192)

The 3% ERA aerodrome shall be located within a circle having a radius equal to 20% of the total flight plan distance, the centre of which lies on the planned route at a distance from the destination aerodrome of 25% of the total flight plan distance, or at least 20% of the total flight plan distance plus 50 nm, whichever is greater, all distances are to be calculated in still air conditions (see figure 1).

Figure 1
Location of the 3% En-Route Alternate (3% ERA) aerodrome for the purposes of reducing contingency fuel to 3%



Appendix 1 to ANTR OPS 1.270

Stowage of baggage and cargo

(a) Procedures established by the operator to ensure that hand baggage and cargo is adequately and securely stowed must take account of the following:

(1) Each item carried in a cabin must be stowed only in a location that is capable of restraining it;

(2) Mass limitations placarded on or adjacent to stowages must not be exceeded;

(3) Underseat stowages must not be used unless the seat is equipped with a restraint bar and the baggage is of such size that it may adequately be restrained by this equipment;

(4) Items must not be stowed in toilets or against bulkheads that are incapable of restraining articles against movement forwards, sideways or upwards and unless the bulkheads carry a placard specifying the greatest mass that may be placed there;

(5) Baggage and cargo placed in lockers must not be of such size that they prevent latched doors from being closed securely;

(6) Baggage and cargo must not be placed where it can impede access to emergency equipment; and

(7) Checks must be made before take-off, before landing, and whenever the fasten seat belts signs are illuminated or it is otherwise so ordered to ensure that baggage is stowed where it cannot impede evacuation from the aircraft or cause injury by falling (or other movement) as may be appropriate to the phase of flight.

Appendix 1 to ANTR OPS 1.305

Refuelling/defueling with passengers embarking, on board or disembarking

(a) An aircraft shall not be refuelled/defuelled 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 type of fuels, the operator must establish operational procedures for re/defueling with passengers embarking, on board or disembarking to ensure the following precautions are taken:

(1) When refuelling/defuelling 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;

(2) The deployment of integral aircraft stairs or the opening of emergency exits as a prerequisite to refuelling is not necessarily required;

(3) One qualified person must remain at a specified location during fuelling operations with passengers on board. This qualified person must be capable of handling emergency procedures concerning fire protection and fire-fighting, handling communications and initiating and directing an evacuation; where passengers are embarking or disembarking during refuelling, their route should avoid areas where fuel vapours are likely to be present and this movement should be under the supervision of a responsible person;

(4) A two-way communication shall be established and shall remain available by the aeroplane’s inter-communication system or other suitable means between the ground crew supervising the refuelling and the qualified personnel on board the aeroplane; the involved personnel should remain within easy reach of the system of communication;

(5) Crew, staff and passengers must be warned that re/defueling will take place;

(6) ‘Fasten Seat Belts’ signs must be off;

(7) ‘NO SMOKING’ signs must be on, together with interior lighting to enable emergency exits to be identified;

(8) Passengers must be instructed to unfasten their seat belts and refrain from smoking, operation of switches or otherwise produce source of ignition;

(9) The minimum required number of cabin crew must be on board and be prepared for an immediate emergency evacuation;

(10) If the presence of fuel vapour is detected inside the aeroplane, or any other hazard arises during re/defueling, fuelling must be stopped immediately and can only be resumed when suitable condition permits;

(11) Sufficient number of exits for expeditious evacuation is made available. The ground area beneath the exits intended for emergency evacuation and slide deployment areas must be kept clear; at doors where stairs are not in potistion for use in the event of evacuation; and

(12) Provision is made for a safe and rapid evacuation.

SUBPART E – ALL WEATHER OPERATIONS

ANTR OPS 1.430 Aerodrome Operating Minima – General

(See Appendix 1 to ANTR OPS 1.430 & IEM OPS to ANTR OPS 1.430)

(a) The operator shall establish aerodrome operating minima for each aerodrome to be used in operations and BCAA shall approve the method of determination of such minima. Such minima shall not be lower than any that may be established for such aerodromes by the State of the Aerodrome, except when specifically approved by that State.

Note: This does not require the State of the Aerodrome to establish aerodrome operating minima.

(b) The BCAA shall authorize operational credit(s) for operations with advanced aircraft. Where the operational credit relates to low visibility operations, the State of the Operator shall issue a specific approval. Such authorization shall not affect the classification of the instrument approach procedure. Operational credit includes:

(1) for the purposes of an approach ban (See ANTR OPS 1.405(b)) or dispatch considerations, a minimum below the aerodrome operating minima;

(2) reducing or satisfying the visibility requirements; or

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

Note 1: Guidance on operational credit and how to express the operational credit in the Operations Specifications is contained in CAP 33 and Annex 6 Part I and ICAO Doc 9365 – All-Weather Operations.

Note 2: Information regarding automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, is contained in the Manual of All-Weather Operations *(Doc 9365).*

(c) When applying for a specific approval for the operational credit, the Operator shall ensure that:

i. the aeroplane meets the appropriate airworthiness certification requirements;

ii. the information necessary to support effective crew tasks for the operation is appropriately available to both pilots where the number of flight crew members specified in the operations manual is more than one;

iii. the operator has carried out a safety risk assessment of the operations supported by the equipment;

iv. the operator has established and documented normal and abnormal procedures and MEL;

v. the operator has established a training programme for the flight crew members and relevant personnel involved in the flight preparation;

vi. the operator has established a system for data collection, evaluation and trend monitoring for low visibility operations for which there is an operational credit; and

vii. the operator has instituted appropriate procedures in respect of continuing airworthiness (maintenance and repair) practices and programmes.

Note1: Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (Doc 9859).

Note2: Guidance on operational approvals is contained in the Manual of All-Weather Operations (Doc 9365).

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

Note: Guidance on operational credit for operations with minima above those related to low visibility operations is contained in the Manual of All-Weather Operations (Doc 9365).

(e) The operator, in establishing the aerodrome operating minima which will apply to any particular operation, the operator shall take full account of:

(1) The type, performance and handling characteristics of the aeroplane and any conditions or limitations stated in the flight manual;

(2) The composition of the flight crew, their competence and experience;

(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; (See Appendix 1 to ANTR OPS 1.430 Table 9 and AMC OPS 1.430, Para VII.)

(5) The equipment available on the aeroplane for the purpose of navigation, acquisition of visual references and/or control of the flight path, during the take-off, the approach, the flare, the landing, roll-out and the missed approach;

(6) The obstacles in the approach and missed approach areas and the obstacle clearance altitude/height for the instrument approach procedures;

(7) The means used to determine and report meteorological conditions.

(8) the obstacles in the climb-out areas and necessary clearance margins.

(9) the conditions prescribed in the operations specifications; and

(10) any minima that may be promulgated by the state of the Aerodrome

(f) Instrument approach operations shall be classified based on the designed lowest operating minima below which an approach operation shall only be continued with the required visual reference as follows:

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

(2) Type B: a decision height below 75 m (250 ft). Type B instrument approach operations are categorized as:

(i) Category I (CAT I): a decision height not lower than 60 m (200 ft) and with either a visibility not less than 800m or a runway visual range not less than 550 m;

(ii) Category II (CAT II): a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m; and

(iii) Category III (CAT III): a decision height lower than 30 m (100 ft) or no decision height and a runway visual range less than 300 m or no runway visual range limitations;

Note 1: Where decision height (DH) and runway visual range (RVR) fall into different categories of operation, the instrument approach operation would be conducted in accordance with the requirements of the most demanding category (e.g. an operation with a DH in the range of CAT III but with an RVR in the range of CAT III would be considered a CAT III operation or an operation with a DH in the range of CAT II but with an RVR in the range of CAT I would be considered a CAT II operation). This does not apply if the RVR and/or DH has been approved as operational credits.

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

Note 3: Guidance on approach classification as it relates to instrument approach operations, procedures, runways and navigation systems is contained in the Manual of All-Weather Operations (Doc 9365).

(g) The aeroplane categories referred to in this Subpart must be derived in accordance with the method given in Appendix 2 to ANTR OPS 1.430.

(h) The state of the operator – BCAA shall not issue a specific approval for instrument approach operations in low visibility which shall only be conducted when RVR information is provided.

Note: Guidance on low visibility operations is contained in the Manual of All-Weather Operations (Doc 9365).

(i) For take-off in low visibility, the State of the Operator shall issue a specific approval for the minimum take-off RVR.

Note: In general, visibility for take-off is defined in terms of RVR. An equivalent horizontal visibility may also be used.

(j) For instrument approach operations, aerodrome operating minima below 800 m visibility should not be authorized unless RVR information is provided.

(k) All approaches shall be flown as stabilised approaches (SAp) unless otherwise approved by the BCAA for a particular approach to a particular runway.

(l) All non-precision approaches shall be flown using the continuous descent final approaches (CDFA) technique unless otherwise approved by the BCAA for a particular approach to a particular runway.

When calculating the minima in accordance with Appendix 1, the operator shall ensure that the applicable minimum RVR is increased by 200 metres (m) for Cat A/B aeroplanes and by 400 m for Cat C/D aeroplanes for approaches not flown using the CDFA technique, providing that the resulting RVR/CMV value does not exceed 5000 m.

(m) The operating minima for 2D instrument approach operations using instrument approach procedures shall be determined by establishing a minimum descent altitude (MDA) or minimum descent height (MDH), minimum visibility and, if necessary, cloud conditions.

Note: For guidance on applying a continuous descent final approach (CDFA) flight technique on non-precision approach procedures, refer to PANS-OPS (Doc 8168), Volume I, Part

II, Section 5,.and ICAO DOC 9365.

(n) The operating minima for 3D instrument approach operations using instrument approach procedures shall be determined by establishing a decision altitude (DA) or decision height (DH) and the minimum visibility or RVR.

The operator shall establish operational procedures designed to ensure that an aeroplane being used to conduct 3D instrument approach operations crosses the threshold by a safe margin, with the aeroplane in the landing configuration and attitude.

(o) The operator shall specify the method of determining aerodrome operating minima in the operations manual.

(p) 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.

ANTR OPS 1.435 Terminology

(a) Terms used in this Subpart and not defined in ANTR Part 1 have the following meaning:

(1) *Circling.* The visual phase of an instrument approach to bring an aircraft into position for landing on a runway which is not suitably located for a straight-in approach.

(2) *Low Visibility Procedures (LVP).* Procedures applied at an aerodrome for the purpose of ensuring safe operations during Lower than Standard Category I, Other than Standard Category II, Category II and III approaches and Low Visibility Take-offs.

(3) *Low Visibility Take-Off (LVTO).* A take-off where the Runway Visual Range (RVR) is less than 400 m.

(4) *Flight control system.* A system which includes an automatic landing system and/or a hybrid landing system.

(5) *Fail-Passive flight control system.* A flight control system is fail-passive if, in the event of a failure, there is no significant out-of-trim condition or deviation of flight path or attitude but the landing is not completed automatically. For a fail-passive automatic flight control system the pilot assumes control of the aeroplane after a failure.

(6) *Fail-Operational flight control system.* A flight control system is fail-operational if, in the event of a failure below alert height, the approach, flare and landing, can be completed automatically. In the event of a failure, the automatic landing system will operate as a fail-passive system.

(7) *Fail-operational hybrid landing system.* A system which consists of a primary fail-passive automatic landing system and a secondary independent guidance system enabling the pilot to complete a landing manually after failure of the primary system.

Note: A typical secondary independent guidance system consists of a monitored head-up providing guidance which normally takes the form of command information, but it may alternatively be situation (or deviation) information.

(8) *Visual approach.* An approach when either part or all of an instrument approach procedure is not completed and the approach is executed with visual reference to the terrain.

(9) *Continuous Descent Final Approach (CDFA)*. A specific technique 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 15m (50ft) above the landing runway threshold or the point where the flare manoeuvre should begin for the type of aeroplane flown.

(10) *Stabilised Approach (SAp).* An approach which is flown in a controlled and appropriate manner in terms of configuration, energy and control of the flight path from a pre-determined point or altitude/height down to a point 50 feet above the threshold or the point where the flare manoeuvre is initiated if higher.

(11) *Head-Up Display (HUD)*. A display system which presents flight information into the pilot's forward external field of view and which does not significantly restrict the external view.

(12) *Head-Up Guidance Landing System (HUDLS)*. The total airborne system which provides head-up guidance to the pilot during the approach and landing and/or go-around. It includes all sensors, computers, power supplies, indications and controls. A HUDLS is typically used for primary approach guidance to decision heights of 50 ft.

(13) *Hybrid Head-Up Display Landing System (Hybrid HUDLS)*. A system which consists of a primary fail-passive automatic landing system and a secondary independent HUD/HUDLS enabling the pilot to complete a landing manually after failure of the primary system.

Note: Typically, the secondary independent HUD/HUDLS provides guidance which normally takes the form of command information, but it may alternatively be situation (or deviation) information.

(14) *Enhanced Vision System (EVS).* An electronic means of displaying a real-time image of the external scene through the use of imaging sensors.

(15) *Converted Meteorological Visibility (CMV).* A value (equivalent to an RVR) which is derived from the reported meteorological visibility, as converted in accordance with the requirements in this subpart.

(16) *Lower than Standard Category I Operation*. A Category I Instrument Approach and Landing Operation using Category I DH, with an RVR lower than would normally be associated with the applicable DH.

(17) *Other than Standard Category II Operation.* A Category II Instrument Approach and Landing Operation to a runway where some or all of the elements of the ICAO Annex 14 Precision Approach Category II lighting system are not available.

(18) *GNSS Landing System (GLS)*. An approach operation using augmented GNSS information to provide guidance to the aircraft based on its lateral and vertical GNSS position. (It uses geometric altitude reference for its final approach slope.)

ANTR OPS 1.440 Low visibility operations – General operating rules
(See Appendix 1 to ANTR OPS 1.440)

To obtain a specific approval, the operator shall demonstrate that:

(a) for low-visibility approach operations, LVTO operations in an RVR less than 125 m, and operations with operational credits, the aircraft has been certified for the intended operations;

(b) the flight crew members are competent to conduct the intended operation and a training and checking programme for the flight crew members and relevant personnel involved in the flight preparation has been established;

(c) operating procedures for the intended operations have been established;

(d) any relevant changes to the minimum equipment list (MEL) have been made;

(e) any relevant changes to the maintenance programme have been made;

(f) procedures have been established to ensure the suitability of aerodromes, including instrument flight procedures, for the intended operations; and

(g) for the intended operations, a safety assessment has been carried out, and performance indicators have been established to monitor the level of safety.

ANTR OPS 1.445 Low visibility operations – Aerodrome considerations

(a) The operator shall not use an aerodrome for Category II or III instrument approach operations unless the aerodrome is approved for such operations by the State of the Aerodrome.

(b) The operator shall verify that Low Visibility Procedures (LVP) have been established, and will be enforced, at those aerodromes where low visibility operations are to be conducted.

(c) The operator shall not conduct instrument approach operations in less than 800m visibility (aerodrome operating minima) unless RVR information is provided.

ANTR OPS 1.450 Low visibility operations – Training and Qualifications
(See Appendix 1 to ANTR OPS 1.450)

(a) The operator shall ensure that the flight crew is competent to conduct the intended operations.

(b) The operator shall ensure that each flight crew member successfully completes training and checking for all types of LVOs and operations with operational credits for which an approval has been granted. Such training and checking shall:

(1) include initial and recurrent training and checking;

(2) include normal, abnormal and emergency procedures;

(3) be tailored to the type of technologies used in the intended operations; and

(4) take into account the human factor risks associated with the intended operations.

(c) The operator shall keep records of the training and qualifications of the flight crew members.

(d) The training and checking shall be conducted 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 ANTR FCL 1.

(e) The training and checking are conducted in accordance with a detailed syllabus approved by the BCAA and included in the Operations Manual. This training is in addition to that prescribed in Subpart N; and

(f) The flight crew qualification is specific to the operation and the aeroplane type.

ANTR OPS 1.455 Low visibility operations – Operating Procedures
(See Appendix 1 to ANTR OPS 1.455)

(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.

ANTR OPS 1.460 Low visibility operations – Minimum equipment

(a) The operator shall include in the Operations Manual the minimum equipment that has to be serviceable at the commencement of a Low Visibility Take-off, a Lower than Standard Category I approach, an Other than Standard Category II approach, an approach utilizing EVS, a Category II or III approach in accordance with the AFM or other approved document.

(b) The commander shall satisfy himself that the status of the aeroplane and of the relevant airborne systems is appropriate for the specific operation to be conducted.

ANTR OPS 1.465 VFR Operating minima
(See Appendix 1 to ANTR OPS 1.465)

(a) The operator shall ensure that:

(1) VFR flights are conducted in accordance with the Visual Flight Rules and in accordance with the Table in Appendix 1 to ANTR OPS 1.465.

(2) Special VFR flights are not commenced when the visibility is less than 3 km and not otherwise conducted when the visibility is less than 1·5 km.

Appendix 1 to ANTR OPS 1.430
Aerodrome Operating Minima

(See IEM to Appendix 1 to ANTR OPS 1.430)

I. TAKE-OFF OPERATIONS — AEROPLANES

(a) General

(1) Take-off minima established by the operator must be expressed as visibility or RVR limits, taking into account all relevant factors for each aerodrome planned to be used and the aeroplane characteristics. Where there is a specific need to see and avoid obstacles on departure and/or for a forced landing, additional conditions (e.g. ceiling) must be specified.

(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.

(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 or Table 2.

(3) For single-engined turbine aeroplane operations, the take-off minima specified by the operator should be expressed as RVR/CMV values not lower than those specified in Table 1 below.

Unless the operator is making use of a risk period, whenever the surface in front of the runway does not allow for a safe forced landing, the RVR/CMV values should not be lower than 800 m. In this case, the proportion of the flight to be considered starts at the lift-off position and ends when the aeroplane is able to turn back and land on the runway in the opposite direction or glide to the next landing site in case of power loss.

(4) 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.
Examples of approved Take-Off Minima

Facilities	RVR / VIS [1]
Adequate visual reference[2] (day only)	500 m/1 600 ft
Runway edge lights or runway centre line markings[3]	400 m/1 200 ft
Runway edge lights and runway centre line markings[3]	300 m/1 000 ft
Runway edge lights and runway centre line lights	200 m/600 ft
Runway edge lights and runway centre line lights and relevant RVR information[4]	TDZ 150 m/500 ft MID 150 m/500 ft Stop-end 150 m/500 ft
High intensity runway edge lights and runway centre line lights (spacing 15 m or less) and relevant RVR information[4]	TDZ 125 m/400 ft MID 125 m/400 ft Stop-end 125 m/400 ft
High intensity runway edge lights and runway centre line lights (spacing 15 m or less), approved lateral guidance system and relevant RVR information[4]	TDZ 75 m/300 ft MID 75 m/300 ft Stop-end 75 m/300 ft
1. The TDZ RVR/VIS may be assessed by the pilot. 2. Adequate visual reference means that a pilot is able to continuously identify the take-off surface and maintain directional control. 3. For night operations, at least runway edge lights or centre line lights and runway end lights are available. 4 The required RVR is achieved for all relevant RVRs.	

Table 2.
Take-off — aeroplanes (without LVTO approval)

Assumed engine failure height above the runway versus RVR/VIS

Assumed engine failure height above the take- off runway (ft)	RVR/VIS (m) **
<50	400
51 – 100	400
101 – 150	400
151 – 200	500
201 – 300	1 000
>300 * or no positive take-off flight path can be constructed	1 500

**: The reported RVR/VIS value representative of the initial part of the take-off run can be replaced by pilot assessment.

II. DETERMINATION OF DH / MDH FOR INSTRUMENT APPROACH OPERATIONS - AEROPLANES

(a) The decision height (DH) to be used for a 3D approach operation or a 2D approach operation flown using the continuous descent final approach (CDFA) technique should not be lower than the highest of:

(1) the obstacle clearance height (OCH) for the category of aircraft;

(2) the published approach procedure DH or minimum descent height (MDH) where applicable;

(3) the system minima specified in Table 3;

(4) the minimum DH permitted for the runway specified in Table 4; or

(5) the minimum DH specified in the aircraft flight manual (AFM) or equivalent document, if stated.

(b) The MDH for a 2D approach operation flown not using the CDFA technique should not be lower than the highest of:

(1) the OCH for the category of aircraft;

(2) the published approach procedure MDH where applicable;

(3) the system minima specified in Table 3;

(4) the lowest MDH permitted for the runway specified in Table 4; or

(5) the lowest MDH specified in the AFM, if stated.

Table 3.
System minima

Facility	Lowest DH/MDH (ft)
ILS/MLS/GLS/SBAS	200*
GNSS/SBAS (LPV)	200 **
Precision Approach Radar (PAR)	200
GNSS/SBAS (LP)	250
GNSS (LNAV)	250
GNSS/Baro-VNAV (LNAV/ VNAV)	250
LOC with or without DME	250
SRA (terminating at ½ NM)	250
SRA (terminating at 1 NM)	300
SRA (terminating at 2 NM or more)	350

VOR	300
VOR/DME	250
NDB	350
NDB/DME	300
VDF	350

* The lowest authorized DH for Cat I operations is 200 ft unless an equivalent level of safety can be achieved through use of additional procedural or operational requirements.

* * For localiser performance with vertical guidance (LPV), a DH of 200 ft may be used only if the published FAS data block sets a vertical alert limit not exceeding 105 ft. Otherwise, the DH should not be lower than 250 ft.

Table 4.
Runway Type Minima – Aeroplanes

Runway type	**Lowest DH/MDH (ft)**	
Instrument runway	Precision approach (PA) runway, category I	200
	NPA runway	250
Non-Instrument runway	Non-instrument runway	Circling minima as shown in Table 9

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.

III. DETERMINATION OF RVR OR VIS FOR INSTRUMENT APPROACH OPERATIONS — AEROPLANES

(a) The RVR or VIS (Visibility) for straight-in instrument approach operations should be not less than the greatest of:
(1) the minimum RVR or VIS for the type of runway used according to Table 5;
(2) the minimum RVR determined according to the MDH or DH and class of lighting facility according to Table 6; or

(3) the minimum RVR according to the visual and non-visual aids and on-board equipment used according to Table 7.

If the value determined in (1) is a VIS, then the result is a minimum VIS. In all other cases, the result is a minimum RVR.

(b) For Category A and B aeroplanes, if the RVR or VIS determined in accordance with (a) is greater than 1 500 m, then 1 500 m should be used.

(c) If the approach is flown with a level flight segment at or above the MDA/H, then 200 m should be added to the RVR calculated in accordance with (a) and (b) for Category A and B aeroplanes and 400 m for Category C and D aeroplanes.

(d) The visual aids should comprise standard runway day markings, runway edge lights, threshold lights, runway end lights and approach lights as defined in Table 8.

Table 5.
Type of runway versus minimum RVR or VIS — aeroplanes

Type of runway	Minimum RVR or VIS(m)
PA runway Category I	RVR 550
NPA runway	RVR 750
Non-instrument runway	VIS according to Table 15 (circling minima)

Table 6.
RVR versus DH/MDH — aeroplanes

DH or MDH (ft)			**Class of lighting facility**			
			FALS	***IALS***	***BALS***	***NALS***
			RVR (m)			
200	-	210	550	750	1 000	1 200
211	-	240	550	800	1 000	1 200
241	-	250	550	800	1 000	1 300
251	-	260	600	800	1 100	1 300
261	-	280	600	900	1 100	1 300
281	-	300	650	900	1 200	1 400
301	-	320	700	1 000	1 200	1 400
321	-	340	800	1 100	1 300	1 500
341	-	360	900	1 200	1 400	1 600
361	-	380	1 000	1 300	1 500	1 700
381	-	400	1 100	1 400	1 600	1 800
401	-	420	1 200	1 500	1 700	1 900
421	-	440	1 300	1 600	1 800	2 000
441	-	460	1 400	1 700	1 900	2 100
461	-	480	1 500	1 800	2 000	2 200
481	-	500	1 500	1 800	2 100	2 300
501	-	520	1 600	1 900	2 100	2 400
521	-	540	1 700	2 000	2 200	2 400
541	-	560	1 800	2 100	2 300	2 400
561	-	580	1 900	2 200	2 400	2 400
581	-	600	2 000	2 300	2 400	2 400

601	-	620	2 100	2 400	2 400	2 400
621	-	640	2 200	2 400	2 400	2 400
641	-	660	2 300	2 400	2 400	2 400
661	and above		2 400	2 400	2 400	2 400

Table 7.
Visual and non-visual aids and/or on-board equipment versus minimum RVR- aeroplanes

<table>
<tr><th rowspan="2">Type of approach</th><th rowspan="2">Facilities</th><th colspan="2">Lowest RVR</th></tr>
<tr><th>Multi-pilot operations</th><th>Single-pilot operations</th></tr>
<tr><td rowspan="3">3D operations Final approach track offset ≤15° for category A and B aeroplanes or ≤5° for Category C and D aeroplanes</td><td>runway touchdown zone lights (RTZL) and runway centre line lights (RCLL)</td><td colspan="2">No limitation</td></tr>
<tr><td>without RTZL and/or RCLL but using HUDLS or equivalent system;
without RTZL and/or RCLL but using autopilot or flight director to the DH</td><td>No limitation</td><td>600 m</td></tr>
<tr><td>No RTZL and/or RCLL, not using HUDLS or equivalent system or autopilot or flight director to the DH</td><td>750 m</td><td>800 m</td></tr>
<tr><td rowspan="2">3D operations</td><td>runway touchdown zone lights (RTZL) and runway centre line lights (RCLL)
and
Final approach track offset >15° for Category A and B aeroplanes or Final approach track offset > 5° for Category C and D aeroplanes</td><td>800 m</td><td>1000 m</td></tr>
<tr><td>without RTZL and RCLL but using HUDLS or equivalent system; autopilot or flight director to the DH
and
Final approach track offset > 15° for Category A and B aeroplanes or Final approach track offset > 5° for Category C and D aeroplanes</td><td>800 m</td><td>1000 m</td></tr>
<tr><td rowspan="3">2D operations</td><td>Final approach track offset ≤15° for category A and B aeroplanes or ≤5° for Category C and D aeroplanes</td><td>750 m</td><td>800 m</td></tr>
<tr><td>Final approach track offset 15° for Category A and B aeroplanes</td><td>1000 m</td><td>1000 m</td></tr>
<tr><td>Final approach track offset 5° for Category C and D aeroplanes</td><td>1200 m</td><td>1200 m</td></tr>
</table>

Table 8.
Approach lighting systems — aeroplanes

Class of lighting facility	**Length, configuration and intensity of approach lights**
FALS	CAT I lighting system (HIALS ≥720 m) distance coded centre line, barrette centre line
IALS	Simple approach lighting system (HIALS 420–719 m) single source, barrette
BALS	Any other approach lighting system (HIALS, MALS or ALS 210–419 m)
NALS	Any other approach lighting system (HIALS, MALS or ALS <210 m) or no approach lights

(e) For night operations or for any operation where credit for visual aids is required, the lights should be on and serviceable except as provided for in Table 11.

(f) Where any visual or non-visual aid specified for the approach and assumed to be available in the determination of operating minima is unavailable, revised operating minima will need to be determined.

IV. RESERVED

V. 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 9; or

(iii) the DH/MDH of the preceding instrument approach procedure (IAP);

(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 (VIS) for the aeropla ne category, if published; or

(ii) the minimum visibility (VIS) derived from Table 9; or

Table 9.
Circling — aeroplanes

MDH and minimum visibility (VIS) versus aeroplane category

	Aeroplane category			
	A	**B**	**C**	**D**
Max IAS (kt)[1]	100	135	185	205
MDH (ft)	400	500	600	700
Minimum meteorological visibility (VIS) (m)[2]	1 500	1 600	2 400	3 600

Note for 1: *As per PANS-OPS, Volume I (Doc 8168).*

Note for 2: *These circling approach visibility differ from those in PANS-OPS, Volume I (ICAO DOC 8168) since the visual maneuvering (circle) approach values are not intended for establishment of operating minima.*

(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 aeroplane'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 (TDZ).

(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 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 a 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; or

(iv) to the minimum holding altitude (MHA) applicable to transition to a holding facility or fix, or continue to climb to an MSA; or 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.

VI. VISUAL APPROACH OPERATIONS

The operator should not use an RVR of less than 800 m for a visual approach operation.

VII. CONVERSION OF VISIBILITY TO CMV - AEROPLANES

The following conditions apply to the use of converted meteorological visibility (CMV) instead of RVR:

(a) If the reported RVR is not available, a CMV may be substituted for the RVR, except:

(1) to satisfy the take-off minima; or

(2) for the purpose of continuation of an approach in LVOs.

(b) If the minimum RVR for an approach is more than the maximum value assessed by the aerodrome operator, then CMV should be used.

(c) In order to determine CMV from visibility:

(1) for flight planning purposes, a factor of 1.0 should be used;

(2) for purposes other than flight planning, the conversion factors specified in Table 10 should be used.

Table 10.
Conversion of reported meteorological visibility (VIS) to RVR/CMV

Light elements in operation	**RVR/CMV = reported meteorological visibility x**	
	Day	**Night**
HI approach and runway lights	1.5	2.0
Any type of light installation other than above	1.0	1.5
No lights	1.0	not applicable

VIII. 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. Only those facilities mentioned in Table 11 should be acceptable to be used to determine the effect of temporarily failed of downgraded equipment. 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 11, and the approach may have to be abandoned.

(b) Conditions applicable to Table 11:

(1) multiple failures of runway / FATO lights other than indicated in Table 11 should not be acceptable;

(2) failures of approach and runway/FATO lights are acceptable at the same time, and the most demanding consequence should be applied; and

(3) failures other than ILS, MLS affect RVR only and not DH.

Table 11.
Failed or downgraded equipment — effect on landing minima

Operations without a low visibility operations (LVO) approval

<table>
<tr><th rowspan="2">Failed or downgraded equipment</th><th colspan="2">Effect on landing minima</th></tr>
<tr><th>Type B</th><th>Type A</th></tr>
<tr><td>Navaid stand-by transmitter</td><td colspan="2">No effect</td></tr>
<tr><td rowspan="4">Outer Marker</td><td rowspan="4">For CAT I: Not allowed except if the required height versus glide path can be checked using other means, e.g. DME fix.</td><td>APV — not applicable</td></tr>
<tr><td>NPA with FAF: no effect unless used as FAF</td></tr>
<tr><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>FOR CAT I: Not allowed except if the required height versus glide path can be checked using other means, e.g. DME fix</td></tr>
<tr><td>Middle marker (ILS Only)</td><td>No effect</td><td>No effect unless used as MAPt</td></tr>
<tr><td>RVR Assessment Systems</td><td colspan="2">No effect</td></tr>
<tr><td>Approach lights</td><td colspan="2">Minima as for NALS</td></tr>
<tr><td>Approach lights except the last 210 m</td><td colspan="2">Minima as for BALS</td></tr>
<tr><td>Approach lights except the last 420 m</td><td colspan="2">Minima as for IALS</td></tr>
<tr><td>Standby power for approach lights</td><td colspan="2">No effect</td></tr>
<tr><td>Edge lights, threshold lights and runway end lights</td><td colspan="2">Day: no effect;
Night: not allowed</td></tr>
</table>

Centre line lights	No effect if F/D, HUDLS or auto-land otherwise RVR 750 m	No effect but the minimum RVR should be 750m.
Centre line lights spacing increased to 30 m	No effect	
Touchdown zone lights	No effect if F/D, HUDLS or auto-land; otherwise RVR 750 m	No effect
Taxiway lighting system	No effect	

IX. VFR OPERATIONS WITH OTHER-THAN-COMPLEX MOTOR- POWERED AIRCRAFT

For the establishment of VFR operation minima, the operator may apply the VFR operating minima specified. ANTR OPS 1.465. Where necessary, the operator may specify in the OM additional conditions for the applicability of such minima taking into account such factors as radio coverage, terrain, nature of sites for take-off and landing, flight conditions and ATS capacity.

X. CONTINUOUS DESCENT FINAL APPROACH (CDFA)

The following criteria apply to CDFA:

(a) For each NPA procedure to be used, the operator should provide information allowing the flight crew to determine the appropriate descent path. This information is either:

(1) a descent path depicted on the approach chart including check altitude/heights against range;

(2) a descent path coded into the aircraft flight management system; or

(3) a recommended descent rate based on estimated ground speed.

(b) The information provided to the crew should observe human factors principles.

(c) The descent path should be calculated to pass at or above the minimum altitude specified at any step-down fix.

(d) The optimum angle for the descent path is 3º and should not exceed 4.5 º except for steep approach operations approved in accordance with this Part.

(e) For multi-pilot operations, the operator should establish procedures that require:

(1) the pilot monitoring to verbalize deviations from the required descent path;

(2) the pilot flying to make prompt corrections to deviation from the required descent path; and

(3) a call-out to be made when the aircraft is approaching the DA/H.

(f) A missed approach should be executed promptly at the DA/H or the MAPt, whichever is first, if the required visual references have not been established.

(g) For approaches other than circling approaches, the lateral part of the missed approach should be flown via the MAPt unless otherwise stated on the approach chart.

XI. 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).

XII. STABILISED APPROACH OPERATIONS — AEROPLANES

1. THE FOLLOWING CRITERIA SHOULD BE SATISFIED FOR ALL STABILISED APPROACH OPERATIONS WITH AEROPLANES:

(a) The flight management systems and approach aids should be correctly set, and any required radio aids identified before reaching a predetermined point or altitude/height on the approach.

(b) The aeroplane should be flown according to the following criteria from a predetermined point or altitude/height on the approach:

(1) the angle of bank should be less than 30 degrees; and

(2) the target rate of descent should be that required to maintain the correct vertical path at the planned approach speed.

(c) Variations in the rate of descent should normally not exceed 50 % of the target rate of descent.

(d) An aeroplane should be considered stabilised for landing when the following conditions are met:

(1) the aeroplane is tracking within an acceptable tolerance of the required lateral path;

(2) the aeroplane is tracking within an acceptable tolerance of the required vertical path;

(3) the vertical speed of the aeroplane is within an acceptable tolerance of the required rate of descent;

(4) the airspeed of the aeroplane is within an acceptable tolerance of the intended landing speed;

(5) the aeroplane is in the correct configuration for landing, unless operating procedures require a final configuration change for performance reasons after visual reference is acquired; and

(6) the thrust/power and trim settings are appropriate.

(e) The aeroplane should be stabilised for landing before reaching 500 ft above the landing runway threshold elevation.

(f) For approach operations where the pilot does not have visual reference with the ground, the aeroplane should additionally be stabilised for landing before reaching 1 000 ft above the landing runway threshold elevation except that a later stabilisation in airspeed may be acceptable if higher than normal approach speeds are required for operational reasons specified in the operations manual.

(g) The operator should specify the following in the operations manual:

(1) the acceptable tolerances referred to in (d);

(2) the means to identify the predetermined points referred to in (a) and (b). This should normally be the FAF.

(h) When the operator requests approval for an alternative to the stabilised approach criteria for a particular approach to a particular runway, the operator should demonstrate that the proposed alternative will ensure that an acceptable level of safety is achieved.

2. ACCEPTABLE TOLERANCES FOR STABILISED APPROACH OPERATIONS

(a) The requirement for the aircraft to be tracking within an acceptable tolerance of the required lateral path does not imply that the aircraft has to be aligned with the runway centre line by any particular height.

(b) The target rate of descent for the final approach segment (FAS) of a stabilised approach normally does not exceed 1 000 fpm. Where a rate of descent of more than 1 000 fpm will be required (e.g. due to high ground speed or a steeper-than-normal approach path), this should be briefed in advance.

(c) Operational reasons for specifying a higher-than-normal approach speed below 1 000 ft may include compliance with air traffic control (ATC) speed restrictions.

(d) For operations where a level flight segment is required during the approach (e.g. circling approaches or approaches flown as non-CDFA), the criteria in Para XII, 1(b) above should apply from the predetermined point until the start of the level flight segment and again from the point at which the aircraft begins descent from the level flight segment down to a point of 50 ft above the threshold or the point where the flare manoeuvre is initiated, if higher.

3. OPERATIONAL PROCEDURES, 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 operations manual and should include the duties of the flight crew during the conduct of such operations. The operator should ensure that the initial and recurrent flight crew training required by ORO.FC includes the use of the CDFA technique.

(b) Operators holding an approval to use another technique for NPAs on certain runways should establish procedures for the application of such techniques.

Appendix 2 to ANTR OPS 1.430

Aeroplane categories – All Weather Operations

(a) *Classification of aeroplanes*

Aeroplanes categories shall be based on the indicated airspeed at threshold (V_{AT}) which is equal to the stalling speed (V_{SO}) multiplied by 1·3 or one-g (Gravity) stall speed (V_{S1G}) multiplied by 1·23 in the landing configuration at the maximum certificated landing mass. If both V_{SO} and V_{S1G} are available, the higher resulting V_{AT} shall be used. The aeroplane categories specified in the table below shall be used

The Aeroplane categories corresponding to V_{AT} values:

Aeroplane Category	V_{AT} (IAS)
A	Less than 91 kt
B	From 91 to 120 kt
C	From 121 to 140 kt
D	From 141 to 165 kt
E	From 166 to 210 kt

The landing configuration which is to be taken into consideration shall be defined by the operator or by the aeroplane manufacturer.

(b) *Permanent change of category (maximum landing mass)*

(1) The operator may impose a permanent, lower, landing mass, and use this mass for determining the V_{AT} if approved by the BCAA.

(2) The category defined for a given aeroplane shall be a permanent value and thus independent of the changing conditions of day-to-day operations.

Appendix 1 to ANTR OPS 1.440

Low Visibility Operations – General Operating Rules

I. AIRCRAFT CERTIFICATION FOR THE INTENDED OPERATIONS

(a) Aircraft used for LVTO in an RVR of less than 125 m should be equipped with a system certified for the purpose.

(b) Aircraft used for low-visibility approach operations should be equipped in accordance with the applicable airworthiness requirements and certified as follows:

(1) For CAT II operations, the aircraft should be certified for CAT II operations.

(2) For CAT III operations, the aircraft should be certified for CAT III operations.

(3) For SA CAT I, the aircraft should be certified for SA CAT I operations.

(4) For SA CAT II, the aircraft should be certified for CAT II operations and be equipped with HUDLS or fail-passive autoland or better.

(5) For EFVS / EVS operations, the aircraft should be equipped with a certified EFVS / EVS.

II. AIRCRAFT CERTIFICATION — EQUIPMENT ELIGIBLE FOR LOW VISIBILITY TAKE-OFF IN AN RVR LESS THAN 125 M

Systems that are used to qualify for take-off in an RVR less than 125 m typically allow the pilot to use the external visual cues as well as instrumented guidance to track the runway centre line. The kind of systems in use today include paravisual display (PVD) and HUD. It is expected that EFVS / EVSs will be certified for take-off guidance in the future. Where the PVD or HUD uses an ILS localiser signal as reference, the ILS sensitive area must be protected by the LVPs at the aerodrome.

III. SAFETY ASSESSMENT — MONITORING, DATA COLLECTION AND PERFORMANCE INDICATORS FOR APPROACH OPERATIONS

(a) The operator should monitor LVOs and operations with operational credits in order to validate the effectiveness of the applicable aircraft flight guidance systems, training, flight crew procedures, and aircraft maintenance programme, and to identify hazards.

(b) Data should be collected whenever an LVO or an operation with an operational credit is attempted regardless of whether the approach is abandoned, is unsatisfactory, or is concluded successfully. The data should include records of the following:

(1) occasions when it was not possible to commence an approach due to deficiencies or unserviceabilities of related airborne equipment;

(2) occasions when approaches were discontinued, including the reasons for discontinuing the approach and the height above the runway at which the approach was discontinued;

(3) occasions when system abnormalities required pilot intervention to ensure a continued approach or safe landing;

(4) landing performance, whether or not the aircraft landed satisfactorily within the desired touchdown area with acceptable lateral velocity or cross-track error. 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 recorded.

(c) Data about LVOs should be collected by means of the operator's flight data monitoring programme supplemented by other means including reports submitted by flight crew. Operators that do not have a flight data monitoring programme should use reports submitted by flight crew as the primary means of gathering data.

(d) Performance indicators should include the following:

(1) the rate of unsuccessful low-visibility approaches, i.e. the number of attempted approaches terminating in discontinued approaches, approaches where pilot intervention was required to ensure a continued approach or safe landing or where landing performance was unsatisfactory, compared to the number of low-visibility approaches attempted;

(2) measures of performance of the airborne equipment for low-visibility approaches or operations with operational credits;

(3) safety performance indicators related to other specific risks associated with LVOs.

(e) The following information should be retained for at least 5 years:

(1) the total number of low-visibility approaches or operations with an operational approval attempted or completed, including practice approaches, by aircraft type; and

(2) reports of unsatisfactory approaches and/or landings, by runway and aircraft registration, in the following categories:

(i) airborne equipment faults;

(ii) ground facility difficulties;

(iii) missed approaches because of air traffic control (ATC) instructions; or

(iv) other reasons.

IV. SAFETY ASSESSMENT PRIOR TO OBTAINING AN APPROVAL

(a) Prior to commencing LVOs or operations with operational credits, an operator should demonstrate to the competent authority that such operations will achieve an acceptable level of safety. This requires the operator to gather data from operations using the relevant systems and procedures and conduct safety assessments taking that data into account.

(b) The operator applying for the approval of low-visibility approach operations should determine the minimum number of approaches required to gather sufficient data to demonstrate an acceptable level of safety and the time period over which such data should be gathered.

(c) If an operator is applying for more than one LVO approval or an approval for operation with operational credits for a particular aircraft type, then data gathered from operations using the systems and procedures designed for one classification of operations or operation with operational credits may be used to support the application for another classification of operations or operation with operational credits provided the following elements are similar:

(1) type of technology, including:

(i) flight control/guidance system (FGS) and associated displays and controls;
(ii) flight management system (FMS) and level of integration with the FGS;
(iii) use of HUD or an equivalent display system; and
(iv) use of EFVS (Enhanced Flight Vision System);

(2) operational procedures, including:

(i) alert height;
(ii) manual landing/automatic landing;
(iii) no DH operations;
(iv) use of HUD or an equivalent display system in hybrid operations; and
(v) use of EFVS (Enhanced Flight Vision System) / EVS (Enhanced Vision System) to touchdown; and

(3) handling characteristics, including:

(i) manual landing from automatic or HUD or an equivalent display system guided approach;
(ii) manual missed approach procedure from automatic approach; and
(iii) automatic/manual roll-out.

(d) An operator holding an approval for low-visibility approach operations or operations with operational credits may use data gathered from approaches conducted using one aircraft type to support an application for approval for a different aircraft type or variants provided the following elements are similar:

(1) type of technology, including the following:

(i) FGS and associated displays and controls;
(ii) FMS and level of integration with the FGS;
(iii) use of HUD or an equivalent display system; and
(iv) use of EFVS / EVS ;

(2) operational procedures, including:

(i) alert height;
(ii) manual landing/automatic landing;
(iii) no DH operations;
(iv) use of HUD or an equivalent display system in hybrid operations; and
(v) use of EFVS / EVS to touchdown; and

(3) handling characteristics, including:

(i) manual landing from automatic or HUD or an equivalent display system guided approach;
(ii) manual missed approach procedure from automatic approach; and
(iii) automatic/manual roll-out.

V. SPECIFIC APPROVAL CRITERIA — SUCCESSFUL APPROACH AND LANDING

(a) The purpose of this guidance is to provide operators with supplemental information regarding the criteria for a successful approach and landing.

(b) An approach may be considered to be successful if:

(1) from 500 ft to start of flare:

(i) speed is maintained within +/- 5 kt of the intended speed, disregarding rapid fluctuations due to turbulence;
(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) A 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 150 m after the threshold and before the end of the touchdown zone (TDZ) (750 m from the threshold);
(5) lateral touchdown with the outboard landing gear is not outside the TDZ edge;
(6) sink rate is not excessive;
(7) bank angle does not exceed a bank angle limit; and
(8) no roll-out failure or deviation (if installed) occurs.

VI. SAFETY PERFORMANCE MONITORING

(a) Data gathering for safety performance monitoring of LVOs and operations with operational credits will need to include sufficient information for the operator to identify hazards and assess the risks associated with LVOs and operations with operational credits.

(b) The following data relating to LVOs and operations with operational credits may be gathered via flight crew reports, flight data monitoring or other means, as appropriate:

(1) date and time;

(2) aircraft details (type and registration);

(3) airport, approach procedure, final approach and take-off area (FATO) and/or runway used;

(4) the type of LVO or operation with operational credits attempted or completed;

(5) weather conditions including wind, reported RVR and natural phenomena that restrict visibility;

(6) the reason for a discontinued approach (if applicable);

(7) details of any pilot intervention to ensure a continued approach or safe landing;

(8) adequacy of speed control;

(9) trim at time of automatic flight control system disengagement (if applicable);

(10) compatibility of automatic flight control system, flight director and raw data;

(11) an indication of the position of the aircraft relative to the centre line when descending through to 100 ft;

(12) touchdown position relative to the TDZ;

(13) an assessment of the sink rate, lateral velocity and bank angle at touchdown;

(14) the nature of any problems encountered by the crew in relation to operating procedures or training; and

(15) any human factors issues that arose in relation to the operation.

(c) Where data is gathered as part of the operator’s flight data monitoring programme, procedures should be established to ensure that information that is only available directly from the flight crew or other sources (e.g. weather information) is captured.

(d) In order to assess the risks associated with LVOs and operations with operational credits, operators may consider hazards with the potential to result in the following unacceptable safety outcomes:

(1) loss of control in flight;

(2) runway overrun or excursion;

(3) controlled flight into terrain;

(4) runway incursion and ground collision; and

(5) airborne conflict.

(e) Operators' safety control processes will ensure that LVOs and operations with operational credits:

(1) meet the safety objectives and performance standards established in the operator's safety policy;

(2) achieve at least the same level of safety as operations other than LVOs and operations without operational credits; and

(3) have a continuously improving safety performance.

(f) Two methods to determine the rate of unsuccessful low-visibility approaches are described below:

(1) Fail/pass method (binary): the rate of unsuccessful low-visibility approaches determined in accordance with Paragraph V of this Appendix should not exceed 5 %. If the unsuccessful operations appear to occur on a given aircraft, aircraft series or runway, specific mitigation measures need to be established and a separate specific rate may need to be calculated and monitored.

Note: the term 'aircraft series' is explained below. Operators may choose to apply a lower rate than 5 %.

Explanations:

(a) *Aircraft make: The aircraft make is the name assigned to the aircraft by the aircraft manufacturer when each aircraft was produced. In most cases, the aircraft make is the common name of the aircraft manufacturer; for example, Airbus, Boeing, Embraer, etc.*

(b) Aircraft model: An aircraft model is an aircraft manufacturer's designation for an aircraft grouping with a similar design or style of structure. In EASA type certificate data sheet (TCDS), this means the aircraft type certificate; for example, A330, B777.

(c) Aircraft series: An aircraft series is an aircraft manufacturer's designation to identify differences within an aircraft model grouping. It provides a further specification to the aircraft type; for example, B777-232 where the series is the number 232. Some manufacturers define the so-called master series: An aircraft master series creates a grouping of similar aircraft series for analytical purposes and to identify aircraft series that share airworthiness properties. A master series contains aircraft series from within one aircraft model. For example, A320-100 and A320-200: the A320-100 master series only has one series (A320-111), while the A320-200 master series has many series (211, 212, 214, 215, 216, 231, 232, 233).

(d) Aircraft variant: a variant defines different sets of limiting structural masses (e.g. MTOW, MLW, MZFW, etc.) within a series. For example, A320-232-007 or the A330-243 RR engine's variant 052. Variants are not covered in the ICAO Cast taxonomy; however, they may be specified in the respective TCDS of the states of design.

(2) Continuous method: this method may be selected by operators with a flight data monitoring programme. This methodology is more refined and allows identifying undesirable trends earlier and possibly before they become severe. This method applies an event monitoring methodology in which the deviations from the nominal performance are categorised according to their severity (severity index). For each event (criterion), a level of deviation may be defined as follows:

(i) Low (‘green’: the deviation is small and within the limits of nominal behaviour. No action is required.)

(ii) Medium (‘yellow’): the deviation is above the criteria for low (‘green’) and below the criteria for high (‘red’). No corrective action should be required based on an isolated occurrence; however, a corrective action should be taken if the situation does not improve, or a negative trend is identified. The monitoring should then focus on the particular runway or aircraft series or combination of those.

(iii) High (‘red’): the deviation is undesirably high. Investigation and corrective action should be undertaken even based on an isolated occurrence. The threshold for level high (‘red’) may be based on the criteria of Paragraph V of this Appendix.

VII. DATA GATHERING FOR SAFETY ASSESSMENT PRIOR TO OBTAINING AN APPROVAL

(a) General

The intention of the safety assessment is to validate the use and effectiveness of the applicable aircraft flight control and guidance systems, procedures, flight crew training and aircraft maintenance programme. The intention is not to repeat the statistical analysis required for certification of equipment, but rather to demonstrate that the various elements of the ‘total system’ for LVOs work together for a particular operator.

(b) Data gathering for safety assessment — LVTOs

(1) If the procedures used for LVTOs are not significantly different from those used for standard take-offs, it may be sufficient for operators to conduct only a small number of take-offs using the procedures established for LVTOs for the purpose of data gathering. The following could be considered as a minimum:

(i) For LVTOs in an RVR of 125 m or more if procedures are similar to those used for standard take-offs: 1 take-off;

(ii) For LVTOs in an RVR of less than 125 m or any other LVTOs using specific procedures: 10 take-offs.

(2) An operator holding an approval for LVTOs on one aircraft type and applying the approval for LVTOs on another type or variant may use data from LVTOs conducted on the first type if the following are similar:

(i) level of technology, including flight deck displays, HUD or an equivalent guidance system;
(ii) operational procedures; and
(iii) handling characteristics.

(c) Data gathering for safety assessment — approach operations with a DH below 200 ft

The data required for the safety assessment needs to be gathered from approaches conducted in a representative sample of expected operating conditions. The operator needs to take seasonal variations in operating conditions such as prevalent weather, planned destinations and operating bases, and ensure that the approaches used for data gathering are conducted over a sufficient period of time to be representative of the planned operation.

In order to ensure that the data is representative of planned operations, approaches are conducted at a variety of airports and runways. If more than 30 % of the approaches are conducted to the same runway, the operator may increase the number of approaches required and take measures to ensure that the data is not distorted.

The number of approaches used for data gathering will depend on the performance indicators and analysis methods used by the operator. The operator will need to demonstrate that the operation for which approval is sought will achieve an acceptable level of safety. The following figures may be considered a minimum for an operator without previous experience of low-visibility approach operations:

(1) for approval of operations with a DH of not less than 50 ft: 30 approaches;

(2) for approval of operations with a DH of less than 50 ft: 100 approaches.

Approaches conducted for the purpose of gathering data in order to conduct a safety assessment prior to obtaining an LVO approval may be conducted in line operations or any other flight where the operator’s procedures are used. Approaches may also be conducted in an FSTD if the operator is satisfied that this would be representative of the operation.

The data gathered from these approaches will only be representative if all required elements of the total system for LVOs are in place. These include not only operating procedures and airborne equipment, but also airport and ATC procedures and ground- or space-based navigation facilities. If the operator chooses to collect data from approaches conducted without all required elements in place, then the data analysis takes into account the effect of at least the following:

(1) air traffic services (ATS) factors including situations where a flight conducting an instrument approach is vectored too close to the FAF for satisfactory lateral and vertical path capture, lack of protection of ILS sensitive areas or ATS requests to discontinue the approach;

(2) misleading navigation signals such as ILS localiser irregularities caused by taxiing aircraft or aircraft overflying the localiser array;

(3) other specific factors that could affect the success of LVOs that are reported by the flight crew.

(d) Safety considerations for approaches used for data gathering

If an operator chooses to collect data from approaches conducted without all required elements of the total system for LVOs in place, then the operator takes actions to ensure an acceptable level of safety.

(e) Sharing of data: operators may use data from other operators or aircraft manufacturers to support the safety assessment required to demonstrate an acceptable level of safety. The operator applying for a specific approval would need to demonstrate that the data used was relevant to the proposed operation.

(f) It is expected that operators will have more than 6 months or at least 1 000 hours of total operational experience on the aircraft model before they can have sufficient data to set up meaningful performance indicators and establish whether planned LVOs would achieve an acceptable level of safety.

Appendix 1 to ANTR OPS 1.450

Low Visibility Operations – Training & Qualifications

I. ANTR OPS 1.450(a) - COMPETENCE OF THE FLIGHT CREW FOR THE INTENDED OPERATIONS — EXPERIENCE IN TYPE OR CLASS, OR AS PILOT-IN-COMMAND/COMMANDER

To ensure that the flight crew is competent to conduct the intended operations, the operator should assess the risks associated with the conduct of low-visibility approach operations by pilots new to the aircraft type or class and take the necessary mitigations. Where such mitigations include an increment to the visibility or RVR for LVOs, this should be stated in the operations manual.

II. ANTR OPS 1.450(a) - COMPETENCE OF THE FLIGHT CREW FOR THE INTENDED OPERATIONS — RECENT EXPERIENCE FOR EFVS / EVS OPERATIONS

To be considered competent to conduct EFVS (Enhanced Flight Vision System) / EVS (Enhanced Vision System) operations:

(a) Pilots should complete a minimum of two approaches on each type of aircraft operated using the operator’s procedures for EFVS / EVS operations during the validity period of each operator proficiency check or periodic demonstration of competence unless credits related to recent experience when operating more than one type are defined in the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1. When the operator is approved for EFVS / EVS , a minimum of one approach in each EFVS / EVS operation should be completed.

(b) If a flight crew member is authorised to operate as pilot flying and pilot monitoring during EFVS / EVS operations, the flight crew member should complete the required number of approaches in each operating capacity.

III. ANTR OPS 1.450(a) - COMPETENCE OF THE FLIGHT CREW FOR THE INTENDED OPERATIONS — RECENT EXPERIENCE FOR SA CAT I, CAT II, SA CAT II AND CAT III APPROACH OPERATIONS

To be considered competent:

(a) Pilots authorised to conduct low-visibility approach operations or operations with operational credits should complete at least two approaches using the operator’s procedures for low-visibility approach operations or operations with operational credits, during the validity period of each operator proficiency check or periodic demonstration of competence, unless credits related to recent experience when operating more than one type are defined in the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1.

(b) If the operator is approved for more than one piece of aircraft equipment used (e.g. autoland, HUD, auto-coupled approach with manual landing, SVGS (Synthetic Vision Guidance System), etc.), pilots should complete at least one additional approach in the lowest approved RVR (either to go-around or landing) for each piece of aircraft equipment used during the validity period of each operator proficiency check or periodic demonstration of competence (e.g. two approaches CAT II with autoland and one CAT II with auto-coupled to below DH with manual landing, two CAT II autoland and one CAT II HUD to below DH with manual landing or vice versa) unless credits related to recent experience when operating more than one type are defined in the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1.

(c) Pilots authorised to conduct low-visibility approach operations or operations with operational credits using HUDLS (HUD Landing System) or equivalent display systems to touchdown should complete two approaches (e.g. an operator approved for CAT II/III HUDLS will do two CAT III HUDLS; other examples would be two CAT III autoland and two CAT III HUDLS to touchdown, two SA CAT II autoland and two SA CAT II HUDLS, or when combining several LVOs and equipment, two CAT III autoland and one CAT II auto-coupled to below DH with manual landing and two CAT III HUDLS to touchdown) using the operator's procedures for low-visibility approach operations or operations with operational credits using HUDLS, during the validity period of each operator proficiency check or periodic demonstration of competence unless credits related to recent experience when operating more than one type are defined in the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1.

(d) If a flight crew member is authorised to operate as pilot flying and pilot monitoring, the flight crew member should complete the required number of approaches in each operating capacity.

IV. ANTR OPS 1.450(a) - COMPETENCE OF THE FLIGHT CREW FOR THE INTENDED OPERATIONS — EXPERIENCE IN TYPE OR CLASS, OR AS PILOT-IN-COMMAND/COMMANDER

As general guidance, the operator may use the following reference to assess the experience in type or class or as pilot-in-command/commander referred to in Para I of this Appendix 1 to ANTR OPS 1.450.

(a) Before commencing CAT II operations, the following guidance applies to pilots-in-command/commanders or pilots to whom conduct of the flight may be delegated, who are new to the aircraft type:

(1) 50 hours or 20 sectors on the type, including LIFUS (Line Flying Under Supervision); and

(2) 100 m should be added to the applicable CAT II RVR minima when the operation requires a CAT II manual landing to touchdown until:

(i) a total of 100 hours or 40 sectors, including LIFUS, has been achieved on the type; or

(ii) 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;

(3) 100 m may be added to the applicable CAT II RVR minima when the operation requires the use of CAT II HUDLS to touchdown until:

(i) a total of 40 sectors, including LIFUS, has been achieved on the type; or

(ii) a total of 20 sectors, including LIFUS, has been achieved on the type where the flight crew member has been previously qualified for CAT II HUDLS to touchdown with an EU operator.

The sector provision in point (a)(1) may always be applicable; the hours on type or class may not fulfil the provisions.

(b) Before commencing CAT III operations, the following additional provisions may apply to pilots-in-command/commanders or pilots to whom conduct of the flight may be delegated, who are new to the aircraft type:

(1) 50 hours or 20 sectors on the type, including LIFUS; and

(2) 100 m may be added to the applicable CAT II or CAT III RVR minima unless they have been 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.

V. ANTR OPS 1.450(b) - INITIAL TRAINING FOR LVTO IN AN RVR LESS THAN 400 M

The operator should ensure that the flight crew members have completed the following training and checking prior to being authorised to conduct take-offs in an RVR below 400 m unless credits related to training and checking for previous experience in LVTOs on similar aircraft types are defined in the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1.:

(a) A ground training course including at least the following:

(1) characteristics of fog;

(2) effects of precipitation, ice accretion, low-level wind shear and turbulence;

(3) the effect of specific aircraft/system malfunctions;

(4) the use and limitations of RVR assessment systems;

(5) procedures to be followed and precautions to be taken 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;

(6) qualification requirements for pilots to obtain and retain approval to conduct LVOs; and

(7) the importance of correct seating and eye position.

(b) A course of FSTD/flight training covering system failures and engine failures resulting in continued as well as rejected take-offs. Such training should include at least:

(1) normal take-off in minimum approved RVR conditions;

(2) take-off in minimum approved RVR conditions with an engine failure:

(i) for aeroplanes, between V1 and V2 (take-off safety speed) or as soon as safety considerations permit;

(ii) for helicopters, at or after the take-off decision point (TDP); and

(3) take-off in minimum approved RVR conditions with an engine failure:
(i) for aeroplanes, before V1 resulting in a rejected take-off; and

(ii) for helicopters, before the TDP.

(c) The operator approved for LVTOs with an RVR below 150 m should ensure that the training specified in (b) is carried out in an FSTD. This training should include the use of any special procedures and equipment.

(d) The operator should ensure that a flight crew member has completed a check before conducting LVTOs in RVRs of less than 150 m. The check should require the execution of:

(1) at least one LVTO in the minimum approved visibility;

(2) at least one rejected take-off at minimum approved RVR in an aircraft or FSTD.

VI. ANTR OPS 1.450(b) - INITIAL TRAINING AND CHECKING FOR SA CAT I, CAT II, SA CAT II AND CAT III APPROACH OPERATIONS

Operators should ensure that flight crew members complete the following training and checking before being authorised to conduct Special Authorization (SA) CAT I, CAT II, SA CAT II and CAT III approach operations unless credits related to training and checking for previous experience on similar aircraft types are defined in the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1:

(a) For flight crew members who do not have previous experience of low-visibility approach operations requiring an approval under this Subpart with an EU operator:

(1) A course of ground training including at least the following:

(i) characteristics and limitations of different types of approach aids;

(ii) characteristics of the visual aids;

(iii) characteristics of fog;

(iv) operational capabilities and limitations of airborne systems to include symbology used on HUD/HUDLS or equivalent display systems, if appropriate;

(v) effects of precipitation, ice accretion, low level wind shear and turbulence;

(vi) the effect of specific aircraft/system malfunctions;

(vii) the use and limitations of RVR assessment systems;

(viii) principles of obstacle clearance requirements;

(ix) the recognition of failure of ground equipment or in satellite approaches, the loss of signal in space and the action to be taken in the event of such failures;

(x) procedures to be followed and precautions to be taken 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;

(xi) the significance of DHs based upon radio altimeters and the effect of terrain profile in the approach area on radio altimeter readings and on automatic approach/landing systems. This applies also to other devices capable of providing equivalent information;

(xii) the effect of the pre-threshold terrain and LSAA (Landing System Assessment Area) on airborne landing systems;

(xiii) the significance of alert height, if applicable, and action in the event of any failure above and below the alert height;

(xiv) qualification requirements for pilots to obtain and retain approval to conduct LVOs;

(xv) the importance of correct seating and eye position; and

(xvi) the significance of LVPs or equivalent procedures.

(2) A course of FSTD training and/or flight training in two phases as follows:

(i) Phase one (LVOs with aircraft and all equipment serviceable) — objectives

(A) understand the operation of equipment required for LVOs;

(B) understand the operating limitations resulting from airworthiness certification;

(C) practise the monitoring of automatic flight control systems and status annunciators;

(D) practise the use of HUD/HUDLS or equivalent display systems, where appropriate;

(E) understand the significance of alert height, if applicable;

(F) become familiar with the maximum lateral and vertical deviation permitted for different types of approach operation;

(G) become familiar with the visual references required at DH;

(H) master the manual aircraft handling relevant to low-visibility approach operations;

(I) practise coordination with other crew members; and

(J) become proficient at procedures for low-visibility approach operations with serviceable equipment.

(ii) Phase one of the training should include the following exercises:

(A) the required checks for satisfactory functioning of equipment, both on the ground and in flight;

(B) the use of HUD/HUDLS or equivalent display systems during all phases of flight, if applicable;

(C) approach using the appropriate flight guidance, autopilots, and control systems installed on the aircraft to the appropriate DH and transition to visual flight and landing;

(D) approach with all engines operating using the appropriate flight guidance, autopilots and control systems installed on the aircraft, including HUD/HUDLS or equivalent display systems, down to the appropriate DH followed by a missed approach, all without external visual reference;

(E) where appropriate, approaches using autopilot to provide automatic flare, hover, landing and roll-out; and

(F) where appropriate, approaches using approved HUD/HUDLS or equivalent display system to touchdown.

(iii) Phase two (low-visibility approach operations with aircraft and equipment failures and degradations) — objectives

(A) understand the effect of known aircraft unserviceability including use of the MEL;

(B) understand the effect of failed or downgraded equipment on aerodrome operating minima;

(C) understand the actions required in response to failures and changes in the status of automatic flight control/guidance systems including HUD/HUDLS or equivalent display systems;

(D) understand the actions required in response to failures above and below alert height, if applicable;

(E) practise abnormal operations and incapacitation procedures; and

(F) become proficient at dealing with failures and abnormal situations during low-visibility approach operations.

(iv) Phase two of the training should include the following exercises:

(A) approaches with engine failures at various stages of the approach;

(B) approaches with critical equipment failures, such as electrical systems, auto-flight systems, ground or airborne approach aids and status monitors;

(C) approaches where failures of auto-flight or flight guidance systems, including HUDLS or equivalent display systems, require either:

(a) reversion to manual control for landing or go-around; or

(b) reversion to manual control or a downgraded automatic mode control for go-around from the DH or below, including those which may result in contact with the runway.

This should include aircraft handling if, during a CAT III fail-passive approach, a fault causes autopilot to disconnect at or below the DH when the last reported RVR is 300 m or less;

(D) failures of systems that will result in excessive lateral or vertical deviation both above and below the DH in the minimum visual conditions for the operation;

(E) incapacitation procedures appropriate to low-visibility approach operations; and

(F) failures and procedures applicable to the specific aircraft type.

(v) FSTD training should include:

(A) for approaches flown using HUDLS or equivalent display systems, a minimum of eight approaches;

(B) otherwise, a minimum of six approaches.

(vi) For aircraft for which no FSTDs representing the specific aircraft are available, operators should ensure that the flight training phase specific to the visual scenarios of low-visibility approach operations is conducted in a specifically approved FSTD. Such training should include a minimum of four approaches. Thereafter, type-specific training should be conducted in the aircraft.

(3) A check requiring the completion of at least the following exercises in an aircraft or FSTD:

(i) Low-visibility approaches in simulated instrument flight conditions down to the applicable DH, using the flight guidance system. Standard procedures of crew coordination (task sharing, call-out procedures, mutual surveillance, information exchange and support) should be observed. For CAT III operations, the operator should use an FSTD approved for this purpose;

(ii) Go-around after approaches as indicated in (2) at any point between 500 ft above ground level (AGL) and on reaching the DH; and

(iii) Landing(s) with visual reference established at the DH following an instrument approach. Depending on the specific flight guidance system, an automatic landing should be performed.

(4) For operators for which LIFUS is required by Part-ORO, practice in approaches during LIFUS, as follows:

(i) For low-visibility approach operations using a manual landing:

(A) if a HUDLS or equivalent display system is used to touchdown, four landings, or if the training required by (a)(2) was conducted in an FSTD qualified for zero flight-time training (ZFTT), two landings;

(B) otherwise, three landings, or if the training required by (a)(2) was conducted in an FSTD qualified for ZFTT, one landing;

(ii) For low-visibility operations using autoland:

(A) if the training required by (a)(2) was conducted in an FSTD qualified for ZFTT, one landing, or none if the fight crew member successfully completed a type rating based on ZFTT;

(B) otherwise, two landings.

(b) For flight crew members who have previous experience of low-visibility approach operations requiring an approval, when changing to an aircraft for which a new class or type rating is required, within the same operator:

(1) A course of ground training as specified in (a)(1), taking into account the flight crew member’s existing knowledge of low-visibility approach operations.

(2) A course of FSTD and/or flight training, as specified in (a)(2) above. If the flight crew member’s previous experience of low-visibility approach operations is on a type where the following were the same or similar:

(i) the technology used in the flight guidance and flight control system;

(ii) operating procedures;

(iii) handling characteristics; and

(iv) the use of HUD/HUDLS or equivalent display systems, then the flight crew member may complete an abbreviated course of FSTD and/or flight training.

(3) An abbreviated course should meet the objectives described in (a)(2), it does not need to include the number of approaches required by (a)(2)(v), but should include at least the following number of landings:

(i) if a HUDLS or an equivalent display system is utilised to touchdown, then four approaches including a landing at the lowest approved RVR and a go-around; or

(ii) otherwise, two approaches including a landing at the lowest approved RVR and a go-around.

(c) For flight crew members who have previous experience of low-visibility approach operations requiring an approval under this Subpart with an EU operator, when joining another operator:

(1) A course of ground training as specified in (a)(1), taking into account the flight crew member’s existing knowledge of low-visibility approach operations.

(2) A course of FSTD and/or flight training as specified in (a)(2) above. If the flight crew member’s previous experience of low-visibility approach operations is on the same aircraft type and variant, or on a different type or variant where the following were the same or similar:

(i) the technology used in the flight guidance and flight control system;

(ii) operating procedures;

(iii) handling characteristics; and

(iv) the use of HUD/HUDLS or equivalent display systems,
then the flight crew member may complete an abbreviated course of FSTD and/or flight training. Such an abbreviated course should meet the objectives described in (a)(2), it does not need to include the number of approaches required by (a)(2)(v), but should include at least the following number of landings:

(A) if a HUDLS or an equivalent display system is utilised to touchdown, then four approaches including a landing at the lowest approved RVR and a go-around; or

(B) otherwise, two approaches including a landing at the lowest approved RVR and a go-around.

(3) Practice in approaches during LIFUS as required by (a)(3) above unless the flight crew member’s previous experience of low-visibility approach operations is on the same aircraft type and variant.

VII. ANTR OPS 1.450(b) - INITIAL TRAINING AND CHECKING FOR EFVS (ENHANCED FLIGHT VISION SYSTEM) / EVS (ENHANCED VISION SYSTEM) OPERATIONS

Operators should ensure that flight crew members complete the following training and checking before being authorised to conduct EFVS / EVS operations unless credits related to training and checking for previous experience on similar aircraft types are defined in the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1:

(a) For flight crew members who do not have previous experience of EFVS operations requiring an approval under this Subpart with an EU operator:

(1) A course of ground training including at least the following:

(i) characteristics and limitations of HUDs/HUDLSs or equivalent display systems including information presentation and symbology;
(ii) EFVS sensor performance, sensor limitations, scene interpretation, visual anomalies and other visual effects;

(iii) EFVS display, control, modes, features, symbology, annunciations and associated systems and components;

(iv) the interpretation of EFVS imagery;

(v) the interpretation of approach and runway lighting systems and display characteristics when using EFVS / EVS;

(vi) weather associated with low-visibility conditions and its effect on EFVS / EVS performance;

(vii) pre-flight planning and selection of suitable aerodromes and approach procedures;

(viii) principles of obstacle clearance requirements;

(ix) the use and limitations of RVR assessment systems;

(x) normal, abnormal and emergency procedures for EFVS / EVS operations;

(xi) the effect of specific aircraft/system malfunctions;

(xii) procedures to be followed and precautions to be taken with regard to surface movement during operations when the RVR is 400 m or less;

(xiii) for EFVS / EVS , the effect of the pre-threshold terrain and LSAA on airborne landing systems;

(xiv) human factors aspects of EFVS / EVS operations;

(xv) qualification requirements for pilots to obtain and retain approval for EFVS operations; and

(xvi) the significance of LVPs or equivalent procedures when operating below RVR 550 m.

(2) A course of FSTD training and/or flight training in two phases as follows:

(i) Phase one (EFVS / EVS operations with aircraft and all equipment serviceable) — objectives:

(A) understand the operation of equipment required for EFVS / EVS operations;

(B) understand operating limitations of the installed EFVS / EVS;

(C) practise the use of HUD/HUDLS or equivalent display systems;

(D) practise the set-up and adjustment of EFVS / EVS equipment in different conditions (e.g. day and night);

(E) practise the monitoring of automatic flight control systems, EFVS / EVS information and status annunciators;

(F) practise the interpretation of EFVS / EVS imagery;

(G) become familiar with the features needed on the EFVS / EVS image to continue approach below the DH;

(H) practise the identification of visual references using natural vision while using EFVS / EVS equipment;

(I) master the manual aircraft handling relevant to EFVS / EVS operations including, where appropriate, the use of the flare cue and guidance for landing;

(J) practise coordination with other crew members; and

(K) become proficient at procedures for EFVS / EVS operations.

(ii) Phase one of the training should include the following exercises:

(A) the required checks for satisfactory functioning of equipment, both on the ground and in flight;

(B) the use of HUD/HUDLS or equivalent display systems during all phases of flight;

(C) approach using the EFVS / EVS installed on the aircraft to the appropriate DH and transition to visual flight and landing;

(D) approach with all engines operating using the EFVS / EVS, down to the appropriate DH followed by a missed approach, all without external visual reference;

(E) where appropriate, approaches using approved EFVS / EVS to touchdown.

(iii) Phase two (EFVS / EVS operations with aircraft and equipment failures and degradations) — objectives:

(A) understand the effect of known aircraft unserviceability including use of the MEL;

(B) understand the effect of failed or downgraded equipment on aerodrome operating minima;

(C) understand the actions required in response to failures and changes in the status of the EFVS / EVS including HUD/HUDLS or equivalent display systems;

(D) understand the actions required in response to failures above and below the DH;

(E) practise abnormal operations and incapacitation procedures; and

(F) become proficient at dealing with failures and abnormal situations during EFVS / EVS operations.

(iv) Phase two of the training should include the following exercises:

(A) approaches with engine failures at various stages of the approach;

(B) approaches with failures of the EFVS / EVS at various stages of the approach, including failures between the DH and the height below which an approach should not be continued if natural visual reference is not acquired, requiring either:

(a) reversion to head-down displays to control missed approach; or

(b) reversion to flight with no, or downgraded, guidance to control missed approaches from the DH or below, including those which may result in a touchdown on the runway;

(C) incapacitation procedures appropriate to EFVS / EVS operations; and

(D) failures and procedures applicable to the specific EFVS / EVS installation and aircraft type.

(v) FSTD training should include a minimum of eight approaches.

(vi) If a flight crew member is to be authorised to operate as pilot flying and pilot monitoring during EFVS / EVS operations, then the flight crew member should complete the required FSTD training for each operating capacity.

(3) For operators for which LIFUS is required by Part-ORO, practice in approaches during LIFUS, as follows:

(i) if EFVS / EVS is used to touchdown, four landings; or

(ii) otherwise, three landings.

(b) For flight crew members who have previous experience of EFVS / EVS operations requiring an approval under this Subpart with an EU operator, when changing to an aircraft for which a new class or type rating is required, with the same operator:

(1) A course of ground training as specified in (a)(1), taking into account the flight crew member’s existing knowledge of low-visibility approach operations.

(2) The course of FSTD and/or flight training required by (a)(2) above. If the flight crew member’s previous experience of low-visibility approach operations is on a type where the following were the same or similar:

(i) the technology used in the EFVS / EVS sensor, flight guidance and flight control system;

(ii) operating procedures; and

(iii) handling characteristics,

then the flight crew member may complete an abbreviated course of FSTD and/or flight training. Such an abbreviated course should meet the objectives described in (a)(2), it does not need to include the number of approaches required by (a)(2)(v), but should include at least the following number of landings:

(i) for EFVS / EVS to touchdown, four approaches including a landing at the lowest approved RVR and a go-around, or

(ii) otherwise, two approaches including a landing at the lowest approved RVR and a go-around.

(c) For flight crew members who have previous experience of EFVS / EVS operations requiring an approval under this Subpart with an EU operator, when joining another operator:

(1) A course of ground training as specified in (a)(1), taking into account the flight crew member's existing knowledge of low-visibility approach operations.

(2) The course of FSTD and/or flight training required by (a)(2) above. If the flight crew member's previous experience of EFVS operations is on the same aircraft type and variant with the same EFVS or on a different type or different EFVS / EVS where the following were the same or similar:

(i) the technology used in the EFVS sensor, flight guidance and flight control system;

(ii) operating procedures; and

(iii) handling characteristics,

then the flight crew member may complete an abbreviated course of FSTD and/or flight training.

(3) Such an abbreviated course should meet the objectives described in (a)(2), it does not need to include the number of approaches required by (a)(2)(v), but should include at least the following number of landings:

(i) for EFVS / EVS to touchdown, four approaches including a landing at the lowest approved RVR and a go-around, or

(ii) otherwise, two approaches including a landing at the lowest approved RVR and a go-around.

(4) Practice in approaches during LIFUS as required by (a)(3) above unless the flight crew member's previous experience of low-visibility approach operations is on the same aircraft type and variant.

VIII. ANTR OPS 1.450(b) - RECURRENT CHECKING FOR LVTO, SA CAT I, CAT II, SA CAT II AND CAT III APPROACH OPERATIONS

(a) The operator should ensure that the pilots' competence to perform LVOs for which they are authorised is checked by completing at least the following exercises:

(1) One or more low-visibility rejected take-off at minimum approved RVR at least once over the period between two operator proficiency checks or once at every periodic demonstration of competence or, for an ATQP operator, at each required operator proficiency check or alternatively at each required LOE (i.e. approximately one or more RTO per year).

(2) Pilots authorised for LVTO operations in an RVR of less than 150 m should conduct at least one LVTO in the minimum approved visibility at each required operator proficiency check or periodic demonstration of competence (i.e. approximately one or more RTO every semester).

(3) One or more low-visibility approaches in simulated instrument flight conditions down to a point between 500 ft AGL and the threshold (e.g. applicable DH), followed by go-around, at each required operator proficiency check or periodic demonstration of competence; and

(4) One or more low-visibility approach and landings with visual reference established at the DH at each required operator proficiency check or periodic demonstration of competence.

(b) Pilots authorised to conduct CAT III operations on aircraft with a fail-passive autoland system, or HUDLS or equivalent, should complete a missed approach at least once over the period of three consecutive operator proficiency checks or demonstrations of competence as the result of an equipment failure at or below the DH when the last reported RVR was less than 300 m. For ATQP operators, pilots authorised to conduct CAT III operations on aircraft with a fail-passive autoland system, or HUDLS or equivalent, should complete a missed approach at least once every two OPCs or LOE (a period of about 2 years).

(c) CAT III approach operations should be conducted in an FSTD. Other exercises may be conducted in an FSTD or aircraft.

IX. ANTR OPS 1.450(b) - DIFFERENCES TRAINING FOR LVTO, SPECIAL AUTHORIZATION (SA) CAT I, CAT II, SA CAT II AND CAT III APPROACH OPERATIONS

(a) The operator should ensure that the flight crew members are provided with differences training or familiarisation whenever they are required to conduct low-visibility approach operations or operations with operational credits requiring an approval under this Subpart for which they are not already authorised, or whenever there is a change to any of the following:

(1) the technology used in the flight guidance and flight control system;

(2) the operating procedures including:

(i) fail-passive/fail-operational;

(ii) alert height;

(iii) manual landing or automatic landing;

(iv) operations with DH or no DH operations;

(3) the handling characteristics;

(4) the use of HUD/HUDLS or equivalent display systems;

(5) the use of EFVS.

(b) The differences training should:

(1) meet the objectives of the appropriate initial training course;

(2) take into account the flight crew members' previous experience; and

(3) take into account the operational suitability data established by the operator in accordance with ANTR OPS 1 / ANTR FCL 1.

X. ANTR OPS 1.450(b) - RECURRENT CHECKING FOR EFVS OPERATIONS

(a) The operator should ensure that the pilots' competence to perform EFVS / EVS operations is checked at each required demonstration of competence or operator proficiency check by performing at least two approaches of which one should be flown without natural vision, to the height below which an approach should not be continued if natural visual reference is not acquired.

(b) If a flight crew member is authorised to operate as pilot flying and pilot monitoring during EFVS operations, then the flight crew member should complete the required number of approaches in each operating capacity.

XI. ANTR OPS 1.450(b) - DIFFERENCES TRAINING FOR EFVS OPERATIONS

(a) The operator should ensure that the flight crew members authorised to conduct EFVS operations are provided with differences training or familiarisation whenever there is a change to any of the following:

(1) the technology used in the EFVS sensor, flight guidance and flight control system;

(2) the operating procedures;

(3) the handling characteristics.

(b) The differences training should:

(1) meet the objectives of the appropriate initial training course;

(2) take into account the flight crew members' previous experience; and

(3) take into account the operational suitability data established by the operator in accordance with ANTR OPS 1.

Appendix 1 to ANTR OPS 1.455

Low Visibility Operations – Operating procedures

I. OPERATING PROCEDURES FOR LVOs

Prior to commencing an LVO, the pilot-in-command/commander should be satisfied that:

(a) the status of visual and non-visual facilities is as required;

(b) if LVPs are required for such operations, LVPs are in effect; and

(c) the flight crew members are appropriately qualified.

II. OPERATING PROCEDURES — GENERAL

(a) Operating procedures should be established for all types of LVOs and operations with operational credits for which an operator is seeking approval. The operating procedures should:

(1) be consistent with the AFM;

(2) be appropriate to the technology and equipment to be used;

(3) specify the duties and responsibilities of each flight crew member in each relevant phase of flight;

(4) ensure that flight crew workload is managed to facilitate effective decision-making and monitoring of the aircraft; and

(5) minimise, as much as practical, the deviation from normal procedures used for routine operations (non-LVOs).

(b) Operating procedures should include:

(1) the required checks for the satisfactory functioning of the aircraft equipment, both before departure and in flight;

(2) the correct seating and eye position;

(3) determination of aerodrome operating minima;

(4) the increment to be added to minima for use by pilots-in-command/commanders who are new to the aircraft type, if applicable;

(5) the effect on aerodrome operating minima of temporarily failed or downgraded ground equipment;

(6) the effect on aerodrome operating minima of the failure or change of the status of any aircraft systems;

(7) when the LVPs at the aerodrome are required. LVPs are required:

(i) for low-visibility flight approach operations;

(ii) for LVTOs with RVR less than 400 m.

If an operator selects an aerodrome with equivalent procedures, where the term ‘LVPs’ is not used (e.g. regional procedures), the operator should verify that suitable procedures are established to ensure an equivalent level of safety to that achieved at approved aerodromes. This situation should be clearly noted in the operations manual or procedures manual, including guidance to the flight crew on how to determine that the suitable procedures are in effect at the time of an actual operation. Note: the AFM may state that some elements of LVPs are not required and therefore the equivalent level of safety may be established on that basis;

(8) a requirement for an ‘approaching minima’ call-out to prevent inadvertent descent below the DA/H;

(9) the requirement for height call-outs below 200 ft to be based on the use of a radio altimeter or other device capable of providing equivalent performance, if applicable;

(10) the required visual references;

(11) the action to be taken in the event of loss of the required visual references; and

(12) the maximum allowable flight path deviations and action to be taken in the event that such deviations occur.

(c) Operators required to comply with the requirements should include operating procedures in the operations manual as required.

III. OPERATING PROCEDURES — CAT II

For CAT II operations, the following should apply:

(a) The flight crew should consist of at least two pilots.

(b) The approach should be flown using a certified system as identified in the AFM.

(c) If the approach is flown using autopilot, for a manual landing the autopilot should remain engaged until after the pilot has achieved visual reference.

(d) All height call-outs below 200 ft above the runway threshold elevation should be determined by the use of a radio altimeter or other device capable of providing equivalent performance.

(e) The DH should be determined by the use of a radio altimeter or other device capable of providing equivalent performance, if so determined by the aircraft certification process.

(f) At DH, the following visual references should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three consecutive lights, which are the centre line of the approach lights or TDZ lights or runway centre line lights or edge lights or a combination of these; and

(2) a visual reference that should include a lateral element of the ground pattern, such as an approach lighting crossbar, or the landing threshold, or a barrette of the TDZ lighting unless the operation is conducted using a HUD or an equivalent system to touchdown.

IV. OPERATING PROCEDURES — CAT III

For CAT III operations, the following should apply:

(a) The flight crew should consist of at least two pilots.

(b) The approach should be flown using a certified system as identified in the AFM.

(c) All height call-outs below 200 ft above the runway threshold elevation should be determined by the use of a radio altimeter or other device capable of providing equivalent performance.

(d) For operations in which a DH is used, the DH should be determined by the use of a radio altimeter or other device capable of providing equivalent performance, if so determined by the aircraft certification process.

(e) At DH, the following visual references should be distinctly visible and identifiable to the pilot:

(1) for operations conducted either with fail-passive flight control systems or with the use of an approved HUD or equivalent display system: a segment of at least three consecutive lights, which are the centre line of the approach lights, or TDZ lights, or runway centre line lights, or runway edge lights, or a combination of these; and

(2) for operations conducted either with fail-operational flight control systems or with a fail-operational hybrid landing system using a DH: at least one centre line light to be attained and maintained by the pilot.

(f) For operations with no DH, there is no specification for visual reference with the runway prior to touchdown.

V. OPERATING PROCEDURES — SA CAT I

For SA CAT I operations, the following should apply:

(a) The approach should be flown using a certified system as identified in the AFM.

(b) All height call-outs below 200 ft above the runway threshold elevation should be determined by the use of a radio altimeter or other device capable of providing equivalent performance.

(c) The DH should be determined by the use of a radio altimeter or other device capable of providing equivalent performance, if so determined by the aircraft certification process.

(d) At DH the following visual references should be visible to the pilot:

(1) a segment of at least three consecutive lights, which are the centre line of the approach lights, or TDZ lights, or runway centre line lights, or runway edge lights, or a combination of these; and

(2) a visual reference that should include a lateral element of the ground pattern, such as an approach lighting crossbar, or the landing threshold, or a barrette of the TDZ lighting unless the operation is conducted utilising an approved HUD or an equivalent system usable down to 120 ft above the runway threshold.

VI. OPERATING PROCEDURES — SA CAT II

For SA CAT II operations, the following should apply:

(a) The flight crew should consist of at least two pilots.

(b) The approach should be flown using a certified HUDLS or autoland system as identified in the AFM.

(c) All height call-outs below 200 ft above the runway threshold elevation should be determined by the use of a radio altimeter or other device capable of providing equivalent performance.

(d) The DH should be determined by the use of a radio altimeter or other device capable of providing equivalent performance, if so determined by the aircraft certification process.

(e) At DH the visual references should be distinctly visible and identifiable to the pilot:

(1) a segment of at least three consecutive lights, which are the centre line of the approach lights or TDZ lights, or runway centre line lights, or runway edge lights or a combination of these;

(2) a visual reference that should include a lateral element of the ground pattern, such as an approach lighting crossbar, or the landing threshold, or a barrette of the TDZ lighting.

VII. OPERATING PROCEDURES — EFVS / EVS OPERATIONS TO A RUNWAY

For EFVS operations to a runway, the following should apply:

(a) The approach should be flown using a certified EFVS / EVS system as identified in the AFM.

(b) The pilot flying should use the EFVS / EVS throughout the approach.

(c) In multi-pilot operations, the pilot monitoring should monitor the EFVS / EVS - derived information.

(d) The approach between the final approach fix (FAF) and the DA/H should be flown using vertical flight path guidance mode (e.g. flight director).

(e) The approach may be continued below the DA/H provided that the pilot can identify on the EFVS / EVS image either:

(1) the approach light system; or

(2) both of the following:

(i) the runway threshold identified by the beginning of the runway landing surface, the threshold lights or the runway end identifier lights; and

(ii) the TDZ identified by the TDZ lights, the TDZ runway markings or the runway edge lights.

(f) Unless the aircraft is equipped with a certified EFVS / EVS, a missed approach should be executed promptly if the required visual reference is not distinctly visible and identifiable to the pilot without reliance on the EFVS / EVS by the following height above the threshold:

(1) the height below which an approach should not be continued if natural visual reference is not acquired by the crew as stated in the AFM; or

(2) if the AFM does not specify such a height, 100 ft.

VIII. FLIGHT 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.

Appendix 1 to ANTR OPS 1.465

Minimum Visibilities for VFR Operations

Airspace class		A B C D E (Note 1)	F G	
			Above 900 m (3 000 ft) AMSL or above 300 m (1 000 ft) above terrain, whichever is the higher	At and below 900 m (3 000 ft) AMSL or 300 m (1 000 ft) above terrain, whichever is the higher
Distance from cloud		1 500 m horizontally 300 m (1 000 ft) vertically		Clear of cloud and in sight of the surface
Flight visibility	8 km at and above 3 050 m (10 000 ft) AMSL (Note 1) 5 km below 3 050 m (10 000 ft) AMSL			5 km (Note 3)

Note 1: *VMC Minima for Class A airspace are included for guidance but do not imply acceptance of VFR flights in Class A airspace.*

Note 2: *When the height of the transition altitude is lower than 3 050 m (10 000 ft) AMSL, FL 100 should be used in lieu of 10 000ft.*

Note 3: *Cat A and B aeroplanes may be operated in flight visibilities down to 3 000 m, provided the appropriate ATS authority permits use of a flight visibility less than 5 km, and the circumstances are such, that the probability of encounters with other traffic is low, and the IAS is 140 kt or less.*

SUBPART F – PERFORMANCE GENERAL

ANTR OPS 1.470 Applicability

(a) The operator shall ensure that multi-engine aeroplanes powered by turbo-propeller engines with a maximum approved passenger seating configuration of more than 9 or a maximum take-off mass exceeding 5700 kg, and all multi-engine turbojet powered aeroplanes are operated in accordance with Subpart G (Performance Class A).

(b) The operator shall ensure that propeller driven aeroplanes with a maximum approved passenger seating configuration of 9 or less, and a maximum take-off mass of 5700 kg or less are operated in accordance with Subpart H (Performance Class B).

(c) The operator shall ensure that aeroplanes powered by reciprocating engines with a maximum approved passenger seating configuration of more than 9 or a maximum take-off mass exceeding 5700 kg are operated in accordance with Subpart I (Performance Class C).

(d) Where full compliance with the requirements of the appropriate Subpart cannot be shown due to specific design characteristics (e.g. supersonic aeroplanes or seaplanes), the operator shall apply approved performance standards that ensure a level of safety equivalent to that of the appropriate Subpart.

ANTR OPS 1.475 General

(a) The operator shall ensure that the mass of the aeroplane:

(1) At the start of the take-off;

or, in the event of in-flight replanning

(2) At the point from which the revised operational flight plan applies,

is not greater than the mass at which the requirements of the appropriate Subpart can be complied with for the flight to be undertaken, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is provided for in the particular requirement.

(b) The operator shall ensure that the approved performance data contained in the Aeroplane Flight Manual is used to determine compliance with the requirements of the appropriate Subpart, supplemented as necessary with other data acceptable to the BCAA as prescribed in the relevant Subpart. When applying the factors prescribed in the appropriate Subpart, account may be taken of any operational factors already incorporated in the Aeroplane Flight Manual performance data to avoid double application of factors. (See AMC OPS 1.475(b) & IEM OPS 1.475(b)).

(c) (i) When showing compliance with the requirements of the appropriate Subpart, due account shall be taken of aeroplane configuration, environmental conditions and the operation of systems which have an adverse effect on performance.

(ii) In applying the Standards of this requirement, account shall be taken of all factors that significantly affect the performance of the aeroplane, including but not limited to: the mass of the aeroplane, the operating procedures, the pressure-altitude appropriate to the elevation of the aerodrome, the runway slope, the ambient temperature, the wind, and surface conditions of the runway at the expected time of use, i.e. presence of snow, slush, water, and/or ice for landplanes, water surface condition for seaplanes. Such factors shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance stipulated under the appropriate subparts (G, H, & I as the case may be), in accordance with which, the aeroplane is being operated.

Note: Guidelines for using runway surface condition are contained in the Aeroplane Performance Manual (ICAO Doc 10064).

(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 compliance with the takeoff requirements of the applicable subpart.

(g) The BCAA, as the State of Registry, shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of Subparts G, H and I.

(h) Placards, listings, instrument markings, or combinations thereof, containing those operating limitations prescribed for visual presentation, shall be displayed in the aeroplane.

ANTR OPS 1.480 Terminology

(a) Terms used in Subparts F, G, H, I and J, and not defined in ANTRs, have the following meaning:

(1) *Accelerate-stop distance available (ASDA).* The length of the take-off run available plus the length of stopway, if such stopway is declared available by the appropriate Authority and is capable of bearing the mass of the aeroplane under the prevailing operating conditions.

(2) *Contaminated runway.* A runway is considered to be contaminated when more than 25% of the runway surface area (whether in isolated areas or not) within the required length and width being used is covered by the following:

(i) Surface water more than 3 mm (0·125 in) deep, or by slush, or loose snow, equivalent to more than 3 mm (0·125 in) of water;

(ii) Snow which has been compressed into a solid mass which resists further compression and will hold together or break into lumps if picked up (compacted snow); or

(iii) Ice, including wet ice.

(3) *Damp runway.* A runway is considered damp when the surface is not dry, but when the moisture on it does not give it a shiny appearance.

(4) *Dry runway.* A dry runway is one 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.

(5) *Landing distance available (LDA).* The length of the runway which is declared available by the appropriate Authority and suitable for the ground run of an aeroplane landing.

(6) *Maximum approved passenger seating configuration.* The maximum passenger seating capacity of an individual aeroplane, excluding pilot seats or flight deck seats and cabin crew seats as applicable, used by the operator, approved by the BCAA and specified in the Operations Manual.

(7) *Take-off distance available (TODA).* The length of the take-off run available plus the length of the clearway available.

(8) *Take-off mass.* The take-off mass of the aeroplane shall be taken to be its mass, including everything and everyone carried at the commencement of the take-off run.

(9) *Take-off run available (TORA).* The length of runway which is declared available by the appropriate Authority and suitable for the ground run of an aeroplane taking off.

(10) *Wet runway.* A runway is considered wet when the runway surface is covered with water, or equivalent, less than specified in sub-paragraph (a)(2) above or when there is sufficient moisture on the runway surface to cause it to appear reflective, but without significant areas of standing water.

(b) The terms 'accelerate-stop distance', 'take-off distance', 'take-off run', 'net take-off flight path', 'one engine inoperative en-route net flight path' and 'two engines inoperative en-route net flight path' as relating to the aeroplane have their meanings defined in the airworthiness requirements under which the aeroplane was certificated, or as specified by the BCAA if it finds that definition inadequate for showing compliance with the performance operating limitations.

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SUBPART G – PERFORMANCE CLASS A

ANTR OPS 1.485 General

(a) The operator shall ensure that, for determining compliance with the requirements of this Subpart, the approved performance data in the Aeroplane Flight Manual is supplemented as necessary with other data acceptable to the BCAA if the approved performance Data in the Aeroplane Flight Manual is insufficient in respect of items such as:

(1) Accounting for reasonably expected adverse operating conditions such as take-off and landing on contaminated runways; and

(2) Consideration of engine failure in all flight phases.

(b) The operator shall ensure that, for the wet and contaminated runway case, performance data determined in accordance with the respective Certification Specification / TCDS as accepted by BCAA for Large Transport Category Aeroplane or equivalent acceptable to the BCAA is used. (See IEM OPS 1.485(b)).

ANTR OPS 1.490 Take-off

(a) The operator shall ensure that the take-off mass does not exceed the maximum take-off mass specified in the Aeroplane Flight Manual for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made.

(b) The operator must meet the following requirements when determining the maximum permitted take-off mass:

(1) The accelerate-stop distance must not exceed the accelerate-stop distance available;

(2) The take-off distance must not exceed the take-off distance available, with a clearway distance not exceeding half of the take-off run available;

(3) The take-off run must not exceed the take-off run available;

(4) Compliance with this paragraph must be shown using a single value of V_1 for the rejected and continued take-off; and

(5) On a wet or contaminated runway, the take-off mass must not exceed that permitted for a take-off on a dry runway under the same conditions.

(c) When showing compliance with sub-paragraph (b) above, the operator must take account of the following:

(1) The pressure altitude at the aerodrome;

(2) The ambient temperature at the aerodrome; and

(3) The runway surface condition and the type of runway surface (See IEM OPS 1.490(c)(3));

(4) The runway slope in the direction of take-off;

(5) Not more than 50% of the reported head-wind component or not less than 150% of the reported tailwind component; and

(6) The loss, if any, of runway length due to alignment of the aeroplane prior to take-off. (See IEM OPS 1.490(c)(6)).

ANTR OPS 1.495 Take-off obstacle clearance

(a) The operator shall ensure that the net take-off flight path clears all obstacles by a vertical distance of at least 35 ft or by a horizontal distance of at least 90 m plus 0·125 x D, where D is the horizontal distance the aeroplane has travelled from the end of the take-off distance available or the end of the take-off distance if a turn is scheduled before the end of the take-off distance available. For aeroplanes with a wingspan of less than 60 m a horizontal obstacle clearance of half the aeroplane wingspan plus 60 m, plus 0·125 x D may be used. (See IEM OPS 1.495(a)).

(b) When showing compliance with sub-paragraph (a) above, the operator must take account of the following:

(1) The mass of the aeroplane at the commencement of the take-off run;

(2) The pressure altitude at the aerodrome;

(3) The ambient temperature at the aerodrome; and

(4) Not more than 50% of the reported head-wind component or not less than 150% of the reported tailwind component.

(c) When showing compliance with sub-paragraph (a) above:

(1) Track changes shall not be allowed up to the point at which the net take-off flight path has achieved a height equal to one half the wingspan but not less than 50 ft above the elevation of the end of the take-off run available. Thereafter, up to a height of 400 ft it is assumed that the aeroplane is banked by no more than 15°. Above 400 ft height bank angles greater than 15°, but not more than 25° may be scheduled;

(2) Any part of the net take-off flight path in which the aeroplane is banked by more than 15° must clear all obstacles within the horizontal distances specified in sub-paragraphs (a), (d) and (e) of this paragraph by a vertical distance of at least 50 ft; and

(3) The operator must use special procedures, subject to the approval of the BCAA, to apply increased bank angles of not more than 20º between 200 ft and 400 ft, or not more than 30º above 400 ft (See Appendix 1 to ANTR OPS 1.495(c)(3)).

(4) Adequate allowance must be made for the effect of bank angle on operating speeds and flight path including the distance increments resulting from increased operating speeds. (See AMC OPS 1.495(c)(4)).

(d) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does not require track changes of more than 15°, the operator need not consider those obstacles which have a lateral distance greater than:

(1) 300 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS 1.495(d)(1) & (e)(1); or

(2) 600 m, for flights under all other conditions.

(e) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does require track changes of more than 15°, the operator need not consider those obstacles which have a lateral distance greater than:

(1) 600 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS 1.495 (d)(1) & (e)(1)); or

(2) 900 m for flights under all other conditions.

(f) The operator shall establish contingency procedures to satisfy the requirements of ANTR OPS 1.495 and to provide a safe route, avoiding obstacles, to enable the aeroplane to either comply with the en-route requirements of ANTR OPS 1.500, or land at either the aerodrome of departure or at a take-off alternate aerodrome (See IEM OPS 1.495(f)).

ANTR OPS 1.500 En-route – One Engine Inoperative

(See AMC OPS 1.500)

(a) The operator shall ensure that the one engine inoperative en-route net flight path data shown in the Aeroplane Flight Manual, appropriate to the meteorological conditions expected for the flight, complies with either sub-paragraph (b) or (c) at all points along the route. The net flight path must have a positive gradient at 1 500 ft above the aerodrome where the landing is assumed to be made after engine failure. In meteorological conditions requiring the operation of ice protection systems, the effect of their use on the net flight path must be taken into account.

(b) The gradient of the net flight path must be positive at least 1 000 ft above all terrain and obstructions along the route within 9·3 km (5 nm) on either side of the intended track.

(c) The net flight path must permit the aeroplane to continue flight from the cruising altitude to an aerodrome where a landing can be made in accordance with ANTR OPS 1.515 or 1.520 as appropriate, the net flight path clearing vertically, by at least 2 000 ft, all terrain and obstructions along the route within 9·3 km (5 nm) on either side of the intended track in accordance with sub-paragraphs (1) to (4) below:

(1) The engine is assumed to fail at the most critical point along the route;

(2) Account is taken of the effects of winds on the flight path;

(3) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used; and

(4) The aerodrome where the aeroplane is assumed to land after engine failure must meet the following criteria:

(i) The performance requirements at the expected landing mass are met; and

(ii) Weather reports or forecasts, or any combination thereof, and field condition reports indicate that a safe landing can be accomplished at the estimated time of landing.

(d) When showing compliance with ANTR OPS 1.500, the operator must increase the width margins of subparagraphs (b) and (c) above to 18·5 km (10 nm) if the navigational accuracy does not meet the 95% containment level.

ANTR OPS 1.505 En-route – Aeroplanes with Three Or More Engines, Two Engines Inoperative

(a) The operator shall ensure that at no point along the intended track will an aeroplane having three or more engines be more than 180 minutes, at the all-engines long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met unless it complies with sub-paragraphs (b) to (f) below.

(b) The two engines inoperative en-route net flight path data must permit the aeroplane to continue the flight, in the expected meteorological conditions, from the point where two engines are assumed to fail simultaneously, to an aerodrome at which it is possible to land and come to a complete stop when using the prescribed procedure for a landing with two engines inoperative. The net flight path must clear vertically, by at least 2 000 ft all terrain and obstructions along the route within 9·3 km (5 nm) on either side of the intended track. At altitudes and in meteorological conditions requiring ice protection systems to be operable, the effect of their use on the net flight path data must be taken into account. If the navigational accuracy does not meet the 95% containment level, the operator must increase the width margin given above to 18·5 km (10 nm).

(c) The two engines are assumed to fail at the most critical point of that portion of the route where the aeroplane is more than 180 minutes, at the all engines long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met.

(d) The net flight path must have a positive gradient at 1500 ft above the aerodrome where the landing is assumed to be made after the failure of two engines.

(e) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.

(f) The expected mass of the aeroplane at the point where the two engines are assumed to fail must not be less than that which would include sufficient fuel to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at least 1 500 ft directly over the landing area and thereafter to fly level for 15 minutes.

ANTR OPS 1.510 Landing – Destination and Alternate Aerodromes

(See AMC OPS 1.510 and 1.515)

(a) The operator shall ensure that the landing mass of the aeroplane determined in accordance with ANTR OPS 1.475(a) does not exceed the maximum landing mass specified for the altitude and the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome.

(b) For instrument approaches with a missed approach gradient greater than 2·5% the operator shall verify that the expected landing mass of the aeroplane allows a missed approach with a climb gradient equal to or greater than the applicable missed approach gradient in the one-engine inoperative missed approach configuration and speed (see the respective Certification Specification / TCDS as accepted by BCAA for Large Transport Category Aeroplane). The use of an alternative method must be approved by the BCAA (see IEM OPS 1.510(b) & (c)).

(c) For instrument approaches with decision heights below 200 ft, the operator must verify that the expected landing mass of the aeroplane allows a missed approach gradient of climb, with the critical engine failed and with the speed and configuration used for go-around of at least 2·5%, or the published gradient, whichever is the greater (see CS-AWO 243*).* The use of an alternative method must be approved by the BCAA (see IEM OPS 1.510(b) and (c)).

ANTR OPS 1.515 Landing – Dry Runways

(See AMC OPS 1.510 and 1.515)

(a) The operator shall ensure that the landing mass of the aeroplane determined in accordance with ANTR OPS 1.475(a) for the estimated time of landing at the destination aerodrome and at any alternate aerodrome allows a full stop landing from 50 ft above the threshold:

(1) For turbo-jet powered aeroplanes, within 60% of the landing distance available; or

(2) For turbo-propeller powered aeroplanes, within 70% of the landing distance available;

(3) For Steep Approach procedures the BCAA may approve the use of landing distance Data factored in accordance with sub-paragraphs (a)(1) and (a)(2) above as appropriate, based on a screen height of less than 50 ft, but not less than 35 ft. (See Appendix 1 to ANTR OPS 1.515(a)(3).)

(4) When showing compliance with sub-paragraphs (a)(1) and (a)(2) above, the BCAA may exceptionally approve, when satisfied that there is a need (see Appendix 1), the use of Short Landing Operations in accordance with Appendices 1 and 2 together with any other supplementary conditions that the BCAA considers necessary in order to ensure an acceptable level of safety in the particular case.

(b) When showing compliance with sub-paragraph (a) above, the operator must take account of the following:

(1) The altitude at the aerodrome;

(2) Not more than 50% of the head-wind component or not less than 150% of the tailwind component; and

(3) The runway slope in the direction of landing if greater than +/-2%.

(c) When showing compliance with sub-paragraph (a) above, it must be assumed that:

(1) The aeroplane will land on the most favourable runway, in still air; and

(2) The aeroplane will land on the runway most likely to be assigned considering the probable wind speed and direction and the ground handling characteristics of the aeroplane, and considering other conditions such as landing aids and terrain. (See IEM OPS 1.515(c).)

(d) If the operator is unable to comply with sub-paragraph (c)(1) above for a destination aerodrome having a single runway where a landing depends upon a specified wind component, an aeroplane may be despatched if 2 alternate aerodromes are designated which permit full compliance with sub-paragraphs (a), (b) and (c). Before commencing an approach to land at the destination aerodrome the commander must satisfy himself that a landing can be made in full compliance with ANTR OPS 1.510 and sub-paragraphs (a) and (b) above.

(e) If the operator is unable to comply with sub-paragraph (c)(2) above for the destination aerodrome, the aeroplane may be despatched if an alternate aerodrome is designated which permits full compliance with sub-paragraphs (a), (b) and (c).

ANTR OPS 1.520 Landing – Wet and contaminated runways

(a) The operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is at least 115% of the required landing distance, determined in accordance with ANTR OPS 1.515.

(b) The operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be contaminated, the landing distance available must be at least the landing distance determined in accordance with sub-paragraph (a) above, or at least 115% of the landing distance determined in accordance with approved contaminated landing distance data or equivalent, accepted by the BCAA, whichever is greater.

(c) A landing distance on a wet runway shorter than that required by sub-paragraph (a) above, but not less than that required by ANTR OPS 1.515(a), may be used if the Aeroplane Flight Manual includes specific additional information about landing distances on wet runways.

(d) A landing distance on a specially prepared contaminated runway shorter than that required by sub-paragraph (b) above, but not less than that required by ANTR OPS 1.515(a), may be used if the Aeroplane Flight Manual includes specific additional information about landing distances on contaminated runways.

(e) When showing compliance with sub-paragraphs (b), (c) and (d) above, the criteria of ANTR OPS 1.515 shall be applied accordingly except that ANTR OPS 1.515(a)(1) and (2) shall not be applied to sub-paragraph (b) above.

Appendix 1 to ANTR OPS 1.495(c)(3)

Approval of increased bank angles

(a) For the use of increased bank angles requiring special approval, the following criteria shall be met:

(1) The Aeroplane Flight Manual must contain approved data for the required increase of operating speed and data to allow the construction of the flight path considering the increased bank angles and speeds.

(2) Visual guidance must be available for navigation accuracy.

(3) Weather minima and wind limitations must be specified for each runway and approved by the BCAA.

(4) Training in accordance with ANTR OPS 1.975.

Appendix 1 to ANTR OPS 1.515(a)(3)

Steep Approach Procedures

(a) The BCAA may approve the application of Steep Approach procedures using glideslope angles of 4·5° or more and with screen heights of less than 50 ft but not less than 35 ft, provided that the following criteria are met:

(1) The Aeroplane Flight Manual must state the maximum approved glideslope angle, any other limitations, normal, abnormal or emergency procedures for the steep approach as well as amendments to the field length data when using steep approach criteria;

(2) A suitable glidepath reference system comprising at least a visual glidepath indicating system must be available at each aerodrome at which steep approach procedures are to be conducted; and

(3) Weather minima must be specified and approved for each runway to be used with a steep approach. Consideration must be given to the following:

(i) The obstacle situation;

(ii) The type of glidepath reference and runway guidance such as visual aids, MLS, 3D–NAV, ILS, LLZ, VOR, NDB;

(iii) The minimum visual reference to be required at DH and MDA;

(iv) Available airborne equipment;

(v) Pilot qualification and special aerodrome familiarisation;

(vi) Aeroplane Flight Manual limitations and procedures; and

(vii) Missed approach criteria.

Appendix 1 to ANTR OPS 1.515(a)(4)

Short Landing Operations

(a) For the purpose of ANTR OPS 1.515(a)(4) the distance used for the calculation of the permitted landing mass may consist of the usable length of the declared safe area plus the declared landing distance available. The BCAA may approve such operations in accordance with the following criteria:

(1) *Demonstration of the need for Short Landing Operations.* There must be a clear public interest and operational necessity for the operation, either due to the remoteness of the airport or to physical limitations relating to extending the runway.

(2) *Aeroplane and Operational Criteria.*

(i) Short landing operation will only be approved for aeroplanes where the vertical distance between the path of the pilot's eye and the path of the lowest part of the wheels, with the aeroplane established on the normal glide path, does not exceed 3 metres;

(ii) When establishing aerodrome operating minima the visibility/RVR must not be less than 1·5 km. In addition, wind limitations must be specified in the Operation Manual; and

(iii) Minimum pilot experience, training requirements and special aerodrome familiarisation must be specified for such operations in the Operations Manual.

(3) It is assumed that the crossing height over the beginning of the usable length of the declared safe area is 50 ft.

(4) *Additional criteria.* The BCAA may impose such additional conditions as are deemed necessary for a safe operation taking into account the aeroplane type characteristics, orographic characteristics in the approach area, available approach aids and missed approach/baulked landing considerations. Such additional conditions may be, for instance, the requirement for VASI/PAPI – type visual slope indicator system.

Appendix 2 to ANTR OPS 1.515(a)(4)

Airfield Criteria for Short Landing Operations

(a) The use of the safe area must be approved by the airport authority.

(b) The useable length of the declared safe area under the provisions of 1.515(a)(4), and this Appendix, must not exceed 90 metres.

(c) The width of the declared safe area shall not be less than twice the runway width or twice the wing span, whichever is the greater, centred on the extended runway centre line.

(d) The declared safe area must be clear of obstructions or depressions which would endanger an aeroplane undershooting the runway and no mobile object shall be permitted on the declared safety area while the runway is being used for short landing operations.

(e) The slope of the declared safe area must not exceed 5% upward nor 2% downward in the direction of landing.

(f) For the purpose of this operation, the bearing strength requirement of ANTR OPS 1.480(a)(5) need not apply to the declared safe area.

SUBPART H – PERFORMANCE CLASS B

ANTR OPS 1.525 General

(a) Except under ANTR OPS 1.526 or where otherwise approved by the BCAA, the operator shall not operate a single-engine aeroplane:

(1) At night; or

(2) In Instrument Meteorological Conditions except under Special Visual Flight Rules.

(b) The operator shall treat two-engine aeroplanes which do not meet the climb requirements of Appendix 1 to ANTR OPS 1.525(b) as single-engine aeroplanes.

Note: Limitations on the operation of single-engine aeroplanes, not approved under ANTR OPS 1.526, are covered by ANTR OPS 1.240(a)(6).

ANTR OPS 1.526 Operations of single-engine turbine-powered aeroplanes at night and/or in Instrument Meteorological Conditions (IMC)

(See ANTR OPS 1.842)
(See IEM OPS 1.526)
(Appendix 2 to ANTR OPS 1.940)

(a) The operator may be approved to conduct operations by single-engine turbine-powered aeroplanes at night and/or in IMC, provided that the airworthiness certification of the aeroplane is appropriate and that the overall level of safety intended by the provisions of ANTR OPS and ANTR M is provided by:

(b) the reliability of the turbine engine shall be shown to have a power loss rate of less than 1 per 100 000 engine hours.

Note 1: Power loss in this context is defined as any loss of power, the cause of which may be traced to faulty engine or engine component design or installation, including design or installation of the fuel ancillary or engine control systems.

Note 2: The operator shall be responsible for engine trend monitoring.

(c) the operator's maintenance procedures, operating practices, flight dispatch procedures and crew training programmes; and

(d) equipment as specified in ANTR OPS 1.842

(e) the minimum equipment list shall specify the operating equipment required for night and/or IMC operations, and for day/VMC operations.

(f) The flight manual shall include limitations, procedures, approval status and other information relevant to operations by single-engine turbine-powered aeroplanes at night and/or in IMC.

(g) The operator approved for operations by single-engine turbine-powered aeroplanes at night and/or in IMC shall report all significant failures, malfunctions or defects to the BCAA for notification to the State of Design.

Note: As part of the trend monitoring system the BCAA will review the safety data and monitor the reliability information so as to be able to take any actions necessary to ensure that *the intended safety level is achieved. The BCAA will notify major events or trends of particular concern to the appropriate Type Certificate Holder and the State of Design.*

(h) Operator route planning shall take account of all relevant information in the assessment of intended routes or areas of operations, including the following:

(1) the nature of the terrain to be overflown, including the potential for carrying out a safe forced landing in the event of an engine failure or major malfunction;

(2) weather information, including seasonal and other adverse meteorological influences that may affect the flight; and

(3) other criteria and limitations as specified by the State of the Operator.

(i) The operator shall identify aerodromes or safe forced landing areas available for use in the event of engine failure, and the position of these shall be programmed into the area navigation system. (See IEM OPS 1.526(i))

Note: *A 'safe' forced landing in this context means a landing in an area at which it can reasonably be expected that it will not lead to serious injury or loss of life, even though the aeroplane may incur extensive damage.*

ANTR OPS 1.530 Take-off

(a) The operator shall ensure that the take-off mass does not exceed the maximum take-off mass specified in the Aeroplane Flight Manual for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made.

(b) The operator shall ensure that the unfactored take-off distance, as specified in the Aeroplane Flight Manual does not exceed:

(1) When multiplied by a factor of 1·25, the take-off run available; or

(2) When stopway and/or clearway is available, the following:

(i) The take-off run available;

(ii) When multiplied by a factor of 1·15, the take-off distance available; and

(iii) When multiplied by a factor of 1·3, the accelerate-stop distance available.

(c) When showing compliance with sub-paragraph (b) above, the operator shall take account of the following:

(1) The mass of the aeroplane at the commencement of the take-off run;

(2) The pressure altitude at the aerodrome;

(3) The ambient temperature at the aerodrome;

(4) The runway surface condition and the type of runway surface (See AMC OPS 1.530(c)(4) & IEM OPS 1.530(c)(4));

(5) The runway slope in the direction of take-off (See AMC OPS 1.530(c)(5)); and

(6) Not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.

ANTR OPS 1.535 Take-off Obstacle Clearance – Multi-Engined Aeroplanes

(See IEM OPS 1.535)

(a) The operator shall ensure that the take-off flight path of aeroplanes with two or more engines, determined in accordance with this sub-paragraph, clears all obstacles by a vertical margin of at least 50 ft, or by a horizontal distance of at least 90 m plus 0·125 x D, where D is the horizontal distance travelled by the aeroplane from the end of the take-off distance available or the end of the take-off distance if a turn is scheduled before the end of the take-off distance available except as provided in sub-paragraphs (b) and (c) below. For aeroplanes with a wingspan of less than 60 m a horizontal obstacle clearance of half the aeroplane wingspan plus 60 m, plus 0.125 x D may be used. When showing compliance with this sub-paragraph (see AMC OPS 1.535(a) & IEM OPS 1.535(a)) it must be assumed that:

(1) The take-off flight path begins at a height of 50 ft above the surface at the end of the take-off distance required by ANTR OPS 1.530(b) and ends at a height of 1500 ft above the surface;

(2) The aeroplane is not banked before the aeroplane has reached a height of 50 ft above the surface, and that thereafter the angle of bank does not exceed 15°;

(3) Failure of the critical engine occurs at the point on the all engine take-off flight path where visual reference for the purpose of avoiding obstacles is expected to be lost;

(4) The gradient of the take-off flight path from 50 ft to the assumed engine failure height is equal to the average all-engine gradient during climb and transition to the en-route configuration, multiplied by a factor of 0·77; and

(5) The gradient of the take-off flight path from the height reached in accordance with sub-paragraph (4) above to the end of the take-off flight path is equal to the one engine inoperative en-route climb gradient shown in the Aeroplane Flight Manual.

(b) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path does not require track changes of more than 15°, the operator need not consider those obstacles which have a lateral distance greater than:

(1) 300 m, if the flight is conducted under conditions allowing visual course guidance navigation, or if navigational aids are available enabling the pilot to maintain the intended flight path with the same accuracy (See Appendix 1 to ANTR OPS 1.535(b)(1) & (c)(1)); or

(2) 600 m, for flights under all other conditions.

(c) When showing compliance with sub-paragraph (a) above for those cases where the intended flight path requires track changes of more than 15°, the operator need not consider those obstacles which have a lateral distance greater than:

(1) 600 m for flights under conditions allowing visual course guidance navigation (See Appendix 1 to ANTR OPS 1.535(b)(1) & (c)(1));

(2) 900 m for flights under all other conditions.

(d) When showing compliance with sub-paragraphs (a), (b) and (c) above, the operator must take account of the following:

(1) The mass of the aeroplane at the commencement of the take-off run;

(2) The pressure altitude at the aerodrome;

(3) The ambient temperature at the aerodrome; and

(4) Not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.

ANTR OPS 1.540 En-Route – Multi-engined aeroplanes

(See IEM OPS 1.540)

(a) The operator shall ensure that the aeroplane, in the meteorological conditions expected for the flight, and in the event of the failure of one engine, with the remaining engines operating within the maximum continuous power conditions specified, is capable of continuing flight at or above the relevant minimum altitudes for safe flight stated in the Operations Manual to a point 1000 ft above an aerodrome at which the performance requirements can be met.

(b) When showing compliance with sub-paragraph (a) above:

(1) The aeroplane must not be assumed to be flying at an altitude exceeding that at which the rate of climb equals 300 ft per minute with all engines operating within the maximum continuous power conditions specified; and

(2) The assumed en-route gradient with one engine inoperative shall be the gross gradient of descent or climb, as appropriate, respectively increased by a gradient of 0·5%, or decreased by a gradient of 0·5%.

ANTR OPS 1.542 En-Route – Single-engine aeroplanes

(See IEM OPS 1.542)

(a) The operator shall ensure that the aeroplane, in the meteorological conditions expected for the flight, and in the event of engine failure, is capable of reaching a place at which a safe forced landing can be made. For landplanes, a place on land is required, unless otherwise approved by the BCAA. (See AMC OPS 1.542(a).)

(b) When showing compliance with sub-paragraph (a) above:

(1) The aeroplane must not be assumed to be flying, with the engine operating within the maximum continuous power conditions specified, at an altitude exceeding that at which the rate of climb equals 300 ft per minute; and

(2) The assumed en-route gradient shall be the gross gradient of descent increased by a gradient of 0·5%.

ANTR OPS 1.545 Landing – Destination and Alternate Aerodromes

(See AMC OPS 1.545 & 1.550)

The operator shall ensure that the landing mass of the aeroplane determined in accordance with ANTR OPS 1.475(a) does not exceed the maximum landing mass specified for the altitude and the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome.

ANTR OPS 1.550 Landing – Dry runway

(See AMC OPS 1.545 & 1.550)

(a) The operator shall ensure that the landing mass of the aeroplane determined in accordance with ANTR OPS 1.475(a) for the estimated time of landing allows a full stop landing from

50 ft above the threshold within 70% of the landing distance available at the destination aerodrome and at any alternate aerodrome.

(1) The BCAA may approve the use of landing distance data factored in accordance with this paragraph based on a screen height of less than 50 ft, but not less than 35 ft. (See Appendix 1 to ANTR OPS 1.550(a).)

(2) The BCAA may approve Short Landing Operations in accordance with the criteria in Appendix 2 to ANTR OPS 1.550(a).

(b) When showing compliance with sub-paragraph (a) above, the operator shall take account of the following:

(1) The altitude at the aerodrome;

(2) Not more than 50% of the head-wind component or not less than 150% of the tail-wind component.

(3) The runway surface condition and the type of runway surface (See AMC OPS 1.550(b)(3)); and

(4) The runway slope in the direction of landing (See AMC OPS 1.550(b)(4));

(c) For despatching an aeroplane in accordance with sub-paragraph (a) above, it must be assumed that:

(1) The aeroplane will land on the most favourable runway, in still air; and

(2) The aeroplane will land on the runway most likely to be assigned considering the probable wind speed and direction and the ground handling characteristics of the aeroplane, and considering other conditions such as landing aids and terrain. (See IEM OPS 1.550(c).)

(d) If the operator is unable to comply with sub-paragraph (c)(2) above for the destination aerodrome, the aeroplane may be despatched if an alternate aerodrome is designated which permits full compliance with sub-paragraphs (a), (b) and (c) above.

ANTR OPS 1.555 Landing – Wet and Contaminated Runways

(a) The operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is equal to or exceeds the required landing distance, determined in accordance with ANTR OPS 1.550, multiplied by a factor of 1·15. (See IEM OPS 1.555(a).)

(b) The operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be contaminated, the landing distance, determined by using data acceptable to the BCAA for these conditions, does not exceed the landing distance available.

(c) A landing distance on a wet runway shorter than that required by sub-paragraph (a) above, but not less than that required by ANTR OPS 1.550(a), may be used if the Aeroplane Flight Manual includes specific additional information about landing distances on wet runways.

Appendix 1 to ANTR OPS 1.525(b)

General – Take-off and Landing Climb

The requirements of this Appendix are based on CS–23.

(a) *Take-off Climb*

(1) *All Engines Operating*

(i) The steady gradient of climb after take-off must be at least 4% with:

(A) Take-off power on each engine;

(B) The landing gear extended except that if the landing gear can be retracted in not more than 7 seconds, it may be assumed to be retracted;

(C) The wing flaps in the take-off position(s); and

(D) A climb speed not less than the greater of 1·1 V_{MC} and 1·2 V_{S1}.

(2) *One Engine Inoperative*

(i) The steady gradient of climb at an altitude of 400 ft above the take-off surface must be measurably positive with:

(A) The critical engine inoperative and its propeller in the minimum drag position;

(B) The remaining engine at take-off power;

(C) The landing gear retracted;

(D) The wing flaps in the take-off position(s); and

(E) A climb speed equal to that achieved at 50 ft.

(ii) The steady gradient of climb must be not less than 0·75% at an altitude of 1500 ft above the take-off surface with:

(A) The critical engine inoperative and its propeller in the minimum drag position;

(B) The remaining engine at not more than maximum continuous power;

(C) The landing gear retracted;

(D) The wing flaps retracted; and

(E) A climb speed not less than 1·2 V_{S1}.

(b) *Landing Climb*

(1) *All Engines Operating*

(i) The steady gradient of climb must be at least 2·5% with:

(A) Not more than the power or thrust that is available 8 seconds after initiation of movement of the power controls from the minimum flight idle position;

(B) The landing gear extended;

(C) The wing flaps in the landing position; and

(D) A climb speed equal to V_{REF}.

(2) *One engine Inoperative*

(i) The steady gradient of climb must be not less than 0·75% at an altitude of 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 V_{S1}.

Appendix 1 to ANTR OPS 1.535(b)(1) & (c)(1)

Take-off Flight Path – Visual Course Guidance Navigation

In order to allow visual course guidance navigation, the operator must ensure that the weather conditions prevailing at the time of operation including ceiling and visibility, are such that the obstacle and/or ground reference points can be seen and identified. The Operations Manual must specify, for the aerodrome(s) concerned, the minimum weather conditions which enable the flight crew to continuously determine and maintain the correct flight path with respect to ground reference points, so as to provide a safe clearance with respect to obstructions and terrain as follows:

(a) The procedure must be well defined with respect to ground reference points so that the track to be flown can be analysed for obstacle clearance requirements;

(b) The procedure must be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;

(c) A written and/or pictorial description of the procedure must be provided for crew use; and

(d) The limiting environmental conditions must be specified (e.g. wind, cloud, visibility, day/night, ambient lighting, obstruction lighting).

Appendix 1 to ANTR OPS 1.550(a)

Steep Approach Procedures

(a) The BCAA may approve the application of Steep Approach procedures using glideslope angles of 4.5° or more, and with screen heights of less than 50 ft but not less than 35 ft, provided that the following criteria are met:

(1) The Aeroplane Flight Manual must state the maximum approved glideslope angle, any other limitations, normal, abnormal or emergency procedures for the steep approach as well as amendments to the field length data when using steep approach criteria;

(2) A suitable glide path reference system, comprising at least a visual glidepath indicating system, must be available at each aerodrome at which steep approach procedures are to be conducted; and

(3) Weather minima must be specified and approved for each runway to be used with a steep approach. Consideration must be given to the following:

(i) The obstacle situation;

(ii) The type of glidepath reference and runway guidance such as visual aids, MLS, 3D–NAV, ILS, LLZ, VOR, NDB;

(iii) The minimum visual reference to be required at DH and MDA;

(iv) Available airborne equipment;

(v) Pilot qualification and special aerodrome familiarisation;

(vi) Aeroplane Flight Manual limitations and procedures; and

(vii) Missed approach criteria.

Appendix 2 to ANTR OPS 1.550(a)

Short Landing Operations

(a) For the purpose of ANTR OPS 1.550(a)(2), the distance used for the calculation of the permitted landing mass may consist of the usable length of the declared safe area plus the declared landing distance available. The BCAA may approve such operations in accordance with the following criteria:

(1) The use of the declared safe area must be approved by the aerodrome authority;

(2) The declared safe area must be clear of obstructions or depressions which would endanger an aeroplane undershooting the runway, and no mobile object shall be permitted on the declared safe area while the runway is being used for short landing operations;

(3) The slope of the declared safe area must not exceed 5% upward slope nor 2% downward slope in the direction of landing;

(4) The useable length of the declared safe area under the provisions of this Appendix shall not exceed 90 metres;

(5) The width of the declared safe area shall not be less than twice the runway width, centred on the extended runway centreline;

(6) It is assumed that the crossing height over the beginning of the usable length of the declared safe area shall not be less than 50ft.

(7) For the purpose of this operation, the bearing strength requirement of ANTR OPS 1.480(a)(5) need not apply to the declared safe area.

(8) Weather minima must be specified and approved for each runway to be used and shall not be less than the greater of VFR or non-precision approach minima;

(9) Pilot requirements must be specified (ANTR OPS 1.975(a) refers);

(10) The BCAA may impose such additional conditions as are necessary for safe operation taking into account the aeroplane type characteristics, approach aids and missed approach/baulked landing considerations.

SUBPART I – PERFORMANCE CLASS C

ANTR OPS 1.560 General

The operator shall ensure that, for determining compliance with the requirements of this Subpart, the approved performance Data in the Aeroplane Flight Manual is supplemented, as necessary, with other Data acceptable to the BCAA if the approved performance Data in the Aeroplane Flight Manual is insufficient.

ANTR OPS 1.565 Take-off

(a) The operator shall ensure that the take-off mass does not exceed the maximum take-off mass specified in the Aeroplane Flight Manual for the pressure altitude and the ambient temperature at the aerodrome at which the take-off is to be made.

(b) The operator shall ensure that, for aeroplanes which have take-off field length data contained in their Aeroplane Flight Manuals that do not include engine failure accountability, the distance from the start of the take-off roll required by the aeroplane to reach a height of 50 ft above the surface with all engines operating within the maximum take-off power conditions specified, when multiplied by a factor of either:

(1) 1·33 for aeroplanes having two engines; or

(2) 1·25 for aeroplanes having three engines; or

(3) 1·18 for aeroplanes having four engines,

does not exceed the take-off run available at the aerodrome at which the take-off is to be made.

(c) The operator shall ensure that, for aeroplanes which have take-off field length data contained in their Aeroplane Flight Manuals which accounts for engine failure, the following requirements are met in accordance with the specifications in the Aeroplane Flight Manual:

(1) The accelerate-stop distance must not exceed the accelerate-stop distance available;

(2) The take-off distance must not exceed the take-off distance available, with a clearway distance not exceeding half of the take-off run available;

(3) The take-off run must not exceed the take-off run available;

(4) Compliance with this paragraph must be shown using a single value of V_1 for the rejected and continued take-off; and

(5) On a wet or contaminated runway, the take-off mass must not exceed that permitted for a take-off on a dry runway under the same conditions.

(d) When showing compliance with sub-paragraphs (b) and (c) above, the operator must take account of the following:

(1) The pressure altitude at the aerodrome;

(2) The ambient temperature at the aerodrome;

(3) The runway surface condition and the type of runway surface (see IEM OPS 1.565(d)(3));

(4) The runway slope in the direction of take-off (see AMC OPS 1.565(d)(4));

(5) Not more that 50% of the reported head-wind component or not less than 150% of the reported tail-wind component; and

(6) The loss, if any, of runway length due to alignment of the aeroplane prior to take-off. (See IEM OPS 1.565(d)(6).)

ANTR OPS 1.570 Take-off Obstacle Clearance

(a) The operator shall ensure that the take-off flight path with one engine inoperative clears all obstacles by a vertical distance of at least 50 ft plus 0·01 x D, or by a horizontal distance of at least 90 m plus 0·125 x D, where D is the horizontal distance the aeroplane has travelled from the end of the take-off distance available. For aeroplanes with a wingspan of less than 60 m a horizontal obstacle clearance of half the aeroplane wingspan plus 60 m, plus 0.125 x D may be used.

(b) The take-off flight path must begin at a height of 50 ft above the surface at the end of the take-off distance required by ANTR OPS 1.565(b) or (c) as applicable, and end at a height of 1500 ft above the surface.

(c) When showing compliance with sub-paragraph (a) above, the operator must take account of the following:

(1) The mass of the aeroplane at the commencement of the take-off run;

(2) The pressure altitude at the aerodrome;

(3) The ambient temperature at the aerodrome; and

(4) Not more than 50% of the reported head-wind component or not less than 150% of the reported tail-wind component.

(d) When showing compliance with sub-paragraph (a) above, track changes shall not be allowed up to that point of the take-off flight path where a height of 50 ft above the surface has been achieved. Thereafter, up to a height of 400 ft it is assumed that the aeroplane is banked by no more than 15°. Above 400 ft height bank angles greater than 15°, but not more than 25° may be scheduled. Adequate allowance must be made for the effect of bank angle on operating speeds and flight path including the distance increments resulting from increased operating speeds. (See AMC OPS 1.570(d).)

(e) When showing compliance with sub-paragraph (a) above for those cases which do not require track changes of more than 15°, the operator need not consider those obstacles which have a lateral distance greater than:

(1) 300 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS 1.570(e)(1) & (f)(1)); or

(2) 600 m, for flights under all other conditions.

(f) When showing compliance with sub-paragraph (a) above for those cases which do require track changes of more than 15°, the operator need not consider those obstacles which have a lateral distance greater than:

(1) 600 m, if the pilot is able to maintain the required navigational accuracy through the obstacle accountability area (See AMC OPS 1.570(e)(1) & (f)(1)); or

(2) 900 m for flights under all other conditions.

(g) The operator shall establish contingency procedures to satisfy the requirements of ANTR OPS 1.570 and to provide a safe route, avoiding obstacles, to enable the aeroplane to either comply with the en-route requirements of ANTR OPS 1.580, or land at either the aerodrome of departure or at a take-off alternate aerodrome.

ANTR OPS 1.575 En-Route – All Engines Operating

(a) The operator shall ensure that the aeroplane will, in the meteorological conditions expected for the flight, at any point on its route or on any planned diversion there from, be capable of a rate of climb of at least 300 ft per minute with all engines operating within the maximum continuous power conditions specified at:

(1) The minimum altitudes for safe flight on each stage of the route to be flown or of any planned diversion there from specified in, or calculated from the information contained in, the Operations Manual relating to the aeroplane; and

(2) The minimum altitudes necessary for compliance with the conditions prescribed in ANTR OPS 1.580 and 1.585, as appropriate.

ANTR OPS 1.580 En-Route – One Engine Inoperative

(See AMC OPS 1.580)

(a) The operator shall ensure that the aeroplane will, in the meteorological conditions expected for the flight, in the event of any one engine becoming inoperative at any point on its route or on any planned diversion there from and with the other engine or engines operating within the maximum continuous power conditions specified, be capable of continuing the flight from the cruising altitude to an aerodrome where a landing can be made in accordance with ANTR OPS 1.595 or ANTR OPS 1.600 as appropriate, clearing obstacles within 9·3 km (5 nm) either side of the intended track by a vertical interval of at least:

(1) 1000 ft when the rate of climb is zero or greater; or

(2) 2000 ft when the rate of climb is less than zero.

(b) The flight path shall have a positive slope at an altitude of 450 m (1500 ft) above the aerodrome where the landing is assumed to be made after the failure of one engine.

(c) For the purpose of this sub-paragraph the available rate of climb of the aeroplane shall be taken to be 150 ft per minute less than the gross rate of climb specified.

(d) When showing compliance with this paragraph, the operator must increase the width margins of sub-paragraph (a) above to 18·5 km (10 nm) if the navigational accuracy does not meet the 95% containment level.

(e) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.

ANTR OPS 1.585 En-Route – Aeroplanes with Three Or More Engines, Two Engines Inoperative

(a) The operator shall ensure that, at no point along the intended track, will an aeroplane having three or more engines be more than 90 minutes at the all-engine long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met unless it complies with sub-paragraphs (b) to (e) below.

(b) The two-engines inoperative flight path shown must permit the aeroplane to continue the flight, in the expected meteorological conditions, clearing all obstacles within 9·3 km (5 nm) either side of the intended track by a vertical interval of at least 2000 ft, to an aerodrome at which the performance requirements applicable at the expected landing mass are met.

(c) The two engines are assumed to fail at the most critical point of that portion of the route where the aeroplane is more than 90 minutes, at the all engines long range cruising speed at standard temperature in still air, away from an aerodrome at which the performance requirements applicable at the expected landing mass are met.

(d) The expected mass of the aeroplane at the point where the two engines are assumed to fail must not be less than that which would include sufficient fuel to proceed to an aerodrome where the landing is assumed to be made, and to arrive there at an altitude of a least 450 m (1500 ft) directly over the landing area and thereafter to fly level for 15 minutes.

(e) For the purpose of this sub-paragraph the available rate of climb of the aeroplane shall be taken to be 150 ft per minute less than that specified.

(f) When showing compliance with this paragraph, the operator must increase the width margins of sub-paragraph (a) above to 18·5 km (10 nm) if the navigational accuracy does not meet the 95% containment level.

(g) Fuel jettisoning is permitted to an extent consistent with reaching the aerodrome with the required fuel reserves, if a safe procedure is used.

ANTR OPS 1.590 Landing – Destination and Alternate Aerodromes

(See AMC OPS 1.590 and 1.595)

The operator shall ensure that the landing mass of the aeroplane determined in accordance with ANTR OPS 1.475(a) does not exceed the maximum landing mass specified in the Aeroplane Flight Manual for the altitude and, if accounted for in the Aeroplane Flight Manual, the ambient temperature expected for the estimated time of landing at the destination and alternate aerodrome.

ANTR OPS 1.595 Landing – Dry Runways

(See AMC OPS 1.590 and 1.595)

(a) The operator shall ensure that the landing mass of the aeroplane determined in accordance with ANTR OPS 1.475(a) for the estimated time of landing allows a full stop landing from 50 ft above the threshold within 70% of the landing distance available at the destination and any alternate aerodrome.

(b) When showing compliance with sub-paragraph (a) above, the operator must take account of the following:

(1) The altitude at the aerodrome;

(2) Not more than 50% of the head-wind component or not less than 150% of the tail-wind component;

(3) The type of runway surface (see AMC OPS 1.595(b)(3)); and

(4) The slope of the runway in the direction of landing (See AMC OPS 1.595(b)(4)).

(c) For despatching an aeroplane in accordance with sub-paragraph (a) above it must be assumed that:

(1) The aeroplane will land on the most favourable runway in still air; and

(2) The aeroplane will land on the runway most likely to be assigned considering the probable wind speed and direction and the ground handling characteristics of the

aeroplane, and considering other conditions such as landing aids and terrain. (See IEM OPS 1.595(c).)

(d) If the operator is unable to comply with sub-paragraph (c)(2) above for the destination aerodrome, the aeroplane may be despatched if an alternate aerodrome is designated which permits full compliance with sub-paragraphs (a), (b) and (c).

ANTR OPS 1.600 Landing – Wet and Contaminated Runways

(a) The operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be wet, the landing distance available is equal to or exceeds the required landing distance, determined in accordance with ANTR OPS 1.595, multiplied by a factor of 1·15.

(b) The operator shall ensure that when the appropriate weather reports or forecasts, or a combination thereof, indicate that the runway at the estimated time of arrival may be contaminated, the landing distance determined by using data acceptable to the BCAA for these conditions, does not exceed the landing distance available.

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SUBPART J – MASS AND BALANCE

ANTR OPS 1.605 General

(See Appendix 1 to ANTR OPS 1.605)

(a) The operator shall ensure that during any phase of operation, the loading, mass and centre of gravity of the aeroplane complies with the limitations specified in the approved Aeroplane Flight Manual, or the Operations Manual if more restrictive.

(b) The operator must establish the mass and the centre of gravity of any aeroplane by actual weighing prior to initial entry into service and thereafter at intervals of 4 years if individual aeroplane masses are used and 9 years if fleet masses are used. The accumulated effects of modifications and repairs on the mass and balance must be accounted for and properly documented. Furthermore, aeroplanes must be reweighed if the effect of modifications on the mass and balance is not accurately known.

(c) The operator must determine the mass of all operating items and crew members included in the aeroplane dry operating mass by weighing or by using standard masses. The influence of their position on the aeroplane centre of gravity must be determined.

(d) The operator must establish the mass of the traffic load, including any ballast, by actual weighing or determine the mass of the traffic load in accordance with standard passenger and baggage masses as specified in ANTR OPS 1.620.

(e) The operator must determine the mass of the fuel load by using the actual density or, if not known, the density calculated in accordance with a method specified in the Operations Manual. (See IEM OPS 1.605(e).)

ANTR OPS 1.607 Terminology

(a) *Dry Operating Mass*. The total mass of the aeroplane ready for a specific type of operation excluding all usable fuel and traffic load. This mass includes items such as:

(1) Crew and crew baggage;

(2) Catering and removable passenger service equipment; and

(3) Potable water and lavatory chemicals.

(b) *Maximum Zero Fuel Mass*. The maximum permissible mass of an aeroplane with no usable fuel. The mass of the fuel contained in particular tanks must be included in the zero fuel mass when it is explicitly mentioned in the Aeroplane Flight Manual limitations.

(c) *Maximum Structural Landing Mass*. The maximum permissible total aeroplane mass upon landing under normal circumstances.

(d) *Maximum Structural Take Off Mass*. The maximum permissible total aeroplane mass at the start of the take-off run.

(e) *Passenger classification.*

(1) Adults, male and female, are defined as persons of an age of 12 years and above.

(2) Children are defined as persons of an age of two years and above but who are less than 12 years of age.

(3) Infants are defined as persons who are less than 2 years of age.

(f) *Traffic Load*. The total mass of passengers, baggage and cargo, including any non-revenue load.

ANTR OPS 1.610 Loading, mass and balance

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 of ANTR OPS 1.605. This system must cover all types of intended operations.

ANTR OPS 1.615 Mass values for crew

(a) The operator shall use the following mass values to determine the dry operating mass:

(1) Actual masses including any crew baggage; or

(2) Standard masses, including hand baggage, of 85 kg for flight crew members and 75 kg for cabin crew members; or

(3) Other standard masses acceptable to the BCAA.

(b) The operator must correct the dry operating mass to account for any additional baggage. The position of this additional baggage must be accounted for when establishing the centre of gravity of the aeroplane.

ANTR OPS 1.620 Mass values for passengers and baggage

(a) The operator shall compute the mass of passengers and checked baggage using either the actual weighed mass of each person and the actual weighed mass of baggage or the standard mass values specified in Tables 1 to 3 below except where the number of passenger seats available is less than 10. In such cases passenger mass may be established by use of a verbal statement by or on behalf of each passenger and adding to it a pre-determined constant to account for hand baggage and clothing (See AMC OPS 1.620(a)). The procedure specifying when to select actual or standard masses and the procedure to be followed when using verbal statements must be included in the Operations Manual.

(b) If determining the actual mass by weighing, the operator must ensure that passengers' personal belongings and hand baggage are included. Such weighing must be conducted immediately prior to boarding and at an adjacent location.

(c) If determining the mass of passengers using standard mass values, the standard mass values in Tables 1 and 2 below must be used. The standard masses include hand baggage and the mass of any infant below 2 years of age carried by an adult on one passenger seat. Infants occupying separate passenger seats must be considered as children for the purpose of this sub-paragraph.

(d) *Mass values for passengers – 20 passenger seats or more*

(1) Where the total number of passenger seats available on an aeroplane is 20 or more, the standard masses of male and female in Table 1 are applicable. As an alternative, in cases where the total number of passenger seats available is 30 or more, the 'All Adult' mass values in Table 1 are applicable.

(2) For the purpose of Table 1, holiday charter means a charter flight solely intended as an element of a holiday travel package. The holiday charter mass values apply provided that not more than 5% of passenger seats installed in the aeroplane are used for the non-revenue carriage of certain categories of passengers (See IEM OPS 1.620(d)(2)).

Table 1

Passenger seats:	20 and more		30 and more
	Male	**Female**	**All adult**
All flights except holiday charters	88 kg	70 kg	84 kg
Holiday charters	83 kg	69 kg	76 kg
Children	35 kg	35 kg	35 kg

(e) *Mass values for passengers – 19 passenger seats or less.*

(1) Where the total number of passenger seats available on an aeroplane is 19 or less, the standard masses in Table 2 are applicable.

(2) On flights where no hand baggage is carried in the cabin or where hand baggage is accounted for separately, 6 kg may be deducted from the above male and female masses. Articles such as an overcoat, an umbrella, a small handbag or purse, reading material or a small camera are not considered as hand baggage for the purpose of this sub-paragraph.

Table 2

Passenger seats	1 – 5	6 – 9	10 – 19
Male	104 kg	96 kg	92 kg
Female	86 kg	78 kg	74 kg
Children	35 kg	35 kg	35 kg

(f) *Mass values for baggage*

(1) Where the total number of passenger seats available on the aeroplane is 20 or more the standard mass values given in Table 3 are applicable for each piece of checked baggage. For aeroplanes with 19 passenger seats or less, the actual mass of checked baggage, determined by weighing, must be used.

(2) For the purpose of Table 3:

(i) Domestic flight means a flight with origin and destination within the borders of the Kingdom of Bahrain;

(ii) Flights within the region means flights, other than Domestic flights, whose origin and destination are within the area specified in Appendix 1 to ANTR OPS 1.620(f); and

(iii) Intercontinental flight, other than flights within the region, means a flight with origin and destination in different continents.

Table 3 – 20 or more passenger seats

Type of flight	Baggage standard mass
Domestic	11 kg
Within the MID region	13 kg
Intercontinental	15 kg
All other	13 kg

(g) If the operator wishes to use standard mass values other than those contained in Tables 1 to 3 above, he must advise the BCAA of his reasons and gain its approval in advance. He must also submit for approval a detailed weighing survey plan and apply the statistical analysis method given in Appendix 1 to ANTR OPS 1.620(g). After verification and approval by the BCAA of the results of the weighing survey, the revised standard mass values are only applicable to that operator. The revised standard mass values can only be used in circumstances consistent with those under which the survey was conducted. Where revised standard masses exceed those in Tables 1–3, then such higher values must be used. (See IEM OPS 1.620(g).)

(h) On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, the operator must determine the actual mass of such passengers by weighing or by adding an adequate mass increment. (See IEM OPS 1.620(h) & (i).)

(i) If standard mass values for checked baggage are used and a significant number of passengers check in baggage that is expected to exceed the standard baggage mass, the operator must determine the actual mass of such baggage by weighing or by adding an adequate mass increment. (See IEM OPS 1.620(h) & (i).)

(j) The operator shall ensure that a commander is advised when a non-standard method has been used for determining the mass of the load and that this method is stated in the mass and balance documentation.

ANTR OPS 1.625 Mass and balance documentation

(See Appendix 1 to ANTR OPS 1.625)

(a) The operator shall establish mass and balance documentation prior to each flight specifying the load and its distribution. The mass and balance documentation must enable the commander to determine that the load and its distribution is such that the mass and balance limits of the aeroplane are not exceeded. The person preparing the mass and balance documentation must be named on the document. The person supervising the loading of the aeroplane must confirm by signature that the load and its distribution are in accordance with the mass and balance documentation. This document must be acceptable to the commander, his acceptance being indicated by countersignature or equivalent. (See also ANTR OPS 1.1055(a)(12).)

(b) The operator must specify procedures for Last Minute Changes to the load.

(c) Subject to the approval of the BCAA, the operator may use an alternative to the procedures required by paragraphs (a) and (b) above.

Appendix 1 to ANTR OPS 1.605

Mass and Balance – General

(See ANTR OPS 1.605)

(a) *Determination of the dry operating mass of an aeroplane*

(1) *Weighing of an aeroplane*

(i) New aeroplanes are normally weighed at the factory and are eligible to be placed into operation without reweighing if the mass and balance records have been adjusted for alterations or modifications to the aeroplane. Aeroplanes transferred from a EASA operator with an approved mass control programme to a Bahraini operator with an approved programme need not be weighed prior to use by the receiving operator unless more than 4 years have elapsed since the last weighing.

(ii) The individual mass and centre of gravity (CG) position of each aeroplane shall be re-established periodically. The maximum interval between two weighings must be defined by the operator and must meet the requirements of ANTR OPS 1.605(b). In addition, the mass and the CG of each aeroplane shall be re-established either by:

(A) Weighing; or

(B) Calculation, if the operator is able to provide the necessary justification to prove the validity of the method of calculation chosen,

whenever the cumulative changes to the dry operating mass exceed ± 0·5% of the maximum landing mass or the cumulative change in CG position exceeds 0·5% of the mean aerodynamic chord.

(2) *Fleet mass and CG position*

(i) For a fleet or group of aeroplanes of the same model and configuration, an average dry operating mass and CG position may be used as the fleet mass and CG position, provided that the dry operating masses and CG positions of the individual aeroplanes meet the tolerances specified in sub-paragraph (ii) below. Furthermore, the criteria specified in sub-paragraphs (iii), (iv) and (a)(3) below are applicable.

(ii) *Tolerances*

(A) If the dry operating mass of any aeroplane weighed, or the calculated dry operating mass of any aeroplane of a fleet, varies by more than ±0·5% of the maximum structural landing mass from the established dry operating fleet mass or the CG position varies by more than ±0·5 % of the mean aero-dynamic chord from the fleet CG, that aeroplane shall be omitted from that fleet. Separate fleets may be established, each with differing fleet mean masses.

(B) In cases where the aeroplane mass is within the dry operating fleet mass tolerance but its CG position falls outside the permitted fleet tolerance, the aeroplane may still be operated under the applicable dry operating fleet mass but with an individual CG position.

(C) If an individual aeroplane has, when compared with other aeroplanes of the fleet, a physical, accurately accountable difference (e.g. galley or seat con-figuration), that causes exceedance of the fleet tolerances, this aeroplane may be maintained in the fleet provided that appropriate corrections are applied to the mass and/or CG position for that aeroplane.

(D) Aeroplanes for which no mean aerodynamic chord has been published must be operated with their individual mass and CG position values or must be subjected to a special study and approval.

(iii) *Use of fleet values*

(A) After the weighing of an aeroplane, or if any change occurs in the aeroplane equipment or configuration, the operator must verify that this aeroplane falls within the tolerances specified in sub-paragraph (2)(ii) above.

(B) Aeroplanes which have not been weighed since the last fleet mass evaluation can still be kept in a fleet operated with fleet values, provided that the individual values are revised by computation and stay within the tolerances defined in sub-paragraph (2)(ii) above. If these individual values no longer fall within the permitted tolerances, the operator must either determine new fleet values fulfilling the conditions of sub-paragraphs (2)(i) and (2)(ii) above, or operate the aeroplanes not falling within the limits with their individual values.

(C) To add an aeroplane to a fleet operated with fleet values, the operator must verify by weighing or computation that its actual values fall within the tolerances specified in sub-paragraph (2)(ii) above.

(iv) To comply with sub-paragraph (2)(i) above, the fleet values must be updated at least at the end of each fleet mass evaluation.

(3) *Number of aeroplanes to be weighed to obtain fleet values*

(i) If ‘n’ is the number of aeroplanes in the fleet using fleet values, the operator must at least weigh, in the period between two fleet mass evaluations, a certain number of aeroplanes defined in the Table below:

Number of aeroplanes in the fleet	**Minimum number of weighings**
2 or 3	n
4 to 9	$\frac{n+3}{2}$
10 or more	$\frac{n+51}{10}$

(ii) In choosing the aeroplanes to be weighed, aeroplanes in the fleet which have not been weighed for the longest time shall be selected.

(iii) The interval between 2 fleet mass evaluations must not exceed 48 months.

(4) *Weighing procedure*

(i) The weighing must be accomplished either by the manufacturer or by an approved maintenance organisation.

(ii) Normal precautions must be taken consistent with good practices such as:

(A) Checking for completeness of the aeroplane and equipment;

(B) Determining that fluids are properly accounted for;

(C) Ensuring that the aeroplane is clean; and

(D) Ensuring that weighing is accomplished in an enclosed building.

(iii) Any equipment used for weighing must be properly calibrated, zeroed, and used in accordance with the manufacturer's instructions. Each scale must be calibrated either by the manufacturer, by a civil department of weights and measures or by an appropriately authorised organisation within 2 years or within a time period defined by the manufacturer of the weighing equipment, whichever is less. The equipment must enable the mass of the aeroplane to be established accurately. (See AMC to Appendix 1 to ANTR OPS 1.605 para(a)(4)(iii).)

(b) *Special standard masses for the traffic load.* In addition to standard masses for passengers and checked baggage, the operator can submit for approval to the BCAA standard masses for other load items.

(c) *Aeroplane loading*

(1) The operator must ensure that the loading of its aeroplanes is performed under the supervision of qualified personnel.

(2) The operator must ensure that the loading of the freight is consistent with the data used for the calculation of the aeroplane mass and balance.

(3) The operator must comply with additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment, and/or the maximum seating limits.

(d) *Centre of gravity limits*

(1) *Operational CG envelope.* Unless seat allocation is applied and the effects of the number of passengers per seat row, of cargo in individual cargo compartments and of fuel in individual tanks is accounted for accurately in the balance calculation, operational margins must be applied to the certificated centre of gravity envelope. In determining the CG margins, possible deviations from the assumed load distribution must be considered. If free seating is applied, the operator must introduce procedures to ensure corrective action by flight or cabin crew if extreme longitudinal seat selection occurs. The CG margins and associated operational procedures, including assumptions with regard to passenger seating, must be acceptable to the BCAA. (See IEM to Appendix 1 to ANTR OPS 1.605 subparagraph (d).)

(2) *In-flight centre of gravity.* Further to sub-paragraph (d)(1) above, the operator must show that the procedures fully account for the extreme variation in CG travel during flight caused by passenger/crew movement and fuel consumption/transfer.

Appendix 1 to ANTR OPS 1.620(f)

Definition of the area for flights within the region

For the purposes of ANTR OPS 1.620(f), flights within the region, other than domestic flights, are flights conducted within the area as agreed to by the BCAA.

Appendix 1 to ANTR OPS 1.620(g)

Procedure for establishing revised standard mass values for passengers and baggage

(See IEM to Appendix 1 to ANTR OPS 1.620 (g))

(a) *Passengers*

(1) *Weight sampling method.* The average mass of passengers and their hand baggage must be determined by weighing, taking random samples. The selection of random samples must by nature and extent be representative of the passenger volume, considering the type of operation, the frequency of flights on various routes, in/outbound flights, applicable season and seat capacity of the aeroplane.

(2) *Sample size.* The survey plan must cover the weighing of at least the greatest of:

(i) A number of passengers calculated from a pilot sample, using normal statistical procedures and based on a relative confidence range (accuracy) of 1% for all adult and 2% for separate male and female average masses (the statistical procedure, complemented with a worked example for determining the minimum required sample size and the average mass, is included in IEM OPS 1.620(g)); and

(ii) For aeroplanes:

(A) With a passenger seating capacity of 40 or more, a total of 2000 passengers; or

(B) With a passenger seating capacity of less than 40, a total number of 50 x (the passenger seating capacity).

(3) *Passenger masses.* Passenger masses must include the mass of the passengers' belongings which are carried when entering the aeroplane. When taking random samples of passenger masses, infants shall be weighed together with the accompanying adult. (See also ANTR OPS 1.620(c)(d) and (e).)

(4) *Weighing location.* The location for the weighing of passengers shall be selected as close as possible to the aeroplane, at a point where a change in the passenger mass by disposing of or by acquiring more personal belongings is unlikely to occur before the passengers board the aeroplane.

(5) *Weighing machine.* The weighing machine to be used for passenger weighing shall have a capacity of at least 150 kg. The mass shall be displayed at minimum graduations of 500 g. The weighing machine must be accurate to within 0·5% or 200 g whichever is the greater.

(6) *Recording of mass values.* For each flight included in the survey, the mass of the passengers, the corresponding passenger category (i.e. male/female/children) and the flight number must be recorded.

(b) *Checked baggage.* The statistical procedure for determining revised standard baggage mass values based on average baggage masses of the minimum required sample size is basically the same as for passengers and as specified in sub-paragraph (a)(1) (See also IEM OPS 1.620(g)). For baggage, the relative confidence range (accuracy) amounts to 1%. A minimum of 2000 pieces of checked baggage must be weighed.

(c) *Determination of revised standard mass values for passengers and checked baggage*

(1) To ensure that, in preference to the use of actual masses determined by weighing, the use of revised standard mass values for passengers and checked baggage does not adversely affect operational safety, a statistical analysis (See IEM OPS 1.620(g)) must be carried out. Such an analysis will generate average mass values for passengers and baggage as well as other data.

(2) On aeroplanes with 20 or more passenger seats, these averages apply as revised standard male and female mass values.

(3) On smaller aeroplanes, the following increments must be added to the average passenger mass to obtain the revised standard mass values:

Number of passengers seats	Required mass increment
1 – 5 incl.	16 kg
6 – 9 incl.	8 kg
10 – 19 incl.	4 kg

Alternatively, all adult revised standard (average) mass values may be applied on aeroplanes with 30 or more passenger seats. Revised standard (average) checked baggage mass values are applicable to aeroplanes with 20 or more passenger seats.

(4) Operators have the option to submit a detailed survey plan to the BCAA for approval and subsequently a deviation from the revised standard mass value provided this deviating value is determined by use of the procedure explained in this Appendix. Such deviations must be reviewed at intervals not exceeding 5 years. (See AMC to Appendix 1 to ANTR OPS 1.620(g), sub-paragraph (c)(4).)

(5) All adult revised standard mass values must be based on a male/female ratio of 80/20 in respect of all flights except holiday charters which are 50/50. If the operator wishes to obtain approval for use of a different ratio on specific routes or flights then data must be submitted to the BCAA showing that the alternative male/female ratio is conservative and covers at least 84% of the actual male/female ratios on a sample of at least 100 representative flights.

(6) The average mass values found are rounded to the nearest whole number in kg. Checked baggage mass values are rounded to the nearest 0.5 kg figure, as appropriate.

Appendix 1 to ANTR OPS 1.625

Mass and Balance Documentation

(See IEM to Appendix 1 to ANTR OPS 1.625)

(a) *Mass and balance documentation*

(1) *Contents*

(i) The mass and balance documentation must contain the following information:

(A) The aeroplane registration and type;

(B) The flight identification number and date;

(C) The identity of the Commander;

(D) The identity of the person who prepared the document;

(E) The dry operating mass and the corresponding CG of the aeroplane;

(F) The mass of the fuel at take-off and the mass of trip fuel;

(G) The mass of consumables other than fuel;

(H) The components of the load including passengers, baggage, freight and ballast;

(I) The Take-off Mass, Landing Mass and Zero Fuel Mass;

(J) The load distribution;

(K) The applicable aeroplane CG positions; and

(L) The limiting mass and CG values.

(ii) Subject to the approval of the BCAA, the operator may omit some of this Data from the mass and balance documentation.

(2) *Last Minute Change.* If any last minute change occurs after the completion of the mass and balance documentation, this must be brought to the attention of the commander and the last minute change must be entered on the mass and balance documentation. The maximum allowed change in the number of passengers or hold load acceptable as a last minute change must be specified in the Operations Manual. If this number is exceeded, new mass and balance documentation must be prepared.

(b) *Computerised systems.* Where mass and balance documentation is generated by a computerised mass and balance system, the operator must verify the integrity of the output data. He must establish a system to check that amendments of his input data are incorporated properly in the system and that the system is operating correctly on a continuous basis by verifying the output data at intervals not exceeding 6 months.

(c) *Onboard mass and balance systems.* The operator must obtain the approval of the BCAA if he wishes to use an onboard mass and balance computer system as a primary source for despatch.

(d) *Datalink.* When mass and balance documentation is sent to aeroplanes via datalink, a copy of the final mass and balance documentation as accepted by the commander must be available on the ground.

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SUBPART K – INSTRUMENTS AND EQUIPMENT

ANTR OPS 1.630 General introduction

(See IEM OPS 1.630)

(a) The operator shall ensure that a flight does not commence unless the instruments and equipment required under this Subpart are:

(1) Approved, except as specified in sub-paragraph (c), and installed in accordance with the requirements applicable to them, including the minimum performance standard and the operational and airworthiness requirements; and

(2) All aeroplanes on all flights. An aeroplane shall be equipped with instruments which will enable the flight crew to control the flight path of the aeroplane, carry out any required procedural manoeuvres and observe the operating limitations of the aeroplane in the expected operating conditions. In operable condition for the kind of operation being conducted except as provided in the MEL (See ANTR OPS 1.030).

(b) Instruments and equipment minimum performance standards are those prescribed in the applicable Technical Standard Orders (TSO) unless different performance standards are prescribed in the operational or airworthiness codes. Instruments and equipment complying with design and performance specifications other than TSO on the date of OPS implementation may remain in service, or be installed, unless additional requirements are prescribed in this Subpart. Instruments and equipment that have already been approved do not need to comply with a revised TSO or a revised specification, other than TSO, unless a retroactive requirement is prescribed.

(c) The following items shall not be required to have an equipment approval:

(1) Fuses referred to in ANTR OPS 1.635;

(2) An independent portable light referred to in ANTR OPS 1.640(a)(4);

(3) An accurate time piece referred to in ANTR OPS 1.650(b) & 1.652(b);

(4) Chart holder referred to in ANTR OPS 1.652(n).

(5) First-aid kits referred to in ANTR OPS 1.745;

(6) Emergency medical kit referred to in ANTR OPS 1.755;

(7) Megaphones referred to in ANTR OPS 1.810;

(8) Survival and pyrotechnic signalling equipment referred to in ANTR OPS 1.835(a) and (c); and

(9) Sea anchors and equipment for mooring, anchoring or manoeuvring seaplanes and amphibians on water referred to in ANTR OPS 1.840.

(10) Child restraint devices referred to in ANTR OPS 1.730(a)(3).

(d) If equipment is to be used by one flight crew member at his station during flight, it must be readily operable from his station. When a single item of equipment is required to be operated by more than one flight crew member it must be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.

(e) Those instruments that are used by any one flight crew member shall be so arranged as to permit the flight crew member to see the indications readily from his station, with the minimum practicable deviation from the position and line of vision which he normally assumes when looking forward along the flight path. Whenever a single instrument is required in an aeroplane operated by more than 1 flight crew member it must be installed so that the instrument is visible from each applicable flight crew station.

ANTR OPS 1.635 Circuit protection devices

The operator shall not operate an aeroplane in which fuses are used unless there are spare fuses available for use in flight equal to at least 10% of the number of fuses of each rating or three of each rating whichever is the greater.

ANTR OPS 1.640 Aeroplane operating lights

The operator shall not operate an aeroplane unless it is equipped with:

(a) For flight by day:

(1) Anti-collision light system;

(2) Lighting supplied from the aeroplane's electrical system to provide adequate illumination for all instruments and equipment essential to the safe operation of the aeroplane;

(3) Lighting supplied from the aeroplane's electrical system to provide illumination in all passenger compartments; and

(4) An independent portable light for each required crew member readily accessible to crew members when seated at their designated station.

(b) For flight by night, in addition to equipment specified in paragraph (a) above:

(1) Navigation/position lights; and

(2) Two landing lights or a single light having two separately energised filaments; and

(3) Lights to conform with the International regulations for preventing collisions at sea if the aeroplane is a Seaplane or an Amphibian.

ANTR OPS 1.645 Windshield wipers

The operator shall not operate an aeroplane with a maximum certificated take-off mass of more than 5 700 kg unless it is equipped at each pilot station with a windshield wiper or equivalent means to maintain a clear portion of the windshield during precipitation.

ANTR OPS 1.650 Day VFR operations – Flight and navigational instruments and associated equipment

(See AMC OPS 1.650/1.652 & IEM OPS 1.650/1.652)

The operator shall not operate an aeroplane by day in accordance with Visual Flight Rules (VFR) unless it is equipped with the flight and navigational instruments and associated equipment and, where applicable, under the conditions stated in the following sub-paragraphs:

(a) A magnetic compass (The means of measuring and displaying magnetic direction should be a magnetic compass or equivalent);

(b) An accurate timepiece showing the time in hours, minutes, and seconds with a sweep-second pointer or digital presentation;

(c) A sensitive pressure altimeter calibrated in feet with a sub-scale setting, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight;

(d) An airspeed indicator calibrated in knots;

(e) A vertical speed indicator/a rate-of-climb and descent indicator;

(f) A turn and slip indicator, or a turn co-ordinator incorporating a slip indicator;

(g) An attitude indicator;

(h) A stabilised heading/direction indicator; and

(i) A means of indicating in the flight crew compartment the outside air temperature calibrated in degrees Celsius (See AMC OPS 1.650(i) & 1.652(i)).

(j) For flights which do not exceed 60 minutes duration, which take off and land at the same aerodrome, and which remain within 50 nm of that aerodrome, the instruments prescribed in sub-paragraphs (f), (g) and (h) above, and sub-paragraphs (k)(4), (k)(5) and (k)(6) below, may all be replaced by either a turn and slip indicator, or a turn co-ordinator incorporating a slip indicator, or both an attitude indicator and a slip indicator.

(k) Whenever two pilots are required the second pilot's station shall have separate instruments as follows:

(1) A sensitive pressure altimeter calibrated in feet with a sub-scale setting calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight;

Note: Neither three-pointer nor drum-pointer altimeters satisfy the requirement in.

(2) An airspeed indicator calibrated in knots;

(3) A vertical speed indicator;

(4) A turn and slip indicator, or a turn co-ordinator incorporating a slip indicator;

(5) An attitude indicator; and

(6) A stabilised direction indicator.

Those instruments that are used by any one pilot shall be so arranged as to permit the pilot to see their indications readily from his or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

(l) Each airspeed indicating system must be equipped with a heated pitot tube or equivalent means for preventing malfunction due to either condensation or icing for:

(1) Aeroplanes with a maximum certificated take-off mass in excess of 5 700 kg or having a maximum approved passenger seating configuration of more than 9;

(2) Aeroplanes first issued with an individual certificate of airworthiness on or after 1 April 1999.

(m) Whenever duplicate instruments are required, the requirement embraces separate displays for each pilot and separate selectors or other associated equipment where appropriate.

(n) All aeroplanes must be equipped with means for indicating when power is not adequately supplied to the required flight instruments; and

(o) All aeroplanes with compressibility limitations not otherwise indicated by the required airspeed indicators shall be equipped with a Mach number indicator at each pilot's station.

Note: This does not preclude the use of the airspeed indicator to derive Mach number for ATS purposes.

(p) The operator shall not conduct Day VFR operations unless the aeroplane is equipped with a headset with boom microphone or equivalent for each flight crew member on flight deck duty (See IEM OPS 1.650(p)/1.652(s)).

(q) Shall be equipped with such additional instruments or equipment as may be prescribed by BCAA.

Note: The requirements of (f), (g) and (h) 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.

ANTR OPS 1.652 IFR or night operations – Flight and navigational instruments and associated equipment

(See AMC OPS 1.650/1.652 & IEM OPS 1.650/1.652)

All aeroplanes when operated in accordance with the instrument flight rules, or when the aeroplane cannot be maintained in a desired attitude without reference to one or more flight instruments, shall be equipped with the flight and navigational instruments and associated equipment and, where applicable, under the conditions stated in the following sub-paragraphs:

(a) A magnetic compass (The means of measuring and displaying magnetic direction should be a magnetic compass or equivalent);

(b) An accurate time-piece showing the time in hours, minutes and seconds, with a sweep-second pointer or digital presentation;

(c) Two sensitive pressure altimeters calibrated in feet, with counter drum-pointer or equivalent presentation; with sub-scale settings, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight.

Note: Neither three-pointer nor drum-pointer altimeters satisfy the requirement in.

(d) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to either condensation or icing including a warning indication of pitot heater failure. The pitot heater failure warning indication requirement does not apply to those aeroplanes with a maximum approved passenger seating configuration of 9 or less or a maximum certificated take-off mass of 5 700 kg or less and issued with an individual Certificate of Airworthiness prior to 1 April 1998 (See AMC OPS 1.652(d) & (k)(2));

(e) A vertical speed indicator/a rate-of-climb and descent indicator;

(f) A turn and slip indicator;

(g) An attitude indicator;

(h) A stabilised heading/direction indicator (directional gyroscope);

Note: The requirements of (f), (g) and (h) 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.

(i) A means of indicating whether the power supply to the gyroscopic instrument is adequate;

(j) A means of indicating in the flight crew compartment the outside air temperature calibrated in degrees Celsius (See AMC OPS 1.650 (i) & 1.652(i)); and

(k) Two independent static pressure systems, except that for propeller driven aeroplanes with maximum certificated take-off mass of 5 700 kg or less, one static pressure system and one alternate source of static pressure is allowed.

(l) Whenever two pilots are required the second pilot's station shall have separate instruments as follows:

(1) Two sensitive pressure altimeters calibrated in feet, with counter drum-pointer or equivalent presentation; with sub-scale settings, calibrated in hectopascals/millibars, adjustable for any barometric pressure likely to be set during flight.

Note: Neither three-pointer nor drum-pointer altimeters satisfy the requirement in.

(2) An airspeed indicating system with heated pitot tube or equivalent means for preventing malfunctioning due to either condensation or icing including a warning indication of pitot heater failure. The pitot heater failure warning indication requirement does not apply to those aeroplanes with a maximum approved passenger seating configuration of 9 or less or a maximum certificated take-off mass of 5 700 kg or less and issued with an individual Certificate of Airworthiness prior to 1 April 1998 (See AMC OPS 1.652(d) & (k)(2));

(3) A vertical speed indicator;
(4) A turn and slip indicator;
(5) An attitude indicator; and
(6) A stabilised direction indicator.

(m) Those aeroplanes with a maximum certificated take-off mass in excess of 5 700 kg or having a maximum approved passenger seating configuration of more than 9 seats must be equipped with an additional, standby, attitude indicator (artificial horizon), capable of being used from either pilot's station, that:

(1) Is powered continuously during normal operation and, after a total failure of the normal electrical generating system is powered from a source independent of the normal electrical generating system;

(2) Provides reliable operation for a minimum of 30 minutes after total failure of the normal electrical generating system, taking into account other loads on the emergency power supply and operational procedures;

(3) Operates independently of any other attitude indicating system;

(4) Is operative automatically after total failure of the normal electrical generating system; and

(5) Is appropriately illuminated during all phases of operation, except for aeroplanes with a maximum certificated take-off mass of 5 700 kg or less, equipped with a standby attitude indicator in the left-hand instrument panel.

(n) In complying with sub-paragraph (l) above, it must be clearly evident to the flight crew when the standby attitude indicator, required by that sub-paragraph, is being operated by emergency power. Where the standby attitude indicator has its own dedicated power supply there shall be an associated indication, either on the instrument or on the instrument panel, when this supply is in use.

Those instruments that are used by any one pilot shall be so arranged as to permit the pilot to see their indications readily from his or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.

(o) A chart holder in an easily readable position which can be illuminated for night operations.

(p) If the standby attitude instrument system is certificated according to CFR 14 PART 25, CS 25 or equivalent, the turn and slip indicators may be replaced by slip indicators.

(q) Whenever duplicate instruments are required, the requirement embraces separate displays for each pilot and separate selectors or other associated equipment where appropriate;

(r) All aeroplanes must be equipped with means for indicating when power is not adequately supplied to the required flight instruments; and

(s) All aeroplanes with compressibility limitations not otherwise indicated by the required airspeed indicators shall be equipped with a Mach number indicator at each pilot's station.

Note: This does not preclude the use of the airspeed indicator to derive Mach number for ATS purposes.

(t) The operator shall not conduct IFR or night operations unless the aeroplane is equipped with a headset with boom microphone or equivalent for each flight crew member on flight deck duty and a transmit button on the control wheel for each required pilot. (See IEM OPS 1.650(p)/1.652(s).)

(u) Notwithstanding the ANTR OPS 1.430(b) to (d), where aeroplanes are equipped with automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS, or any combination of those systems into a hybrid system, the use of such systems for the safe operation of an aeroplane shall be approved in accordance with the criteria stipulated under ANTR OPS 1.785 by the BCAA. In approving the operational use of automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS, the BCAA shall ensure that:

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

(2) the operator has carried out a safety risk assessment of the operations supported by the automatic landing systems, HUD or equivalent displays, EVS, SVS or CVS;

(3) the operator has established and documented the procedures for the use of, and training requirements for, automatic landing systems, a HUD or equivalent displays, EVS, SVS or CVS.

(v) Such additional instruments or equipment as may be prescribed by BCAA.

ANTR OPS 1.655 Additional equipment for single pilot operation under IFR or at night

The operator shall not conduct single pilot IFR operations unless the aeroplane is equipped with an autopilot with:

(a) a serviceable autopilot that has at least altitude hold, and heading select modes;

(b) a headset with a boom microphone or equivalent; and

(c) means of displaying charts that enables them to be readable in all ambient light conditions; and

(d) Operations manual cover these requirements and approved by BCAA.

ANTR OPS 1.660 Altitude alerting system

(a) The operator shall not operate a turbine propeller powered aeroplane with a maximum certificated take-off mass in excess of 5 700 kg or having a maximum approved passenger seating configuration of more than 9 seats or a turbojet powered aeroplane unless it is equipped with an altitude alerting system capable of:

(1) Alerting the flight crew upon approaching a preselected altitude; and

(2) Alerting the flight crew by at least an aural signal, when deviating from a preselected altitude,

except for aeroplanes with a maximum certificated take-off mass of 5700 kg or less having a maximum approved passenger seating configuration of more than 9 and first issued with an individual certificate of airworthiness before 1 April 1972.

ANTR OPS 1.665 Ground proximity warning system and terrain awareness warning system

(a) The operator shall not operate a turbine powered aeroplane having a maximum certificated take-off mass in excess of 5700 kg or a maximum approved passenger seating configuration of more than 9 unless it is equipped with a ground proximity warning system which has a forward-looking terrain avoidance function.

(b) The ground proximity warning system must automatically provide, a timely and distinctive warning to the flight crew when the aeroplane is in potentially hazardous proximity to the earth's surface:

(1) excessive sink / descent rate,

(2) unsafe terrain clearance / excessive terrain closure rate,

(3) excessive altitude loss after take-off or go-around,

(4) unsafe terrain clearance while not in landing configuration;

(i) gear not locked down;

(ii) flaps not in a landing position; and

(5) excessive descent below the instrument glide path.

(c) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700 kg or less and authorized to carry more than five but not more than nine passengers should be equipped with a ground proximity warning system which provides warning:

(1) on excessive descent rate;

(2) on excessive altitude loss after take-off or go-around and

(3) of unsafe terrain clearance and

(4) Forward-looking terrain avoidance function.

(d) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700 kg or less and authorized to carry more than five but not more than nine passengers for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a ground proximity warning system which provides warning:

(1) on excessive descent rate;

(2) on excessive altitude loss after take-off or go-around and

(3) of unsafe terrain clearance and

(4) Forward-looking terrain avoidance function.

(e) All piston-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers shall be equipped with a ground proximity warning system which provides the warnings:

(1) on excessive descent rate;

(2) on excessive altitude loss after take-off or go-around and

(3) of unsafe terrain clearance and

(4) Forward-looking terrain avoidance function.

(f) The operator shall implement database management procedures that ensure the timely distribution and update of current terrain and obstacle data to the ground proximity warning system.

ANTR OPS 1.668 Airborne Collision Avoidance System

(See IEM OPS 1.668)

(a) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorised to carry more than 19 passengers shall be equipped with an airborne collision avoidance system (ACAS II).

(b) All aeroplanes should be equipped with an airborne collision avoidance system (ACAS II).

(c) An airborne collision avoidance system shall operate in accordance with the relevant provisions of ICAO Annex 10, Volume IV.

ANTR OPS 1.670 Airborne weather radar equipment and Windshear warning System

(a) The operator shall not operate:

(1) A pressurised aeroplane; or

(2) An unpressurised aeroplane which has a maximum certificated take-off mass of more than 5700 kg; or

(3) An unpressurised aeroplane having a maximum approved passenger seating configuration of more than 9 seats after 1 April 1999, unless it is equipped with airborne weather radar equipment whenever such an aeroplane is being operated at night or in instrument meteorological conditions in areas where thunderstorms or other potentially hazardous weather conditions (windshear), regarded as detectable with airborne weather radar, may be expected to exist along the route.

(b) For propeller driven pressurised aeroplanes having a maximum certificated take-off mass not exceeding 5700 kg with a maximum approved passenger seating configuration not exceeding 9 seats the airborne weather radar equipment may be replaced by other equipment capable of detecting thunderstorms and other potentially hazardous weather conditions (windshear), regarded as detectable with airborne weather radar equipment, subject to approval by the BCAA.

(c) All turbo-jet aeroplanes of a maximum certificated take-off mass in excess of 5700 kg or authorized to carry more than nine passengers shall be equipped with a forward-looking wind shear warning system capable of;

(1) Providing the pilot with a timely aural and visual warning of wind shear ahead of the aircraft, and the information required to permit the pilot to safely commence and continue a missed approach or go-around or to execute an escape manoeuvre if necessary.

(2) Providing an indication to the pilot when the limits specified for the certification of automatic landing equipment are being approached, when such equipment is in use.

ANTR OPS 1.675 Equipment for operations in icing conditions

(a) The operator shall not operate an aeroplane in expected or actual icing conditions unless it is certificated and equipped with suitable de-icing and/or anti-icing devices to operate in icing conditions.

(b) The operator shall not operate an aeroplane in expected or actual icing conditions at night unless it is equipped with a means to illuminate or detect the formation of ice. Any illumination that is used must be of a type that will not cause glare or reflection that would handicap crew members in the performance of their duties.

ANTR OPS 1.680 Cosmic radiation detection equipment

(a) The operator shall not operate an aeroplane above 15000 m (49000 ft) unless:

(1) It is equipped with an instrument to measure and indicate continuously the dose rate of total cosmic radiation being received (i.e. the total of ionizing and neutron radiation of galactic and solar origin) and the cumulative dose on each flight, The display unit of the equipment shall be readily visible to a flight crew member and

(2) A system of on-board quarterly radiation sampling acceptable to the BCAA is established (See AC OPS 1.680(a)(2)).

(3) The equipment is calibrated on the basis of assumptions / standards and agencies acceptable to the BCAA.

ANTR OPS 1.685 Flight crew interphone system

The operator shall not operate an aeroplane on which a flight crew of more than one is required unless it is equipped with a flight crew interphone system, including headsets and microphones, not of a handheld type, for use by all members of the flight crew.

ANTR OPS 1.690 Crew member interphone system

(a) The operator shall not operate an aeroplane with a maximum certificated take-off mass exceeding 15 000 kg or having a maximum approved passenger seating configuration of more than 19 unless it is equipped with a crew member interphone system.

(b) The crew member interphone system required by this paragraph must:

(1) Operate independently of the public address system except for handsets, headsets, microphones, selector switches and signalling devices;

(2) Provide a means of two-way communication between the flight crew compartment and:

(i) Each passenger compartment;

(ii) Each galley located other than on a passenger deck level; and

(iii) Each remote crew compartment that is not on the passenger deck and is not easily accessible from a passenger compartment;

(3) Be readily accessible for use from each of the required flight crew stations in the flight crew compartment;

(4) Be readily accessible for use at required cabin crew member stations close to each separate or pair of floor level emergency exits;

(5) Have an alerting system incorporating aural or visual signals for use by flight crew members to alert the cabin crew and for use by cabin crew members to alert the flight crew;

(6) Have a means for the recipient of a call to determine whether it is a normal call or an emergency call (See AMC OPS 1.690(b)(6)); and

(7) Provide on the ground a means of two-way communication between ground personnel and at least two flight crew members. (See IEM OPS 1.690(b)(7)).

ANTR OPS 1.695 Public address system

(a) The operator shall not operate an aeroplane with a maximum approved passenger seating configuration of more than 19 unless a public address system is installed.

(b) The public address system required by this paragraph must:

(1) Operate independently of the interphone systems except for handsets, headsets, microphones, selector switches and signalling devices;

(2) Be readily accessible for immediate use from each required flight crew member station;

(3) For each required floor level passenger emergency exit which has an adjacent cabin crew seat, have a microphone which is readily accessible to the seated cabin crew member, except that one microphone may serve more than one exit, provided the proximity of the exits allows unassisted verbal communication between seated cabin crew members;

(4) Be capable of operation within 10 seconds by a cabin crew member at each of those stations in the compartment from which its use is accessible; and

(5) Be audible and intelligible at all passenger seats, toilets and cabin crew seats and work stations.

ANTR OPS 1.700 Flight Recorders - General

(See Appendix 1 to ANTR OPS 1.700)

(a) Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) and/or a data link recorder (DLR). Image and data link information may be recorded on either the CVR or the FDR.

(b) Light weight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) and/or a data link recording system (DLRS). Image and data link information may be recorded on either the CARS or the ADRS.

Note 1: For aeroplanes for which the application for type certification is submitted to a Contracting State before 1 January 2016, specifications applicable to crash-protected *flight recorders may be found in the European Organisation for Civil Aviation Equipment standards, EUROCAE ED-112, ED-56A, ED-55, Minimum Operational Performance Specifications (MOPS), or earlier equivalent documents.*

Note 2: For aeroplanes for which the application for type certification is submitted to a Contracting State on or after 1 January 2016, specifications applicable to flight recorders may be found in EUROCAE ED-112A, Minimum Operational Performance Specification (MOPS), or equivalent documents.

Note 3: Specifications applicable to lightweight flight recorders may be found in EUROCAE ED 155, Minimum Operational Performance Specification (MOPS), or equivalent documents.

Note 4: As of 7 November 2019, Operators are not allowed the use of recordings or transcripts of CVR, CARS, Class A AIR and Class A AIRS for purposes other than the investigation of an accident or incident as per ICAO, Annex 13, except where the recordings or transcripts are:

a) related to a safety-related event identified in the context of a safety management system; are restricted to the relevant portions of a de-identified transcript of the recording; and are subject to the protections accorded by ICAO, Annex 19;

b) sought for use in criminal proceedings not related to an event involving an accident or incident investigation and are subject to the protections accorded by ICAO, Annex 19; or

c) used for inspections of flight recorder systems as provided in Appendix 1 to ANTR OPS 1.700.

Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to ICAO, Annex 19. When an investigation under ICAO, Annex 13 is instituted, investigation records are subject to the protections accorded by ICAO, Annex 13.

Note 5: As of 7 November 2019, Operators are not allowed the use of recordings or transcripts of FDR, ADRS as well as Class B and Class C AIR and AIRS for purposes other than the investigation of an accident or incident as per ICAO, Annex 13, except where the recordings or transcripts are subject to the protections accorded by ICAO, Annex 19 and are:

a) used by the operator for airworthiness or maintenance purposes; Appendix 1 to ANTR OPS 1.700.

b) used by the operator in the operation of a flight data analysis programme required in this ANTR OPS 1;

c) sought for use in proceedings not related to an event involving an accident or incident investigation;

d) de-identified; or

e) disclosed under secure procedures.

Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to ICAO, Annex 19.

(c) Construction and installation

(1) Flight recorders shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and transcribed. Flight recorders shall meet the prescribed crashworthiness and fire protection specifications.

Note 1: Industry crashworthiness and fire protection specifications for FDR, CVR, AIR and DLR are as contained in the EUROCAE ED-112, Minimum Operational Performance Specifications (MOPS) for Crash Protected Airborne Recorder Systems, or equivalent documents.

Note 2: Industry crashworthiness and fire protection specifications for ADRS and CARS are as contained in the EUROCAE ED-155, Minimum Operational Performance Specifications (MOPS) for Light weight Flight Recorder Systems, or equivalent documents.

(2) Non-deployable flight recorder containers shall:

(i) be painted a distinctive orange colour;

(ii) carry reflective material to facilitate their location; and

(iii) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5kHz and, by no later than 1 January 2018, be capable of operating for a minimum of 90 days.

(3) Automatic deployable flight recorder containers shall:

(i) be painted a distinctive orange colour, however the surface visible from outside the aircraft may be of another colour;

(ii) carry reflective material to facilitate their location; and

(iii) have an integrated automatically activated ELT.

(4) The crash-protected flight recorders shall be installed so that:

(i) the probability of damage to the recordings is minimized;

(ii) they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorders without jeopardizing service to essential or emergency loads;

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

(iv) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly; and

(v) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and

(vi) for aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimized.

Note: *The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialized replay or copying techniques.*

(5) The flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.

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

(7) The flight recorder system manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recording systems:

(i) manufacturer's operating instructions, equipment limitations and installation procedures;
(ii) parameter origin or source and equations which relate counts to units of measurement;
(iii) manufacturer's test reports.
(iv) detailed information to ensure the continued serviceability of the flight recorder system.

(8) The holder of the airworthiness approval for the installation design of the flight recorder system shall make available the relevant continuing airworthiness information to the operator of the aeroplane to be incorporated in the continuing airworthiness maintenance programme. This continuing airworthiness information shall cover in detail all the tasks required to ensure the continued serviceability of the flight recorder system.

Note1: *The flight recorder system is composed of the flight recorder as well as any dedicated sensors, hardware and software that provide information required per this Appendix.*

Note2: *Conditions related to the continued serviceability of a flight recorder system are defined in section 7 of this appendix. The Manual on Flight Recorder System Maintenance (FRSM) (Doc 10104) provides guidance on maintenance tasks associated with flight recorder systems.*

(d) Operation

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

(2) To preserve cockpit voice recorder records, cockpit voice recorder shall be deactivated upon completion of flight time following an accident or incident. The flight recorders shall not be reactivated before their disposition as determined in accordance with ANTR Part VI – Aircraft Accident and Incident Investigation, chapter 3, paragraph 3.2.2.4.

Note 1: *The need for removal of the cockpit voice recorder records from the aircraft will be determined by the investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.*

Note 2: The operator shall ensure, to the extent possible, in the event the aeroplane becomes involved in an accident or incident, the preservation of all related cockpit voice recorder records and, if necessary, the associated flight recorders, and their retention in safe custody pending their disposition as determined in accordance with ANTR Part VI, chapter 3, paragraph 3.2.2.4.

(e) Continued Serviceability

Operational checks and evaluations of recordings from the cockpit voice recorder systems shall be conducted to ensure the continued serviceability of the recorders.

Note: Procedures for the inspections of the flight recorder systems are given in Appendix I to ANTR OPS 1.700.

(f) Flight recorder electronic documentation

The documentation requirement concerning FDR and ADRS parameters provided by operators to accident investigation authorities shall be in an electronic format, acceptable to the accident investigation authority, and take account of industry specifications.

Note: Industry specification for documentation concerning flight recorder parameters may be found in the Specification of Aeronautical Radio Incorporated, ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.

(g) Combination Recorders

(1) All aeroplanes of a maximum certificated take-off mass of over 5700kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, should be equipped with two combination recorders (FDR/CVR).

(2) All aeroplanes of a maximum certificated take-off mass of over 15000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and which are required to be equipped with both a CVR and an FDR, shall be equipped with two combination recorders (FDR/CVR). One recorder shall be located as close to the cockpit as practicable and the other recorder located as far aft as practicable.

(3) All aeroplanes of a maximum certificated take-off mass over 5700kg, required to be equipped with an FDR and a CVR, may alternatively be equipped with two combination recorders (FDR/CVR).

Note: The requirement of ANTR OPS 1.700(g) may be satisfied by equipping the aeroplanes with two combination recorders (one forward and one aft) or separate devices.

(4) All multi-engined turbine-powered aeroplanes of a maximum certificated take-off mass of 5700kg or less, required to be equipped with an FDR and/or a CVR, may alternatively be equipped with one combination recorder (FDR/CVR).

ANTR OPS 1.702 Flight Recorder Data Recovery

(a) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg and authorised to carry more than nineteen passengers for which the application for type certification is submitted on or after 1 January 2021, shall be equipped with a means approved by the BCAA, to recover flight recorder data and make it available in a timely manner.

(b) In approving the means to make flight recorder data available in a timely manner, the BCAA shall take into account the following:

(1) the capabilities of the operator;

(2) overall capability of the aeroplane and its systems as certified by State of Design;

(3) the reliability of the means to recover the appropriate CVR channels and appropriate FDR data; and

(4) specific mitigation measures.

Note: Guidance on approving the means to make flight recorder data available in a timely manner is contained in the Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery (Doc 10054).

ANTR OPS 1.705 Flight Data Recorders (FDR) and Aircraft Data Recording Systems (ADRS)

(See Appendix 1 to ANTR OPS 1.705)

Note: Parameters to be recorded are listed in Tables at Appendix 1 to ANTR OPS 1.705

Note: In previous editions of Annex 6, Part I, types of recorders were defined to capture the first evolutions of FDRs.

(a) Applicability

(1) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700kg or less for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 shall be equipped with:

(i) an FDR which shall record at least the first 16 parameters listed in Table 1 of Appendix 1 to ANTR 1.705; or

(ii) a Class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the pilot(s), as defined in Para (c) of Appendix 1 to ANTR OPS 1.705 or

(iii) an ADRS which shall record at least the first 7 parameters listed in Table 2 of Appendix 1 to ANTR OPS 1.705.

Note 1: "The application for type certification is submitted to a Contracting State" refers to the date of application of the original "Type Certificate" for the aeroplane type, not the date of certification of particular aeroplane variants or derivative models.

Note 2: Airborne image recorders (AIRs) classification is defined in paragraph Appendix 2 of ANTR OPS 1.705.

(2) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 shall be equipped with:

(i) *an FDR which should record at least the first 16 parameters listed in* Table 1 of Appendix 1 to ANTR; or

(ii) a Class C AIR or AIRS which should record at least the first 16 parameters listed in Table 1 of Appendix 1 to ANTR; or

(iii) an ADRS which shall record at least the first 7 parameters listed in Table 2 of Appendix 1 to ANTR OPS 1.705.

(3) All aeroplanes of a maximum certificated take-off mass of over 27000kg for which the individual certificate of airworthiness is first issued on or after 1 January 1989 shall be equipped with an FDR which shall record at least first 32 parameters listed in Table 1 of Appendix 1 to ANTR

(4) All aeroplanes of a maximum certificated take-off mass of over 5700kg, up to and including 27000kg, for which the individual certificate of airworthiness is first issued on or after 1 January 1989, shall be equipped with an FDR which shall record at least first 16 parameters listed in Table 1 of Appendix 1 to ANTR.

(5) All multi-engined turbine-engined aeroplanes of a maximum certified take-off mass of 5700 kg or less for which the certificate of airworthiness was first issued on or after 1 January 1990 should be equipped with an FDR which shall record at least first 16 parameters listed in Table 1 of Appendix 1 to ANTR 1.705.

(6) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1989, with a maximum certificated take-off mass of over 5 700 kg, except those in para (8) below, shall be equipped with an FDR which shall record at least the first 5 parameters listed in Table 1 of Appendix 1 to ANTR 1.705.

(7) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 5700kg, except those below in (7), shall be equipped with an FDR which shall record at least the first 9 parameters listed in Table 1 of Appendix 1 to ANTR 1.705.

(8) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued on or after 1 January 1987 but before 1 January 1989, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with an FDR which shall record at least the first 16 parameters listed in Table 1 of Appendix 1 to ANTR 1.705.

(9) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 should be equipped with an FDR which should record, in addition to the first 5 parameters listed in Table 1 of Appendix 1 to ANTR 1.705, such additional parameters as are necessary to meet the objectives of determining:

(i) the attitude of the aeroplane in achieving its flight path; and

(ii) the basic forces acting upon the aero plane resulting in the achieved flight path and the origin of such basic forces.

(10) All aeroplanes of a maximum certificated take-off of over 5700kg for which the individual certificate of airworthiness is first issued after 1 January 2005 shall be equipped with an FDR which should record, in addition to the first 78 parameters listed in Table 1 of Appendix 1 to ANTR 1.705.

(11) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table 1 of Appendix 1 to ANTR 1.705.

(12) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023 shall be equipped with an FDR capable of recording at least the 82 parameters listed in Table 1 of Appendix 1 to ANTR 1.705

(b) Recording Technology

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

(c) Duration

A FDR shall be capable of retaining the information recorded during at least the last 25 hours of its operation, with the exception of those installed on aeroplanes refered in Para (4) above for which the FDR shall be capable of retaining the information recorded during at least the last 30 minutes of its operation and in addition, sufficient information from the preceding take-off for calibration purpose.

(d) Operations

(1) An FDR, AIR or ADRS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power.

(2) In addition, depending on the availability of electrical power, the AIR, if installed, must start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(e) Flight crew-machine interface recordings

All aeroplanes of a maximum take-off mass of over 27 000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2023 shall be equipped with a crash-protected flight recorder which shall record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew as defined in Appendix 2 to ANTR OPS 1.705.

All aeroplanes of a maximum take-off mass of over 5 700 kg, up to and including 27 000 kg, for which the application for type certification is submitted to a Contracting State on or after 1 January 2023 should be equipped with a crash-protected flight recorder which should record the information displayed to the flight crew from electronic displays, as well as the operation of switches and selectors by the flight crew, as defined in Appendix 2 to ANTR OPS 1.705.

The minimum flight crew-machine interface recording duration shall be at least for the last two hours.

Flight crew-machine interface recordings shall be able to be correlated to the recorded cockpit audio.

ANTR OPS 1.710 Cockpit Voice Recorders and Cockpit Audio Recording Systems

(a) Applicability

(1) All turbine-engined aeroplanes of a maximum certificated take-off mass of over 2250 kg, up to and including 5700 kg, for which the application for type certification is submitted to a Contracting State on or after 1 January 2016 and required to be operated by more than one pilot shall be equipped with a CVR or CARS (Cockpit Audio Recording System).

(2) All turbine-engined aeroplanes of a maximum certificated take-off mass of 5700 kg or less for which the individual certificate of airworthiness is first issued on or after 1 January 2016 and required to be operated by more than one pilot should be equipped with either a CVR or CARS.

(3) All aeroplanes of a maximum certificated take-off mass of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 1987 shall be equipped with a CVR.

(4) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a CVR.

(5) All turbine-engined aeroplanes, for which the individual certificate of airworthiness was first issued before 1 January 1987, with a maximum certificated take-off mass of over 5700kg up to and including 27000kg that are of types of which the prototype was certificated by the appropriate national authority after 30 September 1969 shall be equipped with a CVR.

(b) Recording technology

CVRs and CARS shall not use magnetic tape or wire.

(c) Duration

(1) All CVRs shall retain the information recorded during at least the last 2 hours of their operation~~.~~

(2) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2022 shall be equipped with a CVR which shall retain the information recorded during at least the last 25 hours of its operation.

(3) All aeroplanes that are required to be equipped with CARS, and for which the individual certificate of airworthiness is first issued on or after 1 January 2025, shall be equipped with a CARS which shall retain the information recorded during at least the last two hours of their operation.

(d) Operations

(1) The CVR and CARS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR and CARS shall start to record as early as

possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(2) The CVR and CARS shall record the signals specified in Appendix 1 of ANTR OPS 1.710.

(e) Cockpit Voice Recorder Alternate Power Source

(1) An alternate power source shall automatically engage and provide 10 minutes, plus or minus one minute, of operation whenever aeroplane power to the recorder ceases, either by normal shutdown or by any other loss of power. The alternate power source shall power the CVR and its associated cockpit area microphone components. The CVR shall be located as close as practicable to the alternate power source.

Note 1: "Alternate" means separate from the power source that normally provide power to the CVR. The use of aeroplane batteries or other power sources is acceptable provided that the requirements above are met and electrical power to essential and critical loads is not compromised.

Note 2: When the CVR function is combined with other recording functions within the same unit, powering the other functions is allowed.

(2) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the application for type certification is submitted to a Contracting State on or after 1 January 2018 shall be provided with an alternate power source, as defined in Para (e) above, that powers the forward CVR in the case of combination recorders.

(3) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2018 should be provided with an alternate power source, as defined in Para (e) above, that powers at least one CVR.

ANTR OPS 1.715 Data Link Recorders

(a) Applicability

(1) All aeroplanes for which the certificate of airworthiness is first issued on or after 1 January 2016, which use any of the data link communications applications referred to in Appendix 1 of ANTR OPS 1.715 and are required to carry a CVR, shall record the data link communications messages on a crash-protected flight recorder the data link communications messages.

(2) All aeroplanes for which the individual certificate of airworthiness was first issued before 1st January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to use any of the data link communications applications referred in Appendix 1 of ANTR OPS 1.715, shall record the data link communications messages on a crash-protected flight recorder unless the installed data link communications equipment is compliant with a type certificate issued or aircraft modification first approved prior to 1st January 2016.

Note 1: Refer to Table 5 of IEM OPS 1.700/1.705/1.710/1.715 for examples of data link communications recording requirements.

Note 2: A Class B AIR could be a means for recording data link communications applications messages to and from the aeroplanes where it is not practical or is prohibitively expensive to record those data link communications applications messages on FDR or CVR.

Note 3: The "aircraft modifications" refer to modifications to install the data link communications equipment on the aircraft (e.g. structural, wiring).

(3) All aeroplanes for which the individual certificate of airworthiness was first issued before 1 January 2016, that are required to carry a CVR and are modified on or after 1st January 2016 to use any of the data link communications applications referred to in Appendix 1 of ANTR OPS 1.715 should record the data link communications messages on a crash-protected flight recorder.

(b) Duration

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

(c) Correlation

Data link recording shall be able to be correlated to the recorded cockpit audio.

ANTR OPS 1.730 Seats, seat safety belts, harnesses and child restraint devices

(a) The operator shall not operate an aeroplane unless it is equipped with:

(1) A seat or berth for each person who is aged two years or more;

(2) A safety belt, with or without a diagonal shoulder strap, or a safety harness for use in each passenger seat for each passenger aged 2 years or more;

(3) A child restraint device, acceptable to the BCAA, for each infant (See AC OPS 1.730(a)(3);

(4) Except as provided in sub-paragraph (b) below, a safety belt with shoulder harness for each flight crew seat and for any seat alongside a pilot's seat incorporating a device which will automatically restrain the occupant's torso in the event of rapid deceleration;

Note 1: The safety harness for each pilot seat should incorporate a device to prevent a suddenly incapacitated pilot from interfering with the flight controls.

Note 2: Safety harness includes shoulder straps and a seat belt which may be used independently.

(5) Except as provided in sub-paragraph (b) below, a safety belt with shoulder harness for each cabin crew seat and observer's seats. However, this requirement does not preclude use of passenger seats by cabin crew members carried in excess of the required cabin crew complement; and

(6) Seats for cabin crew members located near required floor level emergency exits except that, if the emergency evacuation of passengers would be enhanced by seating cabin crew members elsewhere, other locations are acceptable. The seats shall be forward or rearward facing within 15° of the longitudinal axis of the aeroplane.

(b) All safety belts with shoulder harness must have a single point release.

(c) A safety belt with a diagonal shoulder strap for aeroplanes with a maximum certificated take-off mass not exceeding 5 700 kg or a safety belt for aeroplanes with a maximum certificated take-off mass not exceeding 2 730 kg may be permitted in place of a safety belt with shoulder harness if it is not reasonably practicable to fit the latter.

ANTR OPS 1.731 Fasten Seat belt and No Smoking signs

The operator shall not operate an aeroplane in which all passenger seats are not visible from the flight deck, unless it is equipped with a means of indicating to all passengers and cabin crew when seat belts shall be fastened and when smoking is not allowed.

ANTR OPS 1.735 Internal doors and curtains

The operator shall not operate an aeroplane unless the following equipment is installed:

(a) In an aeroplane with a maximum approved passenger seating configuration of more than 19 passengers, a door between the passenger compartment and the flight deck compartment with a placard ‘crew only’ and a locking means to prevent passengers from opening it without the permission of a member of the flight crew;

(b) A means for opening each door that separates a passenger compartment from another compartment that has emergency exit provisions. The means for opening must be readily accessible;

(c) If it is necessary to pass through a doorway or curtain separating the passenger cabin from other areas to reach any required emergency exit from any passenger seat, the door or curtain must have a means to secure it in the open position;

(d) A placard on each internal door or adjacent to a curtain that is the means of access to a passenger emergency exit, to indicate that it must be secured open during take off and landing; and

(e) A means for any member of the crew to unlock any door that is normally accessible to passengers and that can be locked by passengers.

ANTR OPS 1.740 Placards

(See IEM OPS 1.740)

The operator shall not operate an aeroplane unless the following placards are installed;

(a) Every exit from the aircraft shall be marked, either with the words "Exit" or "Emergency Exit' in both English and Arabic script, or with universal exit signs.

(b) Every exit from the aircraft shall be marked, either with instructions in English and Arabic, or with universal exit signs to indicate the correct method of opening the exit.

(c) The markings shall be placed on or near the inside surface of the door or other closure of the exit and, if it is operable, from the outside of the aircraft on or near the exterior surface.

(d) Every safety related placard intended to be used by passengers and external emergency evacuation crew shall be in both Arabic and English scripts or with universal symbolic signs. Bilingual placards shall meet the applicable airworthiness requirements.

(e) The location instructions for all emergency equipment required to be located by a passenger shall be in English and Arabic or with universal symbolic signs.

ANTR OPS 1.745 First-Aid Kits

(See AMC OPS 1.745)

(a) The operator shall not operate an aeroplane unless it is equipped with first-aid kits, should be distributed as evenly as practicable throughout the passenger cabins and readily accessible to cabin crew members for use. The number of first-aid kits should be appropriate to the number of passengers which the aeroplane is authorized to carry:

Number of passengers seats installed	Number of First-Aid Kits required
0 to 100	1
101 to 200	2
201 to 300	3
301 to 400	4
401 to 500	5
More than 500	6

(b) The operator shall ensure that first-aid kits are:

(1) Inspected periodically to confirm, to the extent possible, that contents are maintained in the condition necessary for their intended use; and

(2) Replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant.

ANTR OPS 1.750 Universal Precaution Kits

(See AMC OPS 1.750)

For routine operations, one or two universal precaution kits should be carried on aircraft that are required to operate with at least one cabin crew member. Additional kit(s) should be made available at times of increased public health risk, such as during an outbreak of a serious communicable disease having pandemic potential. Such kits may be used to clean up any potentially infectious body contents such as blood, urine, vomit and faeces and to protect the cabin crew members who are assisting potentially infectious cases of suspected communicable disease.

The universal precaution kits should be distributed as evenly as practicable throughout the passenger cabins. They should be readily accessible to cabin crew members.

ANTR OPS 1.755 Medical Kit

(See AMC OPS 1.755)

(a) The operator shall not operate an aeroplane with a maximum approved passenger seating configuration of more than 100 seats unless it is equipped with a medical kit if any point on the planned route is more than two hours flying time (at normal cruising speed) for the use of medical doctors or other qualified persons in treating in-flight medical emergencies

(b) The commander shall ensure that drugs are not administered except by qualified doctors, nurses or similarly qualified personnel.

(c) Conditions for carriage

(1) The emergency medical kit must be dust and moisture proof and shall be carried under security conditions and stored in an appropriate secured location, where practicable, on the flight deck; and

(2) The operator shall ensure that emergency medical kits are:

(i) Inspected periodically to confirm, to the extent possible, that the contents are maintained in the condition necessary for their intended use; and

(ii) Replenished at regular intervals, in accordance with instructions contained on their labels, or as circumstances warrant.

ANTR OPS 1.760 First-aid oxygen

(See IEM OPS 1.760)

(a) The operator shall not operate a pressurised aeroplane, above 25000 ft, when a cabin crew member is required to be carried, unless it is equipped with a supply of undiluted oxygen for passengers who, for physiological reasons, might require oxygen following a cabin depressurisation.

(b) The oxygen supply referred to in (a) 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. The dispensing units may be of a portable type.

(d) The first-aid oxygen equipment shall be capable of generating a mass flow to each person.

ANTR OPS 1.765 Electronic flight bags (EFBs)

(a) EFB equipment

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

(b) EFB functions

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

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

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

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

(4) the BCAA shall issue specific approval for the operational use of EFB functions to be used for the safe operation of aeroplanes.

(c) EFB operational approval

When issuaing specific approval for the use of EFBs, the BCAA shall ensure that:

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

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

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

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

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

Note 1: Guidance on EFB equipment, functions and specific approval is contained CAP 07-Electronic Flight Bag (EFB), the Manual on Electronic Flight Bags (ICAO Doc 10020) and EASA AMC 20-25.

Note 2: Guidance on safety risk assessments is contained in the Safety Management Manual (SMM) (ICAO Doc 9859).

ANTR OPS 1.770 Supplemental oxygen – pressurised aeroplanes

(See Appendix 1 to ANTR OPS 1.770)
(See IEM OPS 1.770)

Approximate altitudes in the Standard Atmosphere corresponding to the values of absolute pressure used in the text are as follows:

Absolute pressure	Metres	Feet
700 hPa	*3 000*	*10 000*
620 hPa	*4 000*	*13 000*
376 hPa	*7 600*	*25 000*

(a) A flight to be operated at flight altitudes at which the atmospheric pressure in personnel compartments will be less than 700 hPa shall not be commenced unless sufficient stored breathing oxygen is carried to supply:

(1) all crew members and 10 per cent of the passengers for any period in excess of 30 minutes that the pressure in compartments occupied by them will be between 700 hPa and 620 hPa; and

(2) the crew and passengers for any period that the atmospheric pressure in compartments occupied by them will be less than 620 hPa.

(b) A flight to be operated with a pressurized aeroplane shall not be commenced unless a sufficient quantity of stored breathing oxygen is carried to supply all the crew members and passengers, as is appropriate to the circumstances of the flight being undertaken, in the event of loss of pressurization, for any period that the atmospheric pressure in any compartment occupied by them would be less than 700 hPa. In addition, when an aeroplane is operated at flight altitudes at which the atmospheric pressure is less than 376 hPa, or which, if operated at flight altitudes at which the atmospheric pressure is more than 376 hPa and cannot descend safely within four minutes to a flight altitude at which the atmospheric pressure is equal to 620 hPa, there shall be no less than a 10-minute supply for the occupants of the passenger compartment.

(c) The requirement of equipment and oxygen are given in Appendix 1 to this ANTR OPS 1.770.

(d) Requirement for determination of oxygen, quick donning mask use, without automatic deployable dispensing unit and aeroplane not certified to operate above 25000 ft are given in AMC to OPS 1.770.

ANTR OPS 1.772 Safeguarding of cabin crew and passengers in pressurized aeroplanes in the event of loss of pressurization

(a) Cabin crew shall be safeguarded so as to ensure reasonable probability of their retaining consciousness during any emergency descent which may be necessary in the event of loss of pressurization and, in addition, they should have such means of protection as will enable them to administer first aid to passengers during stabilized flight following the emergency.

(b) Passengers shall be safeguarded by such devices or operational procedures as will ensure reasonable probability of their surviving the effects of hypoxia in the event of loss of pressurization.

Note: It is not envisaged that cabin crew will always be able to provide assistance to passengers during emergency descent procedures which may be required in the event of loss of pressurization.

ANTR OPS 1.775 Supplemental oxygen – Non-pressurised aeroplanes

(See Appendix 1 to ANTR OPS 1.775)

(a) General

(1) The operator shall not operate a non-pressurised aeroplane at altitudes above 10000 ft unless supplemental oxygen equipment, capable of storing and dispensing the oxygen supplies required, is provided.

(2) The amount of supplemental oxygen for sustenance required for a particular operation shall be determined on the basis of flight altitudes and flight duration, consistent with the operating procedures established for each operation in the Operations Manual and with the routes to be flown, and with the emergency procedures specified in the Operations Manual.

(3) An aeroplane intended to be operated at pressure altitudes above 10000 ft shall be provided with equipment capable of storing and dispensing the oxygen supplies required.

(b) Oxygen supply requirements

(1) *Flight crew members.* Each member of the flight crew on flight deck duty shall be supplied with supplemental oxygen in accordance with Appendix 1. If all occupants of flight deck seats are supplied from the flight crew source of oxygen supply, then they shall be considered as flight crew members on flight deck duty for the purpose of oxygen supply.

(2) *Cabin crew members, additional crew members and passengers.* Cabin crew members and passengers shall be supplied with oxygen in accordance with Appendix 1. Cabin crew members carried in addition to the minimum number of cabin crew members

required, and additional crew members, shall be considered as passengers for the purpose of oxygen supply.

ANTR OPS 1.780 Crew Protective Breathing Equipment

(a) The operator shall not operate a pressurised aeroplane or, after 1 April 2000, an unpressurised aeroplane with a maximum certificated take-off mass exceeding 5700 kg or having a maximum approved seating configuration of more than 19 seats unless:

(1) It has equipment to protect the eyes, nose and mouth of each flight crew member while on flight deck duty and to provide oxygen for a period of not less than 15 minutes. The supply for Protective Breathing Equipment (PBE) may be provided by the supplemental oxygen required by ANTR OPS 1.770(b)(1) or ANTR OPS 1.775(b)(1). In addition, when the flight crew is more than one and a cabin crew member is not carried, portable PBE must be carried to protect the eyes, nose and mouth of one member of the flight crew and to provide breathing gas for a period of not less than 15 minutes; and

(2) It has sufficient portable PBE to protect the eyes, nose and mouth of all required cabin crew members and to provide breathing gas for a period of not less than 15 minutes.

(b) PBE intended for flight crew use must be conveniently located on the flight deck and be easily accessible for immediate use by each required flight crew member at their assigned duty station.

(c) PBE intended for cabin crew use must be installed adjacent to each required cabin crew member duty station.

(d) An additional, easily accessible portable PBE must be provided and located at or adjacent to the hand fire extinguishers required by ANTR OPS 1.790(c) and (d) except that, where the fire extinguisher is located inside a cargo compartment, the PBE must be stowed outside but adjacent to the entrance to that compartment.

(e) PBE while in use must not prevent communication where required by ANTR OPS 1.685, ANTR OPS 1.690, ANTR OPS 1.810 and ANTR OPS 1.850.

ANTR OPS 1.785 Head Up Display (HUD) or Equivalent Displays

(See Appendix 1 to ANTR OPS 1.785 HUD, VS or Equivalent)

Notwithstanding the ANTR OPS 1.430(b) to (d), where aeroplanes are equipped with automatic landing system, a head-up display (HUD) or equivalent displays, enhanced vision systems (EVS), synthetic vision systems (SVS) and/or combined vision systems (CVS) or combination of those systems into a hybrid system, the use of such systems for the safe operation of aeroplane, unless:

(a) An approval has been issued by the BCAA for the operational use of such displays;

(b) The equipment meets the appropriate airworthiness certification requirements;

(c) The operator has carried out a safety risk assessment of the operations supported by the HUD or equivalent displays, EVS, SVS or CVS [*Guidance on safety risk assessments is contained in the* Safety Management Manual (SMM) *(Doc 9859)]*;

(d) The operator has established and documented the procedures for the use of, and training requirements for, a HUD or equivalent displays, EVS, SVS or CVS

(e) The criteria for the use of such systems for the safe operation of an aeroplane as described in Appendix 1 to ANTR OPS 1.785 HUD, VS or Equivalent is complied with as applicable.

Note: Information regarding automatic landing systems a HUD or equivalent displays, EVS, SVS or CVS is contained in the Manual of All-Weather Operations (Doc 9365).

ANTR OPS 1.787 Turbine Aeroplane – Runway Overrun Awareness and Alerting System (ROAAS)

(a) All turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg, for which the individual certificate of airworthiness is first issued on or after 1 January 2026, shall be equipped with a runway overrun awareness and alerting system (ROAAS).

Note: Guidance material for ROAAS design is contained in EUROCAE ED-250, Minimum Operational Performance Specification (MOPS) for Runway Overrun Awareness and Alerting Systems (ROAAS), or equivalent documents.

ANTR OPS 1.790 Hand fire extinguishers

(See AMC OPS 1.790)

The operator shall not operate an aeroplane unless hand fire extinguishers are provided for use in crew, passenger and, as applicable, cargo compartments and galleys in accordance with the following:

(a) The type and quantity of extinguishing agent must be suitable for the kinds of fires likely to occur in the compartment where the extinguisher is intended to be used and, for personnel compartments, must minimise the hazard of toxic gas concentration;

(b) At least one hand fire extinguisher, containing Halon 1211 (bromochlorodifluoro-methane, $CBrClF_2$), or equivalent as the extinguishing agent, must be conveniently located on the flight deck for use by the flight crew;

(c) At least one hand fire extinguisher must be located in, or readily accessible for use in, each galley not located on the main passenger deck;

(d) At least one readily accessible hand fire extinguisher must be available for use in each Class A or Class B cargo or baggage compartment and in each Class E cargo compartment that is accessible to crew members in flight; and

(e) At least the following number of hand fire extinguishers must be conveniently located to provide adequate availability for use in the passenger compartment(s):

Maximum approved passenger seating configuration	Number of Extinguishers
7 to 30	1
31 to 60	2
61 to 200	3
201 to 300	4
301 to 400	5
401 to 500	6
501 to 600	7
601 or more	8

(f) 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.

(g) 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.

(h) 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.

(i) Where two or more hand fire extinguishers are required in the passenger compartments and their location is not otherwise dictated by any regulation, an extinguisher should be located near each end of the cabin with the remainder distributed throughout the cabin as evenly as is practicable.

(j) 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.

(k) Any agent used in a built-in fire extinguisher for each lavatory disposal receptacle for towels, paper or waste in an aeroplane for which the individual certificate of airworthiness is first issued on or after 31 December 2011 and any extinguishing agent used in a portable fire extinguisher in an aeroplane for which the individual certificate of airworthiness is first issued on or after 31 December 2018 shall:

(1) meet the applicable minimum performance requirements of the Kingdom of Bahrain; and

(2) is not of a type listed in the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer as it appears in the Eighth Edition of the Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer, Annex A, Group II.

Note: Information concerning extinguishing agents is contained in the UNEP Halons Technical Options Committee Technical Note No. 1 – New Technology Halon Alternatives and FAA Report No. DOT/FAA/AR-99-63, Options to the Use of Halons for Aircraft Fire Suppression Systems.

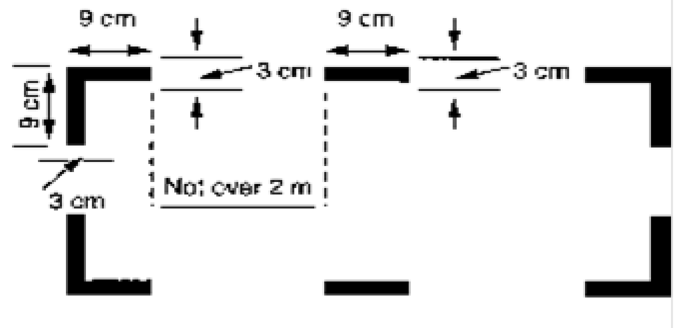
ANTR OPS 1.795 Crash axes and crowbars

(a) The operator shall not operate an aeroplane with a maximum certificated take-off mass exceeding 5700 kg or having a maximum approved passenger seating configuration of more than 9 seats unless it is equipped with at least one crash axe or crowbar located on the flight deck. If the maximum approved passenger seating configuration is more than 200 an additional crash axe or crowbar must be carried and located in or near the most rearward galley area.

(b) Crash axes and crowbars located in the passenger compartment must not be visible to passengers.

ANTR OPS 1.800 Marking of break-in points

The operator shall ensure that, if areas of the fuselage suitable for break-in by rescue crews in emergency are marked on an aeroplane, such areas shall be marked as shown below. The colour of the markings shall be red or yellow, and if necessary, they shall be outlined in white to contrast with the background. If the corner markings are more than 2 metres apart, intermediate lines 9 cm x 3 cm shall be inserted so that there is no more than 2 metres between adjacent marks.



ANTR OPS 1.805 Means for emergency evacuation

(a) The operator shall not operate an aeroplane with passenger emergency exit sill heights:

(1) Which are more than 1·83 metres (6 feet) above the ground with the aeroplane on the ground and the landing gear extended; or

(2) Which would be more than 1·83 metres (6 feet) above the ground after the collapse of, or failure to extend of, one or more legs of the landing gear and for which a Type Certificate was first applied for on or after 1 April 2000, unless it has equipment or devices available at each exit, where sub-paragraphs (1) or (2) apply, to enable passengers and crew to reach the ground safely in an emergency.

(b) Such equipment or devices need not be provided at overwing exits if the designated place on the aeroplane structure at which the escape route terminates is less than 1·83 metres (6 feet) from the ground with the aeroplane on the ground, the landing gear extended, and the flaps in the take off or landing position, whichever flap position is higher from the ground.

(c) In aeroplanes required to have a separate emergency exit for the flight crew and:

(1) For which the lowest point of the emergency exit is more than 1·83 metres (6 feet) above the ground with the landing gear extended; or,

(2) For which a Type Certificate was first applied for on or after 1 April 2000, would be more than 1·83 metres (6 ft) above the ground after the collapse of, or failure to extend of, one or more legs of the landing gear, there must be a device to assist all members of the flight crew in descending to reach the ground safely in an emergency.

ANTR OPS 1.810 Megaphones

(See AMC OPS 1.810)

(a) The operator shall not operate an aeroplane with a maximum approved passenger seating configuration of more than 60 and carrying one or more passengers unless it is equipped with portable battery-powered megaphones readily accessible for use by crew members during an emergency evacuation, to the following scales:

(1) For each passenger deck:

Passenger seating configuration	Number of Megaphones Required
1 to 99	1
100 or more	2

(2) For aeroplanes with more than one passenger deck, in all cases when the total passenger seating configuration is more than 60, at least 1 megaphone is required.

ANTR OPS 1.815 Emergency lighting

(a) The operator shall not operate a passenger carrying aeroplane which has a maximum approved passenger seating configuration of more than 9 unless it is provided with an emergency lighting system having an independent power supply to facilitate the evacuation of the aeroplane. The emergency lighting system must include:

(1) For aeroplanes which have a maximum approved passenger seating configuration of more than 19:

(i) Sources of general cabin illumination;

(ii) Internal lighting in floor level emergency exit areas; and

(iii) Illuminated emergency exit marking and locating signs.

(iv) For aeroplanes for which the application for the type certificate or equivalent was filed before 1 May 1972, and when flying by night, exterior emergency lighting at all overwing exits, and at exits where descent assist means are required.

(v) For aeroplanes for which the application for the type certificate or equivalent was filed on or after 1 May 1972, and when flying by night, exterior emergency lighting at all passenger emergency exits.

(vi) For aeroplanes for which the type certificate was first issued on or after 1 January 1958, floor proximity emergency escape path marking system in the passenger compartment(s).

(2) For aeroplanes which have a maximum approved passenger seating configuration of 19 or less and are certificated to CS–23 or CS–25:

(i) Sources of general cabin illumination;

(ii) Internal lighting in emergency exit areas; and

(iii) Illuminated emergency exit marking and locating signs.

(3) For aeroplanes which have a maximum approved passenger seating configuration of 19 or less and are not certificated to CS–23 or CS–25, sources of general cabin illumination.

(b) After 1 April 1998 the operator shall not, by night, operate a passenger carrying aeroplane which has a maximum approved passenger seating configuration of 9 or less unless it is provided with a source of general cabin illumination to facilitate the evacuation of the aeroplane. The system may use dome lights or other sources of illumination already fitted on the aeroplane and which are capable of remaining operative after the aeroplane’s battery has been switched off.

ANTR OPS 1.820 Emergency Locator Transmitter

(See Appendix 1 to ANTR OPS 1.820)
(See IEM OPS 1.820)

(a) Except as provided for in (b), all aeroplanes authorised to carry more than 19 passengers shall be equipped with at least one automatic ELT or two ELTs of any type.

(b) All aeroplanes authorised to carry more than 19 passengers for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with either:

(1) at least two ELTs, one of which shall be automatic; or

(2) at least one ELT and a capability that meets the requirements of ANTR OPS 1.822.

Note: In the case where the requirements for ANTR OPS 1.822 are met by another system no automatic ELT is required (See IEM OPS 1.820).

(c) Except as provided for in (d), all aeroplanes authorised to carry 19 passengers or less shall be equipped with at least one ELT of any type.

(d) All aeroplanes authorised to carry 19 passengers or less for which the individual certificate of airworthiness is first issued after 1 July 2008 shall be equipped with at least one automatic ELT.

(e) The operator shall ensure that all ELTs that are capable of transmitting on 121.5 & 406 MHz shall meet the requirement with respect to technical specification, characters, frequency, coding and operation are in accordance with ICAO Annex 10, Volume III and its appendix and registered with the national agency responsible for initiating Search and Rescue or another nominated agency.

Note 1: The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

Note 2: Refer to Appendix 1 to ANTR OPS 1.820 for ELT types, specification and ELT battery requirement.

Note 3: Refer to Appendix 2 to ANTR OPS 1.705 for Automatic Deployable Flight Recorder integrated with ELT.

ANTR OPS 1.822 Location of an Aeroplane in Distress

(See Appendix 1 ANTR OPS 1.822)
(See IEM OPS 1.822)

(a) As of 1 January 2025, All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2024, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress, in accordance with Appendix 1 to ANTR OPS 1.822.

(b) All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023, should autonomously transmit information from which a position can be determined at least once every minute, when in distress, in accordance with Appendix 1 to ANTR OPS 1.822.

(c) The operator shall make position information of a flight in distress available to the appropriate organisations, as established by the BCAA.

Note 1: Refer to ANTR OPS 1.175(p) for operator responsibilities when using third parties.

Note 2: Refer to ICAO Annex 6, Part-I, Appendix 9, Attachment K & ICAO DOC 10054 "Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery" for detailed guidelines.

Note 3: Operational procedures for monitoring and making position information of a flight in distress available to the appropriate organisations in a timely manner are contained in PANS-OPS, Volume III, Section 10.

ANTR OPS 1.825 Life Jackets
(See IEM OPS 1.825)

(a) *Land aeroplanes*. The operator shall not operate a land aeroplane without one life jacket or equivalent individual flotation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided:

(1) When flying over water and at a distance of more than 50 nautical miles from the shore, in the case of landplanes operated in accordance with Note.1 or Note. 2

(2) When flying en route over water beyond gliding distance from the shore,

(3) When taking off or landing at an aerodrome where the take-off or approach path is so disposed over water that in the event of a mishap there would be a likelihood of a ditching. Life jackets for infants may be substituted by other approved flotation devices.

(b) *Seaplanes and amphibians.* The operator shall not operate a seaplane or an amphibian on water, unless it is equipped with one life jackets or equivalent flotation device, for each person on board. Each life jacket must be stowed in a position easily accessible from the seat or berth of the person for whose use it is provided. Life jackets for infants may be substituted by other approved flotation devices.

(c) Each life jacket and equivalent individual flotation device, when carried in accordance with (a) & (b) shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons, except where the requirement of (a) 2 is met by the provision of individual flotation devices other than life jackets.

Note 1: En route — one engine inoperative. The aeroplane shall be able, in the event of the critical engine becoming inoperative at any point along the route or planned diversions therefrom, to continue the flight to an aerodrome at which the Standard of aeroplane performance operating limitation can be met, without flying below the minimum flight altitude at any point.

Note 2: En route — two engines inoperative. In the case of aeroplanes having three or more engines, on any part of a route where the location of en-route alternate aerodromes and the total duration of the flight are such that the probability of a second engine becoming inoperative must be allowed for if the general level of safety implied by the Standards of this chapter is *to be maintained, the aeroplane shall be able, in the event of any two engines becoming inoperative, to continue the flight to an en-route alternate aerodrome and land.*

Note 3: "Landplanes"- includes amphibians operated as landplanes.

Note 4: Life jackets accessible from seats or berths located in crew rest compartments are required only if the seats or berths concerned are certified to be occupied during take-off and landing

ANTR OPS 1.830 Extended overwater flights

(a) SEAPLANES

All seaplanes for all flights shall be equipped with:

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

(2) equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable; and

(3) one sea anchor (drogue).

Note 1: "Seaplanes" includes amphibians operated as seaplanes.

Note 2: Life jackets accessible from seats or berths located in crew rest compartments are required only if the seats or berths concerned are certified to be occupied during take-off and landing.

(b) LANDPLANES

Landplanes shall carry the equipment prescribed in (b)(4):

(1) when flying over water and at a distance of more than 93 km (50 NM) away from the shore, in the case of landplanes operated in accordance with;

(i) En route — one engine inoperative. The aeroplane shall be able, in the event of the critical engine becoming inoperative at any point along the route or planned diversions therefrom, to continue the flight to an aerodrome at which the Standard of aeroplane performance operating limitation can be met, without flying below the minimum flight altitude at any point.

(ii) En route — two engines inoperative. In the case of aeroplanes having three or more engines, on any part of a route where the location of en-route alternate aerodromes and the total duration of the flight are such that the probability of a second engine becoming inoperative must be allowed for if the general level of safety implied by the Standards of this chapter is to be maintained, the aeroplane shall be able, in the event of any two engines becoming inoperative, to continue the flight to an en-route alternate aerodrome and land.

(2) when flying en route over water beyond gliding distance from the shore, in the case of all other landplanes; and

(3) when taking off or landing at an aerodrome where, in the opinion of the State of the Operator, the take-off or approach path is so disposed over water that in the event of a mishap there would be a likelihood of a ditching.

(4) The equipment referred to in (b) (1) to (3) shall comprise one life jacket or equivalent individual flotation device for each person on board, stowed in a position easily accessible from the seat or berth of the person for whose use it is provided.

Note 1: "Landplanes" includes amphibians operated as landplanes.

Note 2: Life jackets accessible from seats or berths located in crew rest compartments are required only if the seats or berths concerned are certified to be occupied during take-off and landing.

Note 3: information regarding the acceptable means of compliance with this Standard, particularly in the case of infants, can be found, in the Guidance on the preparation of an Operations Manual (Doc 10153), Chapter11 Attachment D.

(c) All aeroplanes on long-range over-water flights

In addition to the equipment prescribed in Para (a) & (b) above, whichever is applicable, the following equipment shall be installed in all aeroplanes when used over routes on which the aeroplane may be over water and at more than a distance corresponding to 120 minutes at cruising speed or 740 km (400 NM), whichever is the lesser, away from land suitable for making an emergency landing in the case of aircraft operated in accordance with (b)(1)(i) or (b)(1)(ii), and 30 minutes or 185 km (100 NM), whichever is the lesser, for all other aeroplanes:

(1) life-saving rafts in sufficient numbers to carry all persons on board, stowed so as to facilitate their ready use in emergency, provided with such life-saving equipment including means of sustaining life as is appropriate to the flight to be undertaken;

(2) a survivor locator light in each life raft.

(3) equipment for making the pyrotechnical distress signals described in ANTR OPS 1.835; and

(4) at least two survival ELTs [ELT(S)]

(5) at the earliest practicable date, but not later than 1 January 2018, on all aeroplanes of a maximum certificated takeoff mass of over 27 000 kg, a securely attached underwater locating device operating at a frequency of 8.8 kHz., unless

(i) the the aeroplane is operated over routes on which it is at no point at a distance of more than 180 NM from the shore; or

(ii) the aeroplane is equipped with robust and automatic means to accurately determine, following an accident where the aeroplane is severely damaged, the location of the point of end of flight.

This automatically activated underwater locating device shall operate for a minimum of 30 days and shall not be installed in wings or empennage.

Note: Underwater locator beacon (ULB) performance requirements are as contained in the SAE AS6254, Minimum Performance Standard for Low Frequency Underwater Locating Devices (Acoustic) (Self-Powered), or equivalent documents.

(6) Each life jacket and equivalent individual flotation device, when carried in accordance with ANTR OPS 1.825 and ANTR OPS 1.830(a)(1) & ANTR OPS 1.830(b)(1) to (b)(4),

shall be equipped with a means of electric illumination (survivor locator light) for the purpose of facilitating the location of persons, except where the requirement of ANTR OPS 1.830 (b)(3) is met by the provision of individual flotation devices other than life jackets.

ANTR OPS 1.835 Survival equipment
(See IEM OPS 1.835)

(a) The operator shall not operate an aeroplane across land areas which have been designated by the State concerned as areas in which search and rescue would be especially difficult unless it is equipped with the following:

(1) Signalling equipment to make the pyrotechnical distress signals described in ICAO Annex 2;

(2) At least one ELT(S) capable of transmitting on the distress frequencies prescribed in ICAO Annex 10, Volume V, Chapter 2 (Appendix 1 to ANTR OPS 1.820); and

(3) Additional survival equipment for the route to be flown taking account of the number of persons on board (See AMC OPS 1.835(c)),

(b) The additional equipment specified in sub-paragraph (a)(3) need not 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 the one engine inoperative 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 distance 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.

ANTR OPS 1.840 Seaplanes and amphibians – Miscellaneous equipment

(a) The operator shall not operate a seaplane or an amphibian on water unless it is equipped with:

(1) A sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the aircraft on water, appropriate to its size, weight and handling characteristics; and

(2) Equipment for making the sound signals prescribed in the International Regulations for preventing collisions at sea, where applicable.

ANTR OPS 1.842 Additional requirements for operations of single-engine turbine-powered aeroplanes at night and/or in Instrument Meteorological Conditions (IMC)

(a) All single-engine turbine-powered aeroplanes operated at night and/or in IMC shall have an engine trend monitoring system, and those aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2005 shall have an automatic trend monitoring.

(b) To minimize the probability of in-flight engine failure, the engine shall be equipped with:

(1) an ignition system that activates automatically, or is capable of being operated manually, for take-off and landing, and during flight, in visible moisture;

(2) a magnetic particle detection or equivalent system that monitors the engine, accessories gearbox, and reduction gearbox, and which includes a flight deck caution indication; and

(3) an emergency engine power control device that permits continuing operation of the engine through a sufficient power range to safely complete the flight in the event of any reasonably probable failure of the fuel control unit.

(c) Single-engine turbine-powered aeroplanes approved to operate at night and/or in IMC shall be equipped with the following systems and equipment intended to ensure continued safe flight and to assist in achieving a safe forced landing after an engine failure, under all allowable operating conditions:

(1) two separate electrical generating systems, each one capable of supplying all probable combinations of continuous in-flight electrical loads for instruments, equipment and systems required at night and/or in IMC;

(2) a radio altimeter;

(3) an emergency electrical supply system of sufficient capacity and endurance, following loss of all generated power, to as a minimum:

(i) maintain the operation of all essential flight instruments, communication and navigation systems during a descent from the maximum certificated altitude in a glide configuration to the completion of a landing;

(iv) lower the flaps and landing gear, if applicable;

(v) provide power to one pitot heater, which must serve an air speed indicator clearly visible to the pilot;

(vi) provide for operation of the landing light;

(vii) provide for one engine restart, if applicable; and

(vi) provide for the operation of the radio altimeter;

(4) two attitude indicators, powered from independent sources;

(5) a means to provide for at least one attempt at engine-start;

(6) airborne weather radar;

(7) a certified area navigation system capable of being programmed with the positions of aerodromes and safe forced landing areas, and providing instantly available track and distance information to those locations;

(8) for passenger operations, passenger seats and mounts which meet dynamically-tested performance standards and which are fitted with a shoulder harness or a safety belt with a diagonal shoulder strap for each passenger seat;

(9) in pressurized aeroplanes, sufficient supplemental oxygen for all occupants for descent following engine failure at the maximum glide performance from the maximum certificated altitude to an altitude at which supplemental oxygen is no longer required;

(10) a landing light that is independent of the landing gear and is capable of adequately illuminating the touchdown area in a night forced landing; and

(11) an engine fire warning system.

Appendix 1 to ANTR OPS 1.700 Flight Recorders – General

(a) Inspections of flight recorder systems

(1) Prior to the first flight of the day, the built-in test features for the flight recorders and Flight Data Acquisition Unit (FDAU), when installed, shall be monitored by manual and/or automatic checks.

(2) FDR systems or ADRS, CVR systems or CARS, and AIR systems or AIRS shall have recording inspection intervals of one year; subject to the approval from the appropriate regulatory authority, this period may be extended to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring. DLR systems or DLRS shall have recording inspection intervals of two years; subject to the approval from the appropriate regulatory authority, this period may be extended to four years provided these systems have demonstrated high integrity of serviceability and self-monitoring.

(b) Recording inspections shall be carried out as follows:

(1) an analysis of the recorded data from the flight recorders shall ensure that the recorder operates correctly for the nominal duration of the recording;

(2) the FDR or ADRS recording from a complete flight shall be examined in engineering units to evaluate the validity of all recorded parameters. Particular attention shall be given to parameters from sensors dedicated to the FDR or ADRS. Parameters taken from the aircraft's electrical bus system need not be checked if their serviceability can be detected by other aircraft systems;

(3) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;

(4) an examination of the recorded signal on the CVR or CARS shall be carried out by replay of the CVR or CARS recording. While installed in the aircraft, the CVR shall record test signals from each aircraft source and from relevant external sources to ensure that all required signals meet intelligibility standards;

(5) where practicable, during the examination, a sample of in-flight recordings of the CVR or CARS shall be examined for evidence that the intelligibility of the signal is acceptable; and

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

(c) Flight recorder systems shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory parameters is not recorded correctly.

(d) A report of the annual inspection shall be made available on request to regulatory authorities for monitoring purposes.

(e) Calibration requirements of the FDR system shall be as follows:

(1) For those parameters which have sensors dedicated only to the FDR and are not checked by other means, recalibration shall be carried out at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every five years. The recalibration shall determine any discrepancies in the engineering conversion routines for the mandatory parameters, and to ensure that parameters are being recorded within the calibration tolerances; and

When the parameters of altitude and airspeed are provided by sensors that are dedicated to the FDR system, there shall be a recalibration performed at an interval determined by the continuing airworthiness information for the FDR system. In the absence of such information, a recalibration shall be carried out at least every two.

Appendix 1 to ANTR OPS 1.705

Flight Data Recorders (FDR) and Aircraft Data Recording System (ADRS)

(a) The FDR or ADRS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power.

(b) The parameters that satisfy the requirements for FDRs are listed Table 1 below. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity. In addition, the parameters designated by an asterisk (*) shall be recorded if an information data source for the parameter is used by aeroplane systems or the flight crew to operate the aeroplane. However, other parameters may be substituted with due regard to the aeroplane type and the characteristics of the recording equipment.

Note: In previous editions of Annex 6, Part I, types of recorders were defined to capture the first evolutions of FDRs.

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

1) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use 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 autoflight 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) warnings and alerts; and

iv) the identity of displayed pages for emergency procedures and checklists; and

2) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.

(c) The parameters that satisfy the requirements for flight path and speed as displayed to the pilot(s) are listed below. The parameters without an (*) are mandatory parameters which shall be recorded. In addition, the parameters designated by an (*) shall be recorded if an information source for the parameter is displayed to the pilot and is practicable to record:

- Pressure altitude
- Indicated airspeed or calibrated airspeed
- Total or outside air temperature
- Heading (primary flight crew reference)
- Pitch attitude
- Roll attitude
- Engine thrust/power: propulsive thrust/power on each engine, cockpit thrust / power lever position
- Landing-gera status*
- Total or outside air temperature*
- Time or relative time count
- Navigation data*: drift angle, wind speed, wind direction, altitude / longitude
- Radio altitude*

(d) The parameters that satisfy the requirements for ADRS are the first 7 parameters listed in Table 2.

(e) If further ADRS recording capacity is available, the recording of any parameters from 8 onwards defined in Table 2 shall be considered.

(f) Additional information

(2) The measurement range, recording interval and accuracy of parameters on installed equipment shall be verified by methods approved by the appropriate certificating authority.

(3) Documentation concerning parameter allocation, conversion equations, periodic calibration and other service-ability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

Table 1

Parameters characteristics of flight data recorders

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125%/h	1 s
2	Pressure-altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft+1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max V_{So} *(Note 1)* V_{So} to 1.2 V_D *(Note 2)*	1	±5%± 3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration (*Note 8*)	Application for type certification is submitted to a Contracting State before1 January 2016	–3 g to +6 g	0.125	±1% of maximum range excluding datum error of±5%	0.004 g
		Application for type certification is submitted to a Contracting State on or after 1 January 2016	–3 g to +6 g	0.0625	±1% of maximum range excluding datum error of±5%	0.004 g
6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
9	Power on each engine *(Note 3)*		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, and reverse	1 (per engine)		
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretes	1		
16	Longitudinal acceleration (*Note 8*)	Application for type certification submitted to a Contracting State before1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of±0.05 g	0.004 g
17	Lateral acceleration (*Note 8*)	Application for type certification submitted to a Contracting State before1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of±0.05 g	0.004 g
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of±0.05 g	0.004 g
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *(Note 4 and 8)*	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position		Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
21*	Vertical beam deviation (ILS/GNSS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)		Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	±3%	0.3% of full range
23	Marker beacon passage		Discrete	1		
24	Master warning		Discrete	1		
25	Each NAV receiver frequency selection *(Note 5)*		Full range	4	As installed	
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN)) *(Notes 5 and 6)*		0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)
27	Air/ground status		Discrete	1		
28*	GPWS/TAWS/GCA S status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)		Discrete	1		
29*	Angle of attack		Full range	0.5	As installed	0.3 % of full range
30*	Hydraulics, each system (low pressure)		Discrete	2		0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) *(Note 7)*		As installed	1	As installed	
32*	Landing gear and gear selector position		Discrete	4	As installed	
33*	Groundspeed		As installed	1	Data should be obtained from the most accurate system	1 kt
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35	Additional engine parameters (EPR, N_1, indicated vibration level, N_2, EGT, fuel lever position, N_3, engine fuel metering valve position)	Application for type certification is submitted to a Contracting State on or after 1 January 2023 flow, fuel cut-off	As installed	Each engine each second	As installed	2% of full range

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discretes	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric setting (pilot, co- pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path(IRNAV/IAN))			1	As installed	
45*	Selected decision height		As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)		Discrete(s)	4	As installed	
47*	Multi- function/engine/alerts display format		Discrete(s)	4	As installed	
48*	AC electrical bus status		Discrete(s)	4	As installed	
49*	DC electrical bus status		Discrete(s)	4	As installed	
50*	Engine bleed valve position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust and command		As installed	2	As installed	
54*	Engine thrust target		As installed	4	As installed	2% of full range
55*	Computed centre of gravity		As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank		As installed	64	As installed	1% of full range
57*	Head up display in use		As installed	4	As installed	
58*	Para visual display on/off		As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation		As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)		As installed	4	As installed	
61*	Ice detection		As installed	4	As installed	

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
62*	Engine warning each engine vibration		As installed	1	As installed	
63*	Engine warning each engine over temperature		As installed	1	As installed	
64*	Engine warning each engine oil pressure low		As installed	1	As installed	
65*	Engine warning each engine over speed		As installed	1	As installed	
66*	Yaw trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle		Full range	1	±5 %	0.5°
69*	De-icing and/or anti-icing systems		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5 %	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5 %	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5 %	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw		Full range	1	±5 %	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)		Full range (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5 %	0.2% of full range or as installed
76*	Event marker		Discrete	1		
77*	Date		365 days	64		
78*	ANP or EPE or EPU		As installed	4	As installed	
79*	Cabin pressure altitude	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of ful l range
81*	Flight director command	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	0.5°
82*	Vertical speed	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	0.25	As installed (32 ft/min recommended)	16 ft/min

Notes:

(a) V_{So} *stalling speed or minimum steady flight speed in the landing configuration is in Section "Abbreviations and Symbols".*

(b) V_D *design diving speed.*

(c) *Record sufficient inputs to determine power.*

(d) *For aeroplanes with control systems in which movement of a control surface will back drive the pilot's control, "or" applies. For aeroplanes with control systems in which movement of a control surface will not back drive the pilot's control, "and" applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately.*

(e) *If signal available in digital form.*

(f) *Recording of latitude and longitude from INS or other navigation system is a preferred alternative.*

(g) *If signals readily available.*

(h) *It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the measurement range, maximum sampling and recording interval, accuracy limits or recording resolution description detailed in this Appendix.*

Table 2

Parameter Characteristics for Aircraft Data Recording Systems (ADRS)

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading					
	a) Heading (Magnetic or True	±180º	1	±2°	0.5°	Heading is preferred, if not recorded
	b) Yaw rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
2	Pitch					
	a) Pitch attitude	±90º	0.25	±2º	0.5°	Pitch attitude is preferred, not available, pitch rate be recorded
	b) Pitch rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
3	Roll					
	a) Roll attitude	±180º	0.25	±2º	0.5°	Roll attitude is preferred, if not available, roll rate shall be recorded
	b) Roll rate	±300º/s	0.25	±1% + drift of 360°/h	2°/s	
4	Positioning system:					
	a) Time	24 hours	1	±0.5 s	0.1 s	UTC time preferred where available.
	b) Latitude/longitude	Latitude:±90° Longitude:±180°	2 (1 if available)	As installed (0.00015° recommended)	0.00005°	
	c) Altitude	–300 m (–1 000 ft) to maximum altitude of aeroplane +1 500 m (5 000 ft)	2 (1 if available)	As installed (±15 m (±50 ft) recommended)	1.5 m (5 ft)	
	d) Ground speed	0–1 000 kt	2 (1 if available)	As installed (±5 kt recommended)	1 kt	
	e) Track	0–360º	2 (1 if available)	As installed (± 2º recommended)	0.5°	
	f) Estimated error	Available range	2 (1 if available)	As installed	As installed	Shall be recorded if readily available
5	Normal acceleration	–3 g to + 6 g (*)	0.25 (0.125 if available)	As installed (± 0.09 g excluding a datum error of ±0.45 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
7	Lateral acceleration	±1 g (*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	−50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3 % recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16	Engine thrust/power/torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
17	Engine gas generator speed (Ng)	0-150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (Nf)	0-150%	Each engine each second	As installed	0.2% of full range	
19	Coolant temperature	Full range	1	As installed (±5°C recommended)	1° C	
20	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	

22	Flaps position	Full range or each discrete position	2	As installed	0.5°

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
23	Primary flight control surface position	Full range	0.25	As installed	0.2 % of full range	
24	Fuel quantity	Full range	4	As installed	1% of full range	
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		* Where available, record up-and- locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	

Appendix 2 to ANTR OPS 1.705 Automatic Deployable Flight Recorder

(a) Automatic Deployable Flight Recorder (ADFR)

(1) Operation - The following requirements shall apply to an ADFR:

— deployment shall take place when the aeroplane structure has been significantly deformed;

— deployment shall take place when an aeroplane sinks in water;

— ADFR shall not be capable of manual deployment;

— the ADFR shall be able to float on water;

— the ADFR deployment shall not compromise the safe continuation of the flight;

— the ADFR deployment shall not significantly reduce the chance of survival of the recorder and of successful transmission by its ELT;

— the ADFR deployment shall not release more than one piece;

— an alert shall be made to the flight crew when the ADFR is no longer captive to the aircraft;

— the flight crew shall have no means to disable ADFR deployment when the aircraft is airborne;

— the ADFR shall contain an integrated ELT, which shall activate automatically during the deployment sequence. Such ELT may be of a type that is activated in-flight and provides information from which a position can be determined; and

— the integrated ELT of an ADFR shall satisfy the same requirements as an ELT required to be installed on an aeroplane. The integrated ELT shall at least have the same performance as the fixed ELT to maximize detection of the transmitted signal.

Note 1: Refer to the Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery *(Doc 10054) for more information on ADFR.*

Note 2: If an integrated ELT of a type that is activated in flight is used within an ADFR, it could be a means to comply with the requirements of stipulated below in Para -2 (Reference: ICAO, Annex 6, Part-I, Chapter 6, 6.18):

(2) All aeroplanes of a maximum certificated take-off mass of over 27 000 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023, shall autonomously transmit information from which a position can be determined by the operator at least once every minute, when in distress, in accordance with Appendix 9 to ICAO Annex 6, Part-I.

All aeroplanes of a maximum certificated take-off mass of over 5 700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2023, should autonomously transmit information from which a position can be determined at least once every minute, when in distress, in accordance with Appendix 9 to ICAO Annex 6, Part-I.

The operator shall make position information of a flight in distress available to the appropriate organizations, as established by the State of the Operator.

(b) Flight Crew-Machine Interface Recording

(1) The AIR or AIRS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the AIR or AIRS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(2) A Class A AIR or AIRS captures the general cockpit area in order to provide data supplemental to conventional flight recorders.

Note 1: To respect crew privacy, the cockpit area view may be designed as far as practical to exclude the head and shoulders of crew members whilst seated in their normal operating position.

Note 2: There are no provisions for Class A AIR or AIRS in this document.

(i) A Class B AIR or AIRS captures data link message displays.

(ii) A Class C AIR or AIRS captures instruments and control panels.

Note: A Class C AIR or AIRS may be considered as a means for recording flight data where it is not practical or is prohibitively expensive to record on an FDR or an ADRS, or where an FDR is not required.

(3) Applications to be recorded

(i) The operation of switches and selectors and the information displayed to the flight crew from electronic displays shall be captured by sensors or other electronic means.

(ii) The recording of operation of switches and selectors by the flight crew shall include the following:

— any switch or selector that will affect the operation and the navigation of the aircraft; and
— selection of normal and alternate systems.

(iii) The recording of the information displayed to the flight crew from electronic displays shall include the following:

— primary flight and navigation displays;
— aircraft system monitoring displays;
— engine indication displays;
— traffic, terrain, and weather displays;
— crew alerting systems displays;
— stand-by instruments; and
— installed EFB to the extent it is practical.

(iv) If image sensors are used, the recording of such images shall not capture the head and shoulders of the flight crew members while seated in their normal operating position.

Appendix 1 to ANTR OPS 1.710 Cockpit Voice Recorders and Cockpit Audio Recording Systems - List of signals to be recorded.

The CVR or CARS shall start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power. In addition, depending on the availability of electrical power, the CVR or CARS shall start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight.

(a) The CVR shall record simultaneously on four separate channels, or more, at least the following:

(1) voice communication transmitted from or received in the aeroplane by radio;

(2) aural environment on the flight deck;

(3) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed;

(4) voice or audio signals identifying navigation or approach aids introduced in the headset or speaker; and

(5) voice communication of flight crew members using the passenger address system, if installed.

(b) The preferred CVR audio allocation should be as follows:

(1) pilot-in-command audio panel;

(2) co-pilot audio panel;

(3) additional flight crew positions and time reference; and

(4) cockpit area microphone.

(c) The CARS shall record on two separate channels, or more, at least the following:

(1) voice communication transmitted from or received in the aeroplane by radio;

(2) aural environment on the flight deck; and

(3) voice communication of flight crew members on the flight deck using the aeroplane's interphone system, if installed.

(d) The preferred CARS audio allocation shall be as follows:

(1) voice communication; and

(2) aural environment on the flight deck;

Appendix 1 to ANTR OPS 1.715 Data Link Recorders

(a) Applications to be recorded

(1) Where the aircraft flight path is authorized or controlled through the use of data link messages, all data link messages, both uplinks (to the aircraft) and downlinks (from the aircraft), shall be recorded on the aircraft. As far as practicable, the time the messages were displayed to the flight crew and the time of the responses shall be recorded.

Note: Sufficient information to derive the content of the data link communications message and the time the messages were displayed to the flight crew is needed to determine an accurate sequence of events on board the aircraft.

(2) Messages applying to the applications listed in Table 3 shall be recorded. Applications without the asterisk (*) are mandatory applications which shall be recorded regardless of the system complexity. Applications with an (*) shall be recorded only as far as is practicable given the architecture of the system.

Table 3

Description of Applications for Data Link Recorders

Item No.	Application type	Application description	Recoding content
1	Data link Initiation	This includes any applications used to logon to or initiate data link service. In FANS-1/A and ATN, these are ATS Facilities Notification (AFN) and Context Management (CM) respectively.	C
2	Controller/Pilot Communication	This includes any application used to exchange requests, clearances, instructions and reports between the flight crew and controllers on the ground. In FANS-1/A and ATN, this includes the CPDLC application. It also includes applications used for the exchange of oceanic (OCL) and departure clearances (DCL) as well as data link delivery of taxi clearances.	C
3	Addressed Surveillance	This includes any surveillance application in which the ground sets up contracts for delivery of surveillance data. In FANS-1/A and ATN, this includes the Automatic Dependent Surveillance (ADS-C) application. Where parametric data are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	C
4	Flight Information	This includes any service used for delivery of flight information to specific aircraft. This includes, for example, data link aviation weather report service (D-METAR), data link automatic terminal service (D-ATIS), digital notice to Airmen (D-NOTAM) and other textual data link services.	C
5	Aircraft Broadcast Surveillance	This includes elementary and enhanced surveillance systems, as well as broadcast (ADS-B) output data. Where parametric data sent by the aeroplane are reported within the message they shall be recorded unless data from the same source are recorded on the FDR.	M*
6	Aeronautical Operational Control Data	This includes any application transmitting or receiving data used for AOC purposes (per the ICAO definition of AOC).	M*

Key:

C: Complete contents recorded.

M: Information that enables correlation to 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.

Appendix 1 to ANTR OPS 1.770

Oxygen – Minimum Requirements for Supplemental Oxygen for Pressurised Aeroplanes

(a) Pressurised aeroplanes operated at pressure altitudes above 10 000 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 25 000 ft shall be equipped with:

(1) quick donning types of masks for flight crew members, which will readily supply oxygen upon demand;

(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 25 000 ft, or operated at pressure altitudes at, or below 25 000 ft under conditions that would not allow them to descend safely to 13 000 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 25 000 ft, may be reduced to the entire flying time between 10 000 ft and 13 000 ft cabin pressure altitudes for all required cabin crew members and for at least 10 % of the passengers if, at all points along the route to be flown, the aeroplane is able to descend safely within four minutes to a cabin pressure altitude of 13 000 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 aeroplane's maximum certified operating altitude to 10 000 ft in 10 minutes and followed by 20 minutes at 10 000 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 aeroplane's maximum certified operating altitude to 10 000 ft in 10 minutes followed by 110 minutes at 10 000 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 aeroplane's maximum certified operating altitude to 15 000 ft in 10 minutes.

Table 1

Oxygen minimum requirements for pressurised aeroplanes

Supply for	Duration and cabin pressure altitude
1. Occupants of flight crew compartment seats on flight crew compartment duty	(a) The entire flying time when the cabin pressure altitude exceeds 13 000 ft. (b) The remainder of the flying time when the cabin pressure altitude exceeds 10 000 ft but does not exceed 13 000 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 25 000 ft; and (2) 2 hours' supply for aeroplanes certified to fly at altitudes of more than 25 000 ft.
2. Required cabin crew members	(a) The entire flying time when the cabin pressure altitude exceeds 13 000 ft, but not less than 30 minutes' supply. (b) The remainder of the flying time when the cabin pressure altitude exceeds 10 000 ft but does not exceed 13 000 ft, after the initial 30 minutes at these altitudes.
3. 100 % of passengers (1)	The entire flying time when the cabin pressure altitude exceeds 15 000 ft, but in no case less than 10 minutes' supply.
4. 30 % of passengers (1)	The entire flying time when the cabin pressure altitude exceeds 14 000 ft but does not exceed 15 000 ft.
5. 10 % of passengers (1)	The remainder of the flying time when the cabin pressure altitude exceeds 10 000 ft but does not exceed 14 000 ft, after the initial 30 minutes at these altitudes.
(1) Passenger numbers in Table 1 refer to passengers actually carried on board, including persons younger than 24 months.	

Appendix 1 to ANTR OPS 1.775

Supplemental Oxygen for non-pressurised Aeroplanes

Table 1

SUPPLY FOR:	DURATION AND PRESSURE ALTITUDE
1. Occupants of flight crew compartment seats on flight crew compartment duty and crew members assisting flight crew in their duties	The entire flight time at pressure altitudes above 10 000 ft
2. All required cabin crew members	The entire flight time at pressure altitudes above 13 000 ft and for any period exceeding 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft
3. Additional crew member and 100% of passengers (See Note)	The entire flight time at pressure altitudes above 13 000 ft.
4. 10% of passengers (See Note)	The entire flight time after 30 minutes at pressure altitudes greater than 10 000 ft but not exceeding 13 000 ft.

Note: Passenger numbers in Table 1 refer to passengers actually carried on board, including persons younger than 24 months.

Appendix 1 to ANTR OPS 1.785 Automatic Landing Systems, Head-Up Display (HUD), Equivalent Displays and Vision Systems (VS)

(See ANTR OPS 1.785)

Introduction

The material in this appendix provides guidance for certified automatic landing systems, HUD, equivalent displays and vision systems intended for operational use in aeroplanes engaged in international air navigation. These systems and hybrid systems may be installed and operated to reduce workload, improve guidance, reduce flight technical error and enhance situational awareness and/or to obtain an operational credit by establishing minima below the aerodrome operating minima, for approach ban purposes, or reducing the visibility requirements or requiring fewer ground facilities as compensated for by airborne capabilities. Automatic landing systems, HUD, equivalent displays and vision systems may be installed separately or together as part of a hybrid system.

The installation and operational use of these systems as well as any operational credit that can be derived from their use require BCAA approval.

Subject to, but not limited to, the operator's experience of the airport and limits of the design approval of the equipment, the BCAA may, at its discretion, consider the grant of operational credit for the use of HUD/EVS when operating in instrument conditions.

When obtaining operational credit, the operator is required to apply for an exemption from the Air Navigation Technical Regulations (ANTRs). An exemption can only be granted by the BCAA for a system that utilises a HUD as part of the EVS equipment.

Note 1: "Vision systems" is a generic term referring to the existing systems designed to provide images, i.e. enhanced vision systems (EVS), synthetic vision systems (SVS) and combined vision systems (CVS).

Note 2: Operational credit can be granted only within the limits of the airworthiness approval.

Note 3: Currently, operational credit has been given only to vision systems containing an image sensor providing a real-time image of the actual external scene on a HUD.

Note 4: More detailed information and guidance on automatic landing systems, HUD, equivalent displays and vision systems is contained in CAP 33 Head-Up Displays (HUD) and Enhanced Vision Systems (EVS). This CAP should be consulted in conjunction with this appendix.

(a) HUD and equivalent displays

(1) General

A HUD presents flight information into the pilot's forward external field of view without significantly restricting that external view.

Flight information shall be presented on a HUD or an equivalent display as required for the intended use (see CAP 33 for further details).

(2) Operational applications

Flight operations with a HUD can improve situational awareness by combining flight information located on head-down displays with the external view to provide pilots with more immediate awareness of relevant flight parameters and situation information while they continuously view the external scene. This improved situational awareness can also reduce errors in flight operations and improve the pilot’s ability to transition between instrument and visual references as meteorological conditions change.

A HUD may be used:

(i) As a secondary flight display to supplement conventional flight deck instrumentation.

(ii) or as a primary flight display if certified for this purpose;

An approved HUD may qualify for operations with reduced visibility or reduced RVR or replace some parts of the ground facilities such as touchdown zone and/or centre line lights.

The functions of a HUD may be provided by a suitable equivalent display. However, before such systems can be used, the appropriate airworthiness and operational approval should be obtained.

Note: CAP 33 contains further details regarding operational applications.

(2) HUD training

The operator shall comply with the training and recent experience requirements for operations using HUD or equivalent displays as established by the BCAA. Training programmes shall be approved by the BCAA and the implementation of the training shall be subject to oversight by the BCAA.

The training should address all flight operations for which the HUD or equivalent display is used (see CAP 33 for further details).

(b) Enhanced Vision Systems (EVS)

(1) General

“Vision systems” is used as a generic term to refer to the existing systems designed to provide images, i.e. enhanced vision systems (EVSs), synthetic vision systems (SVSs) and combined vision systems (CVSs).

Vision systems can display electronic real-time images of the actual external scene achieved through the use of image sensors (i.e. EVS) or display synthetic images, which are derived from the on-board avionic systems (i.e. SVS). Vision systems can also consist of a combination of these two systems called combined vision systems (i.e. CVS). Such a system may display electronic real-time images of the external scene using the EVS component of the system. The information from vision systems may be displayed head-up and/or head-down. Operational credit may be granted to vision systems which are appropriately qualified.

Light emitting diode (LED) lights may not be visible to infrared-based vision systems. Operators of such vision systems will need to acquire information about the LED implementation programmes at aerodromes where they intend to operate. More details about the consequences of LED lights are contained in CAP 33.

(2) Operational applications

Flight operations with EVS allow the pilot to view an image of the external scene obscured by darkness or other visibility restrictions. The use of EVS will also allow acquisition of an image of the external scene earlier than with natural unaided vision, hence providing for a smoother transition to references by natural vision. The improved acquisition of an image of the external scene may improve situational awareness.

Vision system imagery may also enable pilots to detect other aircraft on the ground, terrain or obstructions on or adjacent to runways or taxiways.

It may also qualify for operational credit for reduced visibility minima when the images are presented into the pilot's external field of view on a HUD without significantly restricting that view.

(3) Vision systems training

Training and recent experience requirements shall be established by the BCAA. Training programmes shall be approved by the BCAA and the implementation of the training shall be subject to oversight by the BCAA. Training shall address all flight operations for which the vision system is used.

This training shall include contingency procedures required in the event of system degradation or failure. Training for situational awareness should not interfere with other required operations. Training for operational credit shall also require training on the applicable HUD used to present the enhanced visual imagery (see CAP 33 for further details).

(4) Operational concepts

Instrument approach operations that involve the use of vision systems include an instrument phase and a visual phase. The instrument phase ends at the published MDA/H or DA/H unless a missed approach is initiated. Using the EVS or CVS does not change the applicable MDS/H or DA/H. The continued approach to landing from MDA/H or DA/H will be conducted using visual references.

This also applies to operations with vision systems. The difference is that the visual references will be acquired by use of an EVS or CVS, natural vision or the vision system in combination with natural vision.

Down to a defined height in the visual segment, typically at or above 30 m (100 ft), the visual references may be acquired solely by means of the vision system. The defined height depends on the airworthiness approval and specific approval by the BCAA. Below this height the visual references shall be solely based on natural vision. In the most advanced applications, the vision system may be used down to touchdown without the requirement for natural vision acquisition of visual references. This means that such a vision system may be the sole means of acquiring visual references and can be used without natural vision.

(5) Visual references

In principle, the required visual references do not change due to the use of an EVS or CVS, but those references are allowed to be acquired by means of either vision system until a certain height during the approach as described in paragraph (b) (3)

EVS operations

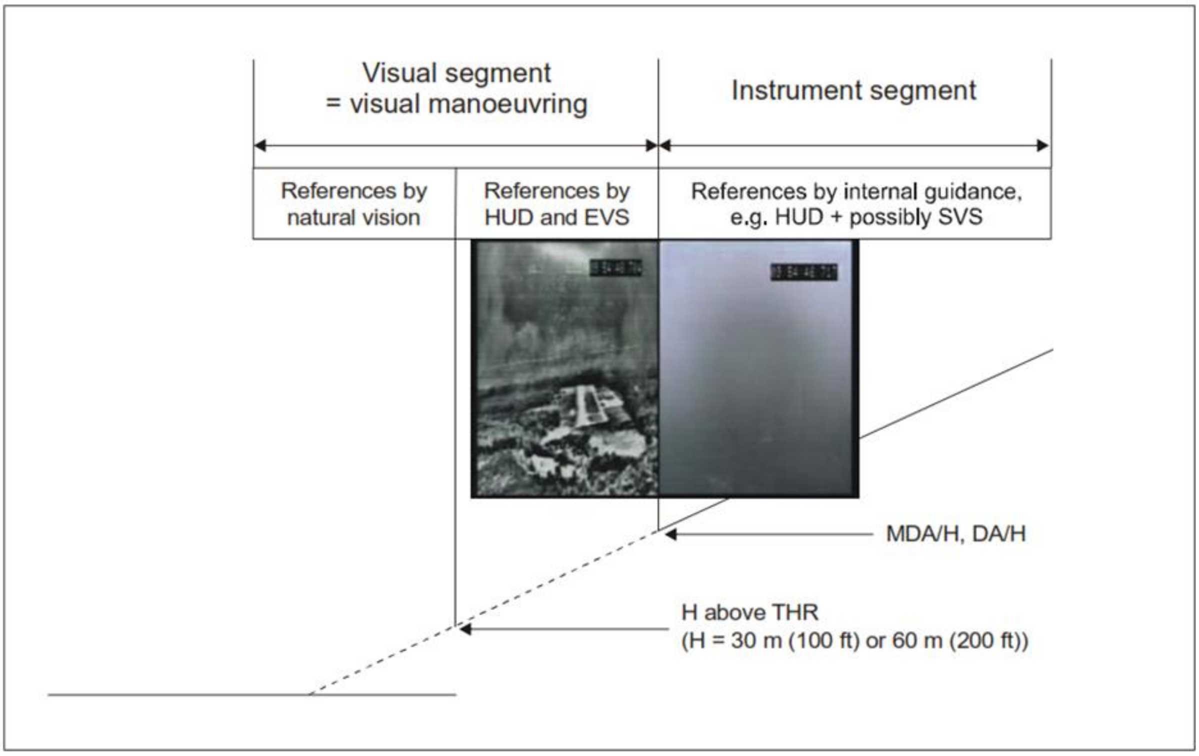


Figure 1-1. EVS operations - transition from instrument to visual references

In States that have developed requirements for operations with vision systems, the use of visual references as indicated in Table 1-1 has been regulated and examples of this are provided in CAP 33.

(c) Hybrid systems

A hybrid system generically means that two or more systems are combined. The hybrid system typically has improved performance compared to each of the component systems, which in turn may qualify for operational credit. The inclusion of more systems in the hybrid system normally enhances the performance of the system. (See CAP 33 for examples of hybrid systems).

(d) Operational credits

Aerodrome operating minima are expressed in terms of minimum visibility/RVR and MDA/H or DA/H. When aerodrome operating minima are established, the combined capability of the aeroplanes equipment and on-ground infrastructure shall be taken into account. Better equipped aeroplanes may be able to operate into lower natural visibility conditions, lower DA/H and/or operate with less ground infrastructure. Operational credit means that the aerodrome operating minima may be reduced in case of suitably equipped aeroplanes. Another way to grant operational credit is to allow visibility requirements to be fulfilled, wholly or partly, by means of the on-board systems. HUD, automatic landing or vision systems were not available at the time when the criteria for aerodrome operating minima were originally established.

The granting of operational credits does not affect the classification (i.e. Type or Category) of an instrument approach procedure since they are designed to support instrument approach operations conducted using aeroplanes with the minimum equipment prescribed.

The relation between the procedure design and the operation can be described as follows. The OCA/H is the end product of the procedure design which does not contain any RVR or visibility values. Based on the OCA/H and all the other elements such as available runway visual aids, the operator will establish MDA/H or DA/H and RVR/visibility, i.e. the aerodrome operating minima. The values derived shall not be less than those prescribed by the State of the Aerodrome.

(e) Operational Procedures

The operator shall develop suitable operational procedures associated with the use of an automatic landing system, a HUD or an equivalent display, vision systems and hybrid systems. These procedures shall be included in the operations manual and cover at least the following:

(1) limitations;

(2) operational credits;

(3) flight planning;

(4) ground and airborne operations;

(5) crew resource management;

(6) standard operating procedures; and

(7) ATS flight plans and radio communication.

(f) Approval Requirements

General

Approval requirements differ based on whether the intended function of the system is to increase situational awareness or to obtain operational credit.

When enhanced vision imagery is used to improve situational awareness, operational approval requirements may be limited. An example of this type of operation may include an EVS or an SVS on a head-down display that is used only for situational awareness of the surrounding area of the aeroplane during ground operations where the display is not in the pilot‘s primary field of view. For enhanced situational awareness, the installation and operational procedures need to ensure that the operation of the vision system does not interfere with normal procedures or the operation or use of other aircraft systems. In some cases, modifications to these normal procedures for other aircraft systems or equipment may be necessary to ensure compatibility.

When enhanced vision imagery is used for operational credit, specific operational approval may require that the imagery be combined with flight guidance and presented on a HUD. Specific Operational approval may also require that this information be presented on a head-down display. A pilot could use this system to continue an instrument approach below published minimum altitudes using the enhanced visual imagery combined with flight guidance on the HUD.

When EVS is used for operational credit, operational approval standards shall ensure the credit for the individual image sensor or combination of sensors is appropriate. Operational credit may be applied for any flight operation, but credit for instrument approach and landing operations is more common.

Any operational approval (including specific approval for operational credit) that has been granted shall be reflected in the operation specifications for the type or individual aeroplane as applicable.

Note: When the application for a specific approval relates to operational credits for systems not including a vision system, the guidance on approvals in this attachment may be used to the extent applicable as determined by the BCAA.

(g) Application Process for EVS/HUD Operational Approval

An application for the approval for the use of HUD/EVS shall be made using the application form, ALD/OPS/F112 on the BCAA website, www.mtt.gov.bh.

The content of a suitable application should include:

(1) *Applicant details —– required for all approval requests*. The official name and business or trading name(s), address, mailing address, e-mail address and contact telephone/fax numbers of the applicant.

Note: For AOC holders, the company name, AOC number and e-mail address should be required.

(2) *Aircraft details — required for all approval requests*. Aircraft make(s), model(s) and registration mark(s).

(3) *Operator's vision system compliance list*. The contents of the compliance list are included in form ALD/OPS/F112 and in CAP 33. The compliance list should include the information that is relevant to the approval requested and the registration marks of the aircraft involved. If more than one type of aircraft/fleet is included in a single application a completed compliance list should be included for each aircraft/fleet.

The following items shall be covered in a vision systems compliance list:

(i) reference documents used in compiling the submission for approval;

(ii) flight manual;

(iii) feedback and reporting of significant problems;

(iv) requested operational credit and resulting aerodrome operating minima;

(v) operations manual entries including MEL and standard operating procedures;

(vi) safety risk assessments;

(vii) training programmes; and

(viii) continuing airworthiness

Note 1: Expanded guidance on these items is contained in CAP 33.

Note 2 Application form ALD/OPS/F112 and the Vision Systems Compliance List is contained in CAP 33.

(4) *Documents to be included with the application*. Copies of all documents listed in column 4 of the operator's vision system compliance list in form ALD/OPS/F112 should be included when returning the completed application form to the civil aviation authority. There should no need to send complete manuals; only the relevant sections/pages should be required.

(5) *Name, title and signature*.

Appendix 1 to ANTR OPS 1.820 Emergency Locator Transmitter (ELT)

(See ANTR OPS 1.820, ANTR OPS 1.830(c) and ANTR OPS 1.835(b))

I. Types of ELT and general technical specifications

1. An Emergency Locator Transmitter (ELT) is a generic term describing equipment which broadcasts distinctive signals on designated frequencies and, depending on application, may be activated by impact or be manually activated. An ELT is one of the following:

   a. Automatic Fixed (ELT(AF)). An automatically activated ELT that is permanently attached to an aircraft and is designed to aid search and rescue (SAR) teams in locating the crash site.

   b. Automatic Portable (ELT(AP)). Automatic portable (ELT(AP)). An automatically activated ELT, that is rigidly attached to an aircraft before a crash, but is readily removable from the aircraft after a crash. It functions as an ELT during the crash sequence. If the ELT(AP) does not employ an integral antenna, the aircraft-mounted antenna may be disconnected and an auxiliary antenna (stored on the ELT case) attached to the ELT. The ELT can be tethered to a survivor or a life-raft. This type of ELT is intended to aid SAR teams in locating the crash site or survivor(s).

   c. Automatic Deployable (ELT(AD)). An ELT that is rigidly attached to the aircraft 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 type of ELT should float in water and is intended to aid SAR teams in locating the crash site.

   d. Survival ELT (ELT(S)). An ELT that is removable from an aircraft, 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. A water-activated ELT(S) is not an ELT(AP).

2. To minimise the possibility of damage in the event of crash impact, the automatic ELT should be rigidly fixed to the aircraft 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.

3. 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.

4. The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

Note: The integrated ELT of an ADFR shall satisfy the same requirements as an ELT required to be installed on an aeroplane. The integrated ELT shall at least have the same performance as the fixed ELT to maximize detection of the transmitted signal. Refer to Appendix 2 to ANTR OPS 1.705.

II. Batteries

1. All batteries used in ELTs should be replaced (or recharged if the battery is rechargeable) when the equipment has been in use for more than 1 cumulative hour or in the following cases:

   a. Batteries specifically designed for use in ELTs and having an airworthiness release certificate (EASA Form 1 or equivalent) should be replaced (or recharged if the battery is rechargeable) before the end of their useful life in accordance with the maintenance instructions applicable to the ELT.

   b. Standard batteries manufactured in accordance with an industry standard and not having an airworthiness release certificate (EASA Form 1 or equivalent), when used in ELTs should be replaced (or recharged if the battery is rechargeable) when 50 % of their useful life (or for rechargeable, 50 % of their useful life of charge), as established by the battery manufacturer, has expired.

   c. The battery useful life (or useful life of charge) criteria in (1) and (2) do not apply to batteries (such as water-activated batteries) that are essentially unaffected during probable storage intervals.

2. The new expiry date for a replaced (or recharged) battery should be legibly marked on the outside of the equipment.

Appendix 1 to ANTR OPS 1.822 Location of an Aeroplane in Distress
(See ANTR OPS 1.822)

(a) Purpose and Scope

Location of an aeroplane in distress aims at establishing, to a reasonable extent, the location of an accident site within a 6 NM radius. The aircraft shall have installed with equipment & systems to enable Autonomous Distress Tracking (ADT) system to identify the location of aircraft in distress with the aim of establishing to a reasonable extent the location of an accident site within a 6 NM radius.

(b) Operation

(1) An aeroplane in distress shall automatically activate the transmission of information from which its position can be determined by the operator and the position information shall contain a time stamp. It shall also be possible for this transmission to be activated manually. The system used for the autonomous transmission of position information shall be capable of transmitting that information in the event of aircraft electrical power loss, at least for the expected duration of the entire flight.

Note: Guidance on the location of an aeroplane in distress is provided in IEM OPS 1.822.

(2) An aircraft is in a distress condition when it is in a state that, if the aircraft behaviour event is left uncorrected, can result in an accident. Autonomous transmission of position information shall be active when an aircraft is in a distress condition. This will provide a high probability of locating an accident site to within a 6 NM radius. The operator shall be alerted when an aircraft is in a distress condition with an acceptable low rate of false alerts. In case of a triggered transmission system, initial transmission of position information shall commence immediately or no later than five seconds after the detection of the activation event.

Note1: Aircraft behaviour events can include, but are not limited to, unusual attitudes, unusual speed conditions, collision with terrain and total loss of thrust/propulsion on all engines and ground proximity warnings.

Note 2: A distress alert can be triggered using criteria that may vary as a result of aircraft position and phase of flight. Further guidance regarding in-flight event detection and triggering criteria may be found in the EUROCAE ED-237, Minimum Aviation System Performance Specification (MASPS) for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information.

(3) When an aircraft operator or an air traffic service unit (ATSU) has reason to believe that an aircraft is in distress, coordination shall be established between the ATSU and the aircraft operator.

(4) The State of the Operator shall identify the organizations that will require the position information of an aircraft in an emergency phase. These shall include, as a minimum:

(i) air traffic service unit(s) (ATSU); and

(ii) SAR rescue coordination centre(s) (RCC) and sub-centres.

(5) When autonomous transmission of position information has been activated, it shall only be able to be deactivated using the same mechanism that activated it.

(6) The accuracy of position information shall, as a minimum, meet the position accuracy requirements established for ELTs.

*Note: The ICAO DOC 10054 - **Manual on Location of Aircraft in Distress and Flight Recorder Data Recovery** provides guidance on Standards and Recommended Practices (SARPs) contained in Annex 6 - Operation of Aircraft, Part I - International Commercial Air Transport - Aeroplanes, relating to the location of an aircraft in distress and flight recorder data recovery.*

SUBPART L – COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

ANTR OPS 1.845 General introduction

(See IEM OPS 1.845)

(a) The operator shall ensure that a flight does not commence unless the communication and navigation equipment required under this Subpart is:

(1) Approved and installed in accordance with the requirements applicable to them, including the minimum performance standard and the operational and airworthiness requirements;

(2) Installed such that the failure of any single unit required for either communication or navigation purposes, or both, will not result in the failure of another unit required for communications or navigation purposes.

(3) In operable condition for the kind of operation being conducted except as provided in the MEL (ANTR OPS 1.030 refers); and

(4) So arranged that if equipment is to be used by one flight crew member at his station during flight it must be readily operable from his station. When a single item of equipment is required to be operated by more than one flight crew member it must be installed so that the equipment is readily operable from any station at which the equipment is required to be operated.

(5) The aeroplane shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate in accordance with OPS 1.865(a) and OPS 1.865(d)(2) and OPS 1.872.

(b) Communication and navigation equipment minimum performance standards are those prescribed in the applicable Technical Standard Orders (TSO) unless different performance standards are prescribed in the operational or airworthiness codes. Communication and navigation equipment complying with design and performance specifications other than TSO on the date of OPS implementation may remain in service, or be installed, unless additional requirements are prescribed in this Subpart. Communication and navigation equipment which has already been approved does not need to comply with a revised TSO or a revised specification, other than TSO, unless a retroactive requirement is prescribed.

ANTR OPS 1.850 Communication Equipment

(a) The operator shall not operate an aeroplane unless it is equipped with radio required for the kind of operation being conducted and capable of:

(1) conducting two-way communication for aerodrome control purposes;

(2) receiving meteorological information at any time during flight; and

(3) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

Note: The requirements above are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

(b) Where two independent (separate and complete) radio systems are required under this Subpart, each system must have an independent antenna installation except that, where rigidly supported non-wire antennae or other antenna installations of equivalent reliability are used, only one antenna is required.

(c) The radio communication equipment required to comply with paragraph (a) above must also provide for communications on the aeronautical emergency frequency 121·5 MHz.

(d) For operations where communication equipment is required to meet an RCP specification for performance-based communication (PBC), an aeroplane shall, in addition to the requirements specified in this Subpart:

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

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

(3) have information relevant to the aeroplane RCP specification capabilities included in the MEL.

Note: Information on the performance-based communication and surveillance (PBCS) concept and guidance material on its implementation are contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

(e) The BCAA shall, for operations where an RCP specification for PBC has been prescribed, ensure that the operator has established and documented:

(1) normal and abnormal procedures, including contingency procedures;

(2) flight crew qualification and proficiency requirements, in accordance with appropriate RCP specifications;

(3) a training programme for relevant personnel consistent with the intended operations; and

(4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RCP specifications.

(f) The BCAA shall ensure that, in respect of those aeroplanes mentioned in sub-paragraph (d) above, adequate provisions exist for:

(1) receiving the reports of observed communication performance issued by monitoring programmes (Refer to ICAO Annex 11, Chapter: 3.3.5.2); and

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

ANTR OPS 1.855 Audio Selector Panel

The operator shall not operate an aeroplane under IFR unless it is equipped with an audio selector panel accessible to each required flight crew member.

ANTR OPS 1.860 Radio equipment for operations under VFR over routes navigated by reference to visual landmarks

The operator shall not operate an aeroplane under VFR over routes that can be navigated by reference to visual landmarks, unless it is equipped with the radio communication equipment necessary under normal operating conditions to fulfil the following:

(a) Communicate with appropriate ground stations;

(b) Communicate with appropriate air traffic control facilities from any point in controlled airspace within which flights are intended; and

(c) Receive meteorological information;

ANTR OPS 1.865 Communication and Navigation equipment for operations under IFR, or under VFR over routes not navigated by reference to visual landmarks

(See AMC OPS 1.865)

(a) The operator shall not operate an aeroplane under IFR, or under VFR over routes that cannot be navigated by reference to visual landmarks, unless the aeroplane is equipped with radio communication and SSR transponder and navigation equipment which will enable it to proceed:

(1) in accordance with its operational flight plan; and

(2) in accordance with the requirements of air traffic services;

except when, if not so precluded by the appropriate authority, navigation for flights under VFR is accomplished by visual reference to landmarks.

(b) *Radio equipment*. The operator shall ensure that radio equipment comprises not less than;

(1) two independent radio communication systems necessary under normal operating conditions to communicate with an appropriate ground station from any point on the route including diversions; and

(2) SSR transponder equipment as required for the route being flown.

(c) *Navigation equipment*.

(1) The operator shall ensure that navigation equipment comprises not less than:

(i) One VOR receiving system, one ADF system, one DME except that an ADF system need not be installed provided that the use of ADF is not required in any phase of the planned flight (See AC OPS 1.865(c)(1)(i));

(ii) One ILS or MLS where ILS or MLS is required for approach navigation purposes;

(iii) One Marker Beacon receiving system where a Marker Beacon is required for approach navigation purposes;

(iv) An Area Navigation System when area navigation is required for the route being flown;

(v) An additional DME system on any route, or part thereof, where navigation is based only on DME signals;

(vi) An additional VOR receiving system on any route, or part thereof, where navigation is based only on VOR signals; and

(v) An additional ADF system on any route, or part thereof, where navigation is based only on NDB signals, or

(2) For operations where a navigation specification for performance-based navigation has been prescribed, an aeroplane shall, in addition to requirements specified in this Subpart;

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

(ii) have information relevant to the aeroplane navigation specification capabilities listed in the aeroplane flight manual or other aeroplane documentation approved by the State of Design or the BCAA as the State of Registry, and

(iii) have information relevant to the aeroplane navigation specification capabilities included in the MEL.

(See also AC OPS 1.243)

(d) The operator may operate an aeroplane that is not equipped with an ADF or with the navigation equipment specified in sub-paragraph(s) (c)(1)(vi) and/or (c)(1)(vii) above, provided that it is equipped with alternative equipment authorised, for the route being flown, by the BCAA. The reliability and the accuracy of alternative equipment must allow safe navigation for the intended route.

(e) When operating in regional airspace requiring FM immunity performance standards, the operator shall ensure that VHF communication equipment, ILS Localiser and VOR receivers installed on aeroplanes to be operated in IFR are of a type that has been approved as complying with the FM immunity performance standards (See AC OPS 1.865(e)).

(f) The operator shall ensure that aeroplanes conducting EDTO have a communication means capable of communicating with an appropriate ground station at normal and planned contingency altitudes. For EDTO routes where voice communication facilities are available, voice communications shall be provided. For all EDTO operations beyond 180 minutes, reliable communication technology, either voice based or data link, must 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 must be ensured. (See AC OPS 1.865(g)).

ANTR OPS 1.866 Transponder equipment

(a) All aeroplanes shall be equipped with a pressure-altitude reporting transponder which operates in accordance with the relevant provisions of Annex 10, Volume IV.

(b) All aeroplanes for which the individual certificate of airworthiness is first issued after 1 January 2009 shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

(c) All aeroplanes shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft), or better.

(d) The Mode S transponder should be provided with the airborne/on-the-ground status if the aeroplane is equipped with an automatic means of detecting such status.

Note 1: These provisions will improve the effectiveness of airborne collision avoidance systems as well as air traffic services that employ Mode S radar. In particular, tracking processes are significantly enhanced with a resolution of 7.62 m (25 ft), or better.

Note 2: Mode C replies of transponders always report pressure altitude in 30.50 m (100 ft) increments irrespective of the resolution of the data source.

ANTR OPS 1.867 Surveillance equipment

(a) An aeroplane shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.

(b) For operations where surveillance equipment is required to meet an RSP specification for performance-based surveillance (PBS), an aeroplane shall, in addition to the requirements specified in sub-paragraph (a);

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

(2) have information relevant to the aeroplane RSP specification capabilities listed in the flight manual or other aeroplane documentation approved by the State of Design or the BCAA; and

(3) have information relevant to the aeroplane RSP specification capabilities included in the MEL.

Note 1: Information on surveillance equipment is contained in the Aeronautical Surveillance Manual (Doc 9924).

Note 2: Information on RSP specifications for performance-based surveillance is contained in the Performance-based Communication and Surveillance (PBCS) Manual (Doc 9869).

(c) For operations where an RSP specification for PBS has been prescribed, the operator shall establish and document;

(1) normal and abnormal procedures, including contingency procedures;

(2) flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;

(3) a training programme for relevant personnel consistent with the intended operations; and

(4) appropriate maintenance procedures to ensure continued airworthiness, in accordance with appropriate RSP specifications.

(d) The BCAA shall ensure that, in respect of those aeroplanes mentioned in sub-paragraph (b), adequate provisions exist for;

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

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

ANTR OPS 1.868 Installation

The equipment installation shall be such that the failure of any single unit required for communication, navigation or surveillance purposes or any combination thereof will not result in the failure of another unit required for communication, navigation or surveillance purposes.

ANTR OPS 1.870 Additional navigation equipment for operations in NAT HLA airspace

(See AC OPS 1.870)

(a) For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, North Atlantic High Level Airspace (NAT HLA) are prescribed, an aeroplane shall be provided with navigation equipment which:

1) continuously provides indications to the flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and

2) has been authorized by the BCAA for NAT HLA operations concerned.

Note: The prescribed minimum navigation performance specifications and the procedures governing their application are published in the Regional Supplementary Procedures (Doc 7030).

(b) The navigational equipment meets the required performance;

(c) The navigation equipment comprising of navigation displays, indicators and controls required by this paragraph must be visible and operable by either pilot seated at his/her duty station.

(d) For unrestricted operation in NAT HLA airspace based on Regional Air Navigation Agreement an aeroplane must be equipped with two independent Long Range Navigation Systems (LRNS).

(e) For operation in NAT HLA / Regional Air Navigation Agreement airspace along notified special routes an aeroplane must be equipped with one Long Range Navigation System (LRNS), unless otherwise specified.

(f) A training programme for the flight crew members involved in these operations has been established by the operator.

(g) operating procedures have been established by the operator 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.

ANTR OPS 1.872 Equipment for operation in defined airspace with Reduced Vertical Separation Minima (RVSM)

(a) For the flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1000 ft) is applied between FL 290 and FL 410 inclusive. The operator shall ensure that aeroplanes operated in RVSM airspace are equipped with:

(1) provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the aeroplane to navigate.

(2) on flights in which it is intended to land in instrument meteorological conditions, an aeroplane shall be provided with radio equipment capable of receiving signals providing guidance to a point from which a visual landing can be effected. This equipment shall be capable of providing such guidance for each aerodrome at which it is intended to land in instrument meteorological conditions and for any designated alternate aerodromes.

(3) Two independent altitude measurement systems;

(4) An altitude alerting system for providing an alert to the flight crew when a deviation occurs from the selected flight level. The threshold for the alerts shall not exceed ± 90 m (300 ft);

(5) An automatic altitude control system to automatically maintaining a selected flight level;

(6) A secondary surveillance radar (SSR) transponder with altitude reporting system that can be connected to the altitude measurement system in use for altitude keeping.

ANTR OPS 1.875 Electronic Navigation Data Management

(a) The operator shall not employ electronic navigation data products that have been processed for application in theair and on the ground unless the BCAA has approved the operator’s procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the existing equipment.

(b) The operator shall continue to monitor both process and products.

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

Note: Guidance relating to the processes that data suppliers may follow is contained in RTCA DO-200A/EUROCAE ED-76 and RTCA DO-201A/EUROCAE ED-77.

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SUBPART M – AEROPLANE MAINTENANCE

ANTR OPS 1.880 General

The operator shall not operate an aeroplane unless it is maintained and released to service by an organisation appropriately approved/accepted in accordance with ANTR- 145, except that pre-flight inspections need not necessarily be carried out by the ANTR- 145 organisation.

Note: Aeroplane continuing airworthiness requirements needed to comply with the operator certification requirements in ANTR OPS 1.180 are contained in ANTR M.

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SUBPART N – FLIGHT CREW

ANTR OPS 1.940 Composition of Flight Crew

(See Appendices 1 & 2 to ANTR OPS 1.940)

(a) The operator shall ensure that:

(1) The composition of the flight crew and the number of flight crew members at designated crew stations are both in compliance with, and no less than the minimum specified in, the Aeroplane Flight Manual (AFM) or other documents associated with the certificate of airworthiness;

(2) The flight crew includes additional flight crew members when required by the type of operation, and is not reduced below the number specified in the Operations Manual;

The flight crew member shall include at least one member who holds a valid license, issued or rendered valid by the BCAA, authorizing operation of the type of radio transmitting equipment to be used.

(3) All flight crew members hold an applicable and valid licence acceptable to the BCAA and are suitably qualified and competent to conduct the duties assigned to them;

(4) Procedures are established, acceptable to the BCAA, to prevent the crewing together of inexperienced flight crew members (See AMC OPS 1.940(a)(4));

(5) One pilot amongst the flight crew, qualified as a pilot-in-command in accordance with the requirements governing Flight Crew Licences, is designated as the commander who may delegate the conduct of the flight to another suitably qualified pilot; and

(6) RESERVED

(7) When engaging the services of flight crew members who are self-employed and/or working on a freelance or part-time basis, the requirements of Subpart N are complied with. In this respect, particular attention must be paid to the total number of aircraft types or variants that a flight crew member may fly for the purposes of commercial air transportation, which must not exceed the requirements prescribed in ANTR OPS 1.980 and ANTR OPS 1.981, including when his services are engaged by another operator. For crew members serving the operator as a commander, initial operator's Crew Resource Management (CRM) training shall be completed before commencing unsupervised line flying. However, for crew members serving the operator as a commander, initial CRM training shall be completed before commencing unsupervised line flying unless the crew member has previously completed an initial operator's CRM course.

(8) RESERVED

(9) The operator shall, for each type of aeroplane, assign to all flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation. Annual training in accomplishing these functions shall be contained in the operator's training programme and shall include instruction in the use of all emergency and life-saving equipment required to be carried, and drills in the emergency evacuation of the aeroplane.

(b) Minimum flight crew for operations under IFR or at night. For operations under IFR or at night, the operator shall ensure that:

(1) For all turbo-propeller aeroplanes with a maximum approved passenger seating configuration of more than 9 and for all turbojet aeroplanes, the minimum flight crew is 2 pilots; or

(2) An aeroplane not operated under the IFR or at night by a single pilot unless approved by BCAA.

(3) An aeroplane not operated under the IFR or at night by a single pilot unless:

(i) the flight manual does not require a flight crew of more than one;

(ii) the aeroplane is propeller-driven;

(iii) the maximum approved passenger seating configuration is not more than nine;

(iv) the maximum certificated take-off mass does not exceed 5 700 kg;

(v) the aeroplane is equipped as stipulated in ANTR OPS 1.655; and

(vi) the pilot-in-command has satisfied requirements of experience, training, checking and recency described in Appendix 2 to ANTR OPS 1.940.

(4) Aeroplanes other than those covered by sub-paragraph (b)(1) above are operated by a single pilot provided that the requirements of Appendix 2 to ANTR OPS 1.940 are satisfied. If the requirements of Appendix 2 are not satisfied, the minimum flight crew is 2 pilots.

ANTR OPS 1.941 Initial training

The operator shall ensure that each flight crew member successfully complete initial training. The operator shall establish and maintain an initial ground and flight training programme, approved by the authority which ensures that all flight crew members are adequately trained to perform their assigned duties.

(a) The training programme shall:

(1) include indoctrination training comprises of operator's and regulatory requirements;

(2) include ground and flight training facilities and properly qualified instructors as determined and approved/accepted by BCAA;

(3) consist of ground and flight training in the type(s) of aeroplane on which the flight crew members serves;

(4) include flight crew coordination and training in all types of emergency and abnormal situations or procedures caused by power plant, airframe or systems malfunctions, fire or other abnormalities;

(5) include upset prevention and recovery training;

(6) include training in knowledge and skills related to visual and instrument flight procedures for the intended area of operation, charting, human performance including threat and error management and in the transport of dangerous goods;

(7) ensure that all flight crew members know the functions for which they are responsible and the relation of these functions to the functions of other crew members, particularly in regard to abnormal or emergency procedures as defined therein, but not limited to the requirement of ANTR OPS 1.940(a)(9) and ANTR OPS 1.965(d);

(8) training be given on a recurrent basis and shall include an assessment of competence;

(b) The requirement for recurrent flight training in a particular type of aeroplane shall be considered fulfilled by;

(1) the use, to the extent deemed feasible by the authority, of flight simulation training devices approved by the BCAA for that purpose; or

(2) the completion within the appropriate period of the proficiency check required by ANTR OPS 1.943, 1.945, 1.950, 1.965.

Note 1: It prohibits the in-flight simulation of emergency or abnormal situations when passengers or cargo are being carried.

Note 2: Flight training may, to the extent deemed appropriate by the State of the Operator, be given in flight simulation training devices approved by the State for that purpose.

Note 3: The scope of the recurrent training required by ANTR OPS 1.020 & ANTR OPS 1.941 may be varied and need not be as extensive as the initial training given in a particular type of aeroplane.

Note 4: The use of correspondence courses and written examinations as well as other means may, to the extent deemed feasible by the State of the Operator, be utilized in meeting the requirements for periodic ground training.

Note 5: For more information on dangerous goods operational requirements, see Subpart R – Transport of Dangerous Goods by air.

Note 6: Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factors Training Manual (Doc 9683).

Note 7: Information for pilots and flight operations personnel on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Procedure for Aircraft Operation are contained in PAN-OPS (ICAO DOC 8168), Volume III. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

Note 8: Guidance material to design flight crew training programmes can be found in the Manual of Evidence-based Training (Doc 9995).

Note 9: Guidance material on the different means used to assess competence can be found in the Attachment to Chapter 2 of the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868).

Note 10: Procedures for upset prevention and recovery training in a flight simulation training device are contained in the Procedures for Air Navigation Services — Training PANS-TRG, ICAO Doc 9868).

Note 11: Guidance on upset prevention and recovery training in a flight simulation training device is contained in the Manual on Aeroplane Upset Prevention and Recovery Training (ICAO Doc 10011).

ANTR OPS 1.943 Initial Operator's Crew Resource Management (CRM) training

(See AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))
(See AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(a) When a flight crew member has not previously completed initial Operator's Crew Resource Management (CRM) training (either new employees or existing staff), then the operator shall ensure that the flight crew member completes an initial CRM training course. New employees shall complete initial Operator's CRM Training prior to being qualified and scheduled to operate with the present operator. Flight crew who are already operating as flight crew members in commercial air transportation and who have not completed CRM training before shall complete an initial operator's CRM training course effective forthwith.

(b) If the flight crew member has not previously been trained in Human Factors then a theoretical course, based on the human performance and limitations programme for the ATPL (see the requirements applicable to the issue of Flight Crew Licences) shall be completed before the initial Operator's CRM training or combined with the initial Operator's CRM training.

(c) Initial CRM training shall be conducted by at least one CRM trainer acceptable to the BCAA who may be assisted by experts in order to address specific areas. (See AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)).

(d) Initial CRM training is conducted in accordance with a detailed course syllabus included in the Operations Manual.

ANTR OPS 1.945 Conversion training and checking

(See Appendix 1 to ANTR OPS 1.945)
(See AMC OPS 1.945)
(See IEM OPS 1.945)
(See AC OPS (AMC) 1.943/ 1.945(a)(9)/1.955(b)(6)/ 1.965(e))
(See AC OPS (IEM) 1.943/ 1.945(a)(9)/1.955(b)(6)/ 1.965(e))
(See ANTR-FCL 1.261(c)(2))
(See AMC FCL 1.261(c)(2)

(a) The operator shall ensure that:

(1) A flight crew member completes a Type Rating course which satisfies the requirements applicable to the issue of Flight Crew Licences when changing from one type of aeroplane to another type or class for which a new type or class rating is required;

(2) A flight crew member completes the operator's conversion course before commencing unsupervised line flying:

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

(ii) When changing operator;

(3) Conversion training is conducted by suitably qualified personnel in accordance with a detailed course syllabus included in the Operations Manual. The operator shall ensure that the personnel integrating elements of CRM into conversion training are suitably qualified;

(4) The amount of training required by the operator’s conversion course is determined after due note has been taken of the flight crew member’s previous training as recorded in his training records prescribed in ANTR OPS 1.985;

(5) The minimum standards of qualification and experience required of flight crew members before undertaking conversion training are specified in the Operations Manual;

(6) Each flight crew member undergoes the checks required by ANTR OPS 1.965(b) and the training and checks required by ANTR OPS 1.965(d) before commencing line flying under supervision;

(7) Upon completion of line flying under supervision, the check required by ANTR OPS 1.965(c) is undertaken;

(8) Once the operator’s conversion course has been commenced, a flight crew member does not undertake flying duties on another type or class until the course is completed or terminated; and

(9) Elements of CRM training are integrated into the conversion course.

(See AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e) & AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e) and AMC OPS 1.945(a)(9) and IEM OPS 1.945(a)(9)).

(b) In the case of changing aeroplane type or class, the check required by 1.965(b) may be combined with the type or class rating skill test under the requirements applicable to the issue of Flight Crew Licences.

(c) The operator’s conversion course and the Type or Class Rating course required for the issue of Flight Crew Licences may be combined.

(d) A pilot, undertaking a ZFTT course, shall:

(1) Commence Line Flying Under Supervision as soon as possible within 21 days after completion of the skill test. If Line Flying Under Supervision has not been commenced within the 21 days, the operator shall provide appropriate training acceptable to the BCAA.

(2) Complete the six take-offs and landings required in Appendix 1 ANTR-FCL 1.261(c)(2) in a flight simulator, qualified in accordance with ANTR-FSTD A and user approved by the BCAA, not later than 21 days after the completion of the skill test. This simulator session shall be conducted by a TRI(A) occupying a pilot's seat. When approved by the BCAA, the number of take-offs and landings may be reduced. If these take-offs and landings have not been performed within the 21 days, the operator shall provide refresher training acceptable to the BCAA.

(3) Conduct the first four take-offs and landings of the Line Flying Under Supervision in the aeroplane under the supervision of a TRI(A) occupying a pilot’s seat. When approved by the BCAA, the number of take-offs and landings may be reduced.

ANTR OPS 1.950 Differences training and Familiarisation training

(a) The operator shall ensure that a flight crew member completes:

(1) Differences training which requires additional knowledge and training on an appropriate training device or the aeroplane;

(i) When operating another variant of an aeroplane of the same type or another type of the same class currently operated; or

(ii) When changing equipment and/or procedures on types or variants currently operated;

(2) Familiarisation training which requires the acquisition of additional knowledge:

(i) When operating another aeroplane of the same type; or

(ii) When changing equipment and/or procedures on types or variants currently operated.

(b) The operator shall specify in the Operations Manual when such differences training or familiarisation training is required.

ANTR OPS 1.955 Nomination as commander

(a) The operator shall ensure that for upgrade to commander from co-pilot and for those joining as commanders:

(1) A minimum level of experience, acceptable to the BCAA, is specified in the Operations Manual; and

(2) For multi-crew operations, the pilot completes an appropriate command course.

(b) The command course required by sub-paragraph (a)(2) above must be specified in the Operations Manual and include at least the following:

(1) Training in an FSTD (including Line Orientated Flying Training) and/or flying training;

(2) The operator proficiency check operating as commander;

(3) Commander’s responsibilities;

(4) Line training in command under supervision. A minimum of 10 sectors is required for pilots already qualified on the aeroplane type;

(5) Completion of a commander’s line check as prescribed in ANTR OPS 1.965(c) and route and aerodrome competence qualification as prescribed in ANTR OPS 1.975; and

(6) Elements of Crew Resource Management.

(See AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e) & AC OPS (IEM) 1.943/ 1.945(a)(9)/1.955(b)(6)/1.965(e).)

ANTR OPS 1.960 Commanders holding a Commercial Pilot Licence

(a) The operator shall ensure that:

(1) A Commercial Pilot Licence (CPL) holder does not operate as a commander of an aeroplane certificated in the Aeroplane Flight Manual for single pilot operations unless:

(i) When conducting passenger carrying operations under Visual Flight Rules (VFR) outside a radius of 50 nm from an aerodrome of departure, the pilot has a minimum of 500 hours total flight time on aeroplanes or holds a valid Instrument Rating; or

(ii) When operating on a multi-engine type under Instrument Flight Rules (IFR), the pilot has a minimum of 700 hours total flight time on aeroplanes which includes 400 hours as pilot-in-command in accordance with the requirements governing Flight Crew Licenses, of which 100 hours have been under IFR including 40 hours multi-engine operation. The 400 hours as pilot-in-command may be substituted by hours operating as co-pilot on the basis of two hours co-pilot is equivalent to one hour as pilot-in-command provided those hours were gained within an established multi-pilot crew system prescribed in the Operations Manual;

(2) In addition to sub-paragraph (a)(1)(ii) above, when operating under IFR as a single pilot, the requirements prescribed in Appendix 2 to ANTR OPS 1.940 are satisfied; and

(3) In multi-pilot crew operations, in addition to sub-paragraph (a)(1) above, and prior to the pilot operating as commander, the command course prescribed in ANTR OPS 1.955(a)(2) is completed.

ANTR OPS 1.965 Recurrent training and checking

(See Appendices 1 & 2 to ANTR OPS 1.965)

(See AMC OPS 1.965)

(See AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(See AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(See IEM OPS 1.965)

(a) *General.* The operator shall ensure that:

(1) Each flight crew member undergoes recurrent training and checking and that all such training and checking is relevant to the type or variant of aeroplane on which the flight crew member operates;

(2) A recurrent training and checking programme is established in the Operations Manual and approved by the BCAA;

(3) The operator may establish a suitable Evidence-Based-Training (EBT) programme approved by BCAA in lieu of ANTR OPS 1.965 ‘Recurrent Training and checking’ or ANTR-OPS 1.978 ‘Alternative Training and Qualification Programme’.

Note1: The EBT programme and philosophy are intended to be applied as the means of assessing and training key areas of flight crew performance in a recurrent training system.

Note2: *The data analyses undertaken to support the EBT programme illustrate inadequacies in the perpetuation of historical airline flight training regimes and identify areas in which major change is necessary. The analyses strongly support the implementation of such change in both the regulation and development of recurrent airline pilot assessment and training. Finally, they identify the areas for improvement, providing the prioritisation of relevant training topics to guide in the construction of suitable EBT programmes.*

(4) Recurrent training is conducted by the following personnel:

(i) *Ground and refresher training* – by suitably qualified personnel;

(ii) *Aeroplane/FSTD training* - by a Type Rating Instructor (TRI), Class Rating Instructor (CRI) or in the case of the FSTD content, a Synthetic Flight Instructor (SFI), providing that the TRI, CRI or SFI satisfies the operator's experience and knowledge requirements sufficient to instruct on the items specified in paragraphs (a)(1)(i)(A) and (B) of Appendix 1 to ANTR OPS 1.965;

(iii) *Emergency and safety equipment training* – by suitably qualified personnel; and

(iv) *Crew Resource Management (CRM):*

(A) Integration of CRM elements into all their phases of the recurrent training - by all the personnel conducting recurrent training. The operator shall ensure that all personnel conducting recurrent training are suitably qualified to integrate elements of CRM into this training;

(B) Modular CRM training – by at least one CRM trainer acceptable to the BCAA (see AMC OPS 1.943/1.945(a)(9)/1.955(b)(6)/ 1.965(e)) who may be assisted by experts in order to address specific areas.

(5) Recurrent checking is conducted by the following personnel:

(i) *Operator proficiency check* – by a Type Rating Examiner (TRE), or, if the check is conducted in a FSTD, a TRE, or a Synthetic Flight Examiner (SFE), trained in CRM concepts and the assessment of CRM skills;

(ii) *Line checks* – annually by TRE / TRI with line check authority.

(iii) *Emergency and safety equipment checking* – by suitably qualified personnel.

(6) The requirement for recurrent flight training in a particular type of aeroplane shall be considered fulfilled by;

(1) the use, to the extent deemed feasible by the authority, of flight simulation training devices approved by the BCAA for that purpose; or

(2) the completion within the appropriate period of the proficiency check required by ANTR OPS 1.943, 1.945, 1.950 and 1.965.

(b) *Operator Proficiency Check*

(1) The operator shall ensure that:

(i) Each flight crew member undergoes operator proficiency checks to demonstrate his competence in carrying out normal, abnormal and emergency procedures; and

(ii) The check is conducted without external visual reference when the flight crew member will be required to operate under IFR.

(iii) Each flight crew member undergoes operator proficiency checks as part of a normal flight crew complement.

(2) The period of validity of the operator proficiency check shall be 6 calendar months in addition to the remainder of the month of issue. If issued within the final 3 calendar months of validity of a previous operator proficiency check, the period of validity shall extend from the date of issue until 6 calendar months from the expiry date of that previous operator proficiency check.

(c) *Line Check*. The operator shall ensure that each flight crew member undergoes a line check on the aeroplane to demonstrate his competence in carrying out normal line operations described in the Operations Manual. The period of validity of a line check shall be 12 calendar months, in addition to the remainder of the month of issue. If issued within the final 3 calendar months of validity of a previous line check the period of validity shall extend from the date of issue until 12 calendar months from the expiry date of that previous line check. (See AMC OPS 1.965(c)).

(d) *Emergency and Safety Equipment training and checking*. The operator shall ensure that each flight crew member undergoes training and checking on the location and use of all emergency and safety equipment carried. The period of validity of an emergency and safety equipment check shall be 12 calendar months in addition to the remainder of the month of issue. If issued within the final 3 calendar months of validity of a previous emergency and safety check, the period of validity shall extend from the date of issue until 12 calendar months from the expiry date of that previous emergency and safety equipment check. (See AMC OPS 1.965(d)).

(e) *CRM.* The operator shall ensure that:

(1) Elements of CRM are integrated into all appropriate phases of the recurrent training, and;

(2) Each flight crew member undergoes specific modular CRM training. All major topics of CRM training shall be covered over a period not exceeding 3 years;

(f) *Ground and Refresher training*. The operator shall ensure that each flight crew member undergoes ground and refresher training at least every 12 calendar months. If the training is conducted within 3 calendar months prior to the expiry of the 12 calendar months period, the next ground and refresher training must be completed within 12 calendar months of the original expiry date of the previous ground and refresher training.

(g) *Aeroplane/FSTD training*. The operator shall ensure that each flight crew member undergoes aeroplane/FSTD training at least every 12 calendar months. If the training is conducted within 3 calendar months prior to the expiry of the 12 calendar months period, the next aeroplane/FSTD training must be completed within 12 calendar months of the original expiry date of the previous aeroplane/FSTD training.

ANTR OPS 1.968 Pilot qualification to operate in either pilot’s seat

(See Appendix 1 to ANTR OPS 1.968)

(a) The operator shall ensure that:

(1) A pilot who may be assigned to operate in either pilot’s seat completes appropriate training and checking; and

(2) The training and checking programme are specified in the Operations Manual and is acceptable to the BCAA.

ANTR OPS 1.970 Recent experience

(a) The operator shall ensure that:

(1) A pilot is not assigned to operate an aeroplane as part of the minimum certificated crew, either as pilot flying or pilot non-flying, unless he has operated the flight controls during at least three take-offs and three landings within the preceding 90 days on the same type of aeroplane, or in a flight simulator, of the same type approved for the purpose.

(2) A pilot who does not hold a valid instrument rating is not assigned to operate an aeroplane at night as commander unless he has carried out at least one landing at night in the preceding 90 days as pilot flying in an aeroplane, or in a flight simulator, of the same type/class.

Note: For expired ratings, see ANTR FCL 1.245(f) and AMC FCL 1.245(f)(1).

ANTR OPS 1.975 Route and Aerodrome Competence qualification

(See AMC OPS 1.975)

(a) The operator shall not utilize a pilot as pilot-in-command of an aeroplane on a route or route segment for which that pilot is not currently qualified until such pilot has complied with requirement at (b) & (c) below:

(b) Each such pilot shall demonstrate to the operator an adequate knowledge of:

i) the route to be flown, and the aerodromes which are to be used. This shall include knowledge of:

1) the terrain and minimum safe altitudes;

2) the seasonal meteorological conditions;

3) the meteorological, communication and air traffic facilities, services and procedures;

4) the search and rescue procedures; and

5) the navigational facilities and procedures, including any long-range navigation procedures, associated with the route along which the flight is to take place; and

ii) procedures applicable to flight paths over heavily populated areas and areas of high air traffic density, obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures, and applicable operating minima.

Note: That portion of the demonstration relating to arrival, departure, holding and instrument approach procedures may be accomplished in an appropriate training device which is adequate for this purpose.

(c) A pilot-in-command shall have made an actual approach into each aerodrome of landing on the route, accompanied by a pilot who is qualified for the aerodrome, as a member of the flight crew or as an observer on the flight deck, unless:

i) the approach to the aerodrome is not over difficult terrain and the instrument approach procedures and aids available are similar to those with which the pilot is familiar, and a margin to be approved by the State of the Operator is added to the normal operating minima, or there is reasonable certainty that approach and landing can be made in visual meteorological conditions; or

ii) the descent from the initial approach altitude can be made by day in visual meteorological conditions; or

iii) the operator qualifies the pilot-in-command to land at the aerodrome concerned by means of an adequate pictorial presentation; or

iv) the aerodrome concerned is adjacent to another aerodrome at which the pilot-in-command is currently qualified to land.

(d) The operator shall maintain a record, sufficient to satisfy the State of the Operator of the qualification of the pilot and of the manner in which such qualification has been achieved.

(e) The period of validity of the route and aerodrome competence qualification shall be 12 calendar months in addition to the remainder of:

(1) The month of qualification; or

(2) The month of the latest operation on the route or to the aerodrome.

(f) The operator shall not continue to utilize a pilot as a pilot-in-command on a route or within an area specified by the operator and approved by BCAA unless, within the preceding 12 months, that pilot has made at least one trip as a pilot member of the flight crew, or as a check pilot, or as an observer in the flight crew compartment:

i) within that specified area; and

ii) if appropriate, on any route where procedures associated with that route or with any aerodromes intended to be used for take-off or landing require the application of special skills or knowledge.

(g) Route and aerodrome competence qualification shall be revalidated by operating on the route or to the aerodrome within the period of validity prescribed in sub-paragraph (e) above.

(h) In the event that more than 12 months elapse in which a pilot-in-command has not made such a trip on a route in close proximity and over similar terrain, within such a specified area, route or aerodrome, and has not practised such procedures in a training device which is adequate for this purpose, prior to again serving as a pilot-in-command within that area or on that route, that pilot must requalify in accordance with (b) & (c).

Note: If revalidated within the final 3 calendar months of validity of previous route and aerodrome competence qualification, the period of validity shall extend from the date of revalidation until 12 calendar months from the expiry date of that previous route and aerodrome competence qualification.

ANTR OPS 1.978 Alternative Training and Qualification Programme

(See Appendix 1 to ANTR OPS 1.978)

(See AC OPS 1.978)

(a) The operator, following a minimum of two years continuous operations, may substitute the training and checking requirements for flight crew specified in Appendix 1 to ANTR OPS 1.978(a) by an Alternative Training and Qualification Programme (ATQP) or Evidence Based Training (EBT) approved by the BCAA. The two years continuous operations may be reduced at the discretion of the BCAA.

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), or Evidence Based Training (EBT) approved by the competent authority:

(1) 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 must contain training and checking which establishes and maintains a level of proficiency demonstrated to be at least not less than the level of proficiency achieved by following the provisions of ANTR OPS 1.945, 1.965 and 1.970. The standard/level of flight crew training and qualification shall be established prior to the introduction of ATQP; the required ATQP training and qualification standards shall also be specified.

(c) The operator applying for approval to implement an ATQP shall provide the BCAA with an implementation plan in accordance with paragraph (c) of Appendix 1 to ANTR OPS 1.978.

(d) In addition to the checks required by ANTR OPS 1.965 and 1.970 the operator shall ensure that each flight crew member undergoes a Line Orientated Evaluation (LOE).

(1) The Line Orientated Evaluation (LOE) shall be conducted in a simulator. The LOE may be undertaken with other approved ATQP training.

(2) The period of validity of a LOE shall be 12 calendar months, in addition to the remainder of the month of issue. If issued within the final 3 calendar months of validity of a previous LOE the period of validity shall extend from the date of issue until 12 calendar months from the expiry date of that previous LOE.

(e) After 2 years of operating within an approved ATQP the operator may, with the approval of the BCAA, extend the periods of validity of ANTR OPS 1.965 and 1.970 as follows:

(1) Operator proficiency check – 12 calendar months in addition to the remainder of the month of issue. If issued within the final 3 calendar months of validity of a previous operator proficiency check, the period of validity shall extend from the date of issue until 12 calendar months from the expiry date of that previous operator proficiency check.

(2) Line Check - 24 calendar months in addition to the remainder of the month of issue. If issued within the final 6 calendar months of validity of a previous line check, the period of validity shall extend from the date of issue until 24 calendar months from the expiry date of that previous line check. The line check may be combined with a Line Oriented Quality Evaluation (LOQE) with the approval of the authority.

(3) Emergency and Safety equipment checking – 24 calendar months in addition to the remainder of the month of issue. If issued within the final 6 calendar months of validity of a previous check, the period of validity shall extend from the date of issue until 24 calendar months from the expiry date of that previous check.

(f) The ATQP shall be the responsibility of a nominated post holder.

ANTR OPS 1.980 Operation on more than one type or variant

(See Appendix 1 to ANTR OPS 1.980)

(See AMC OPS 1.980)

(a) The operator shall ensure that a flight crew member does not operate on more than one type or variant, unless: the flight crew member is competent to do so.

(b) When considering operations of more than one type or variant, the operator shall ensure that the differences and/or similarities of the aeroplanes concerned justify such operations, taking account of the following:

(1) The level of technology;

(2) Operational procedures;

(3) Handling characteristics. (See AMC OPS 1.980(b) and IEM OPS 1.980(b))

(c) The operator shall ensure that a flight crew member operating more than one type or variant complies with all of the requirements prescribed in Subpart N for each type or variant unless the BCAA has approved the use of credit(s) related to the training, checking and recent experience requirements.

(d) The operator shall specify appropriate procedures and/or operational restrictions, approved by the BCAA, in the Operations Manual, for any operation on more than one type or variant covering:

(1) The flight crew members' minimum experience level;

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

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

(4) All applicable recent experience requirements for each type or variant.

ANTR OPS 1.981 Operation of helicopters and aeroplanes

(a) When a flight crew member operates both helicopters and aeroplanes:

(1) The operator shall ensure that operations of helicopter and aeroplane are limited to one type of each.

(2) The operator shall specify appropriate procedures and/or operational restrictions, approved by the BCAA, in the Operations Manual.

ANTR OPS 1.985 Training records

(See IEM OPS 1.985)

(a) The operator shall:

(1) Maintain records of all training, checking and qualification prescribed in ANTR OPS 1.945, 1.955, 1.965, 1.968 and 1.975 undertaken by a flight crew member; and

(2) Make the records of all conversion courses and recurrent training and checking available, on request, to the flight crew member concerned.

Appendix 1 to ANTR OPS 1.940

In-flight relief of flight crew members

(a) A flight crew member may be relieved in flight of his duties at the controls by another suitably qualified flight crew member.

(b) *Relief of the Commander*

(1) The commander may delegate conduct of the flight to:

(i) Another qualified commander; or

(ii) For operations only above FL200, a pilot qualified as detailed in sub-paragraph (c) below.

(c) *Minimum requirements for a pilot relieving the commander*

(1) Valid Airline Transport Pilot Licence;

(2) Conversion training and checking (including Type Rating training) as prescribed in ANTR OPS 1.945;

(3) All recurrent training and checking as prescribed in ANTR OPS 1.965 and ANTR OPS 1.968; and

(4) Route competence qualification as prescribed in ANTR OPS 1.975.

(d) *Relief of the co-pilot*

(1) The co-pilot may be relieved by:

(i) Another suitably qualified pilot; or

(ii) A cruise relief co-pilot qualified as detailed in sub-paragraph (e) below.

(e) *Minimum requirements for Cruise Relief Co-Pilot*

(1) Valid Commercial Pilot Licence with Instrument Rating;

(2) Conversion training and checking, including Type Rating training, as prescribed in ANTR OPS 1.945 except the requirement for take-off and landing training;

(3) All recurrent training and checking as prescribed in ANTR OPS 1.965 except the requirement for take-off and landing training; and

(4) To operate in the role of co-pilot in the cruise only above FL 200.

(5) Recent experience as prescribed in ANTR OPS 1.970 is not required. The pilot shall, however, carry out Flight Simulator recency and refresher flying skill training at intervals not exceeding 90 days. This refresher training may be combined with the training prescribed in ANTR OPS 1.965.

(f) A flight engineer may be relieved in flight by a crew member suitably qualified in accordance with ANTR-FCL 4.

Appendix 2 to ANTR OPS 1.940

Single pilot operations under IFR or at night

(a) Aeroplanes referred to in ANTR OPS 1.940(b)(2) may be operated by a single pilot under IFR or at night when the following requirements are satisfied:

(1) The operator shall include in the Operations Manual a pilot's conversion and recurrent training programme which includes the additional requirements for a single pilot operation;

(2) The pilot shall have under gone training on the operator's procedures in particular regarding:

(i) Engine management and emergency handling;

(ii) Use of normal, abnormal and emergency checklists;

(iii) ATC communication;

(iv) Departure and approach procedures;

(v) Autopilot management, if applicable;

(vi) Use of simplified in-flight documentation; and

(vii) Single-pilot crew resource management.

(3) The recurrent checks required by ANTR OPS 1.965 shall be performed in the single-pilot role on the type or class of aeroplane in an environment representative of the operation;

(4) The pilot shall have a minimum of 50 hours flight time under IFR on the relevant type or class of aeroplane of which 10 hours is as commander; and

(5) For aeroplane operations under IFR or at night, the pilot shall have:

(i) for operations under the IFR or at night, have a minimum of 50 hours flight time under IFR on the relevant type or class of aeroplane, of which 10 hours are as commander;

(ii) for operations under the IFR, have a minimum of 25 hours flight time under the IFR on class of aeroplane, which may form part of the 50 hours flight time in sub-paragraph (5)(i) above;

(iii) for operation at night, have a minimum of 15 hours flight time at night, which may form part of the 50 hours flight time in sub-paragraph (5)(i) above;

(iv) for operations under the IFR, have acquired recent experience as pilot engaged in single pilot operation under the IFR of

(a) at least 5 IFR flights, including 3 instrument approaches carried out during the preceding 90 days on the class of aeroplane in single pilot role or

(b) an IFR instrument approach check carried out on such an aeroplane during the preceding 90 days;

(v) for operations at night, have made at least 3 take-offs and landings at night on the class of aeroplanes in the single pilot role in the preceding 90 days; and

(vi) have successfully completed training programmes that include, in addition to the requirements of ANTR OPS 1.941, passenger briefing with respect to emergency evacuation, autopilot management, and the use of simplified in-flight documentation.

Appendix 1 to ANTR OPS 1.945

Operator's Conversion Course

(See AMC OPS 1.945)

(See AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(See AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(See IEM OPS 1.945)

(a) The operator's conversion course shall include:

  (1) Ground training and checking including aeroplane systems, normal, abnormal and emergency procedures;

  (2) Emergency and safety equipment training and checking which must be completed before aeroplane training commences;

  (3) Aeroplane/FSTD training and checking; and

  (4) Line flying under supervision and line check.

(b) The conversion course shall be conducted in the order set out in sub-paragraph (a) above.

(c) Elements of Crew Resource Management shall be integrated into the conversion course, and conducted by suitably qualified personnel.

(d) When a flight crew member has not previously completed the operator's conversion course, the operator shall ensure that in addition to sub-paragraph (a) above, the flight crew member undergoes general first aid training and, if applicable, ditching procedures training using the equipment in water.

Appendix 1 to ANTR OPS 1.965

Recurrent training and checking – Pilots

(See AMC OPS 1.965(c))

(See AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(See AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e))

(See IEM OPS 1.965)

(a) Recurrent Training – Recurrent training shall comprise:

(1) Ground and refresher training

(i) The ground and refresher training programme shall include:

(A) Aeroplane systems;

(B) Operational procedures and requirements including ground de-/anti-icing (See AMC OPS 1.345(a)) and pilot incapacitation (see AMC to Appendix 1 to ANTR OPS 1.965); and

(C) Accident/Incident and occurrence review.

(ii) Knowledge of the ground and refresher training shall be verified by a questionnaire or other suitable methods.

(2) Aeroplane/FSTD training

(i) The aeroplane/FSTD training programme shall be established such that all major failures of aeroplane systems and associated procedures will have been covered in the preceding 3 year period.

(ii) When engine-out manoeuvres are carried out in an aeroplane, the engine failure shall be simulated.

(iii) Aeroplane/FSTD training may be combined with the operator proficiency check.

(3) Emergency and Safety Equipment Training

(i) Emergency and safety equipment training may be combined with emergency and safety equipment checking and shall be conducted in an aeroplane or a suitable alternative training device.

(ii) Every year the emergency and safety equipment training programme must include the following:

(A) Actual donning of a lifejacket where fitted;

(B) Actual donning of protective breathing equipment where fitted;

(C) Actual handling of fire extinguishers;

(D) Instruction on the location and use of all emergency and safety equipment carried on the aeroplane;

(E) Instruction on the location and use of all types of exits; and

(F) Security procedures.

(iii) Every 3 years the programme of training must include the following:

(A) Actual operation of all types of exits;

(B) Demonstration of the method used to operate a slide where fitted;

(C) Actual fire-fighting using equipment representative of that carried in the aeroplane on an actual or simulated fire except that, with Halon extinguishers, an alternative method acceptable to the BCAA may be used;

(D) The effects of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;

(E) Actual handling of pyrotechnics, real or simulated, where fitted; and

(F) Demonstration in the use of the life-raft(s) where fitted.

(4) *Crew Resource Management (CRM)*

(i) Elements of CRM shall be integrated into all appropriate phases of recurrent training; and

(ii) A specific modular CRM training programme shall be established such that all major topics of CRM training are covered over a period not exceeding 3 years, as follows:

(A) Human error and reliability, error chain, error prevention and detection;

(B) Company safety culture, SOPs, organisational factors;

(C) Stress, stress management, fatigue and vigilance;

(D) Information acquisition and processing, situation awareness, workload management;

(E) Decision making;

(F) Communication and co-ordination inside and outside the cockpit;

(G) Leadership and team behaviour, synergy;

(H) Automation and philosophy of the use of Automation (if relevant to the type);

(I) Specific type-related differences;

(J) Case based studies;

(K) Additional areas which warrant extra attention, as identified by the safety management system (see ANTR OPS 1.037).

(iii) Operators shall establish procedures to update their CRM recurrent training programme. Revision of the Programme shall be conducted over a period not exceeding 3 years. The revision of the programme shall take into account the de-identified results of the CRM assessments of crews, and information identified by the safety management system.).

(b) *Recurrent checking.* Recurrent checking shall comprise:

(1) *Operator proficiency checks*

(i) Where applicable, operator proficiency checks shall include the following manoeuvres:

(A) Rejected take-off when a Flight Simulator is available to represent that specific aeroplane, otherwise touch drills only;

(B) Take-off with engine failure between V_1 and V_2 or as soon as safety considerations permit;

(C) Precision instrument approach to minima with, in the case of multi-engined 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; and

(F) Landing with one engine inoperative. For single-engined aeroplanes a practice forced landing is required.

(ii) When engine out manoeuvres are carried out in an aeroplane, the engine failure must be simulated.

(iii) In addition to the checks prescribed in sub-paragraphs (i)(A) to (F) above, the requirements applicable to the revalidation or renewal of the aircraft Type or Class Rating must be completed every 12 months and may be combined with the operator proficiency check.

(iv) For a pilot operating VFR only, the checks prescribed in sub-paragraphs (i)(C) to (E) above may be omitted except for an approach and go-around in a multi-engined aeroplane with one engine inoperative.

(v) Operator proficiency checks must be conducted by a Type Rating Examiner.

(2) *Emergency and safety equipment checks*. The items to be checked shall be those for which training has been carried out in accordance with sub-paragraph (a)(3) above.

(3) *Line checks*;

(i) Line checks must establish the ability to perform satisfactorily a complete line operation including pre-flight and post-flight procedures and use of the equipment provided, as specified in the Operations Manual.

(ii) The flight crew must be assessed on their CRM skills in accordance with a methodology acceptable to the BCAA and published in the Operations Manual. The purpose of such assessment is to:

(A) Provide feedback to the crew collectively and individually and serve to identify retraining; and

(B) Be used to improve the CRM training system.

(iii) CRM assessment alone shall not be used as a reason for a failure of the line check.

(iv) When pilots are assigned duties as pilot flying and pilot non-flying they must be checked in both functions.

(v) Line checks must be completed in an aeroplane.

(vi) Line checks must be conducted by commanders nominated by the operator and acceptable to the BCAA. The person conducting the line check, who is described in ANTR OPS 1.965(a)(4)(ii), shall be trained in CRM concepts and the assessment of CRM skills and shall occupy an observer’s seat where installed. In the case of long haul operations where additional operating flight crew are carried, the person may fulfil the function of a cruise relief pilot and shall not occupy either pilot’s seat during take-off, departure, initial cruise, descent, approach and landing. His CRM assessments shall solely be based on observations made during the initial briefing, cabin briefing, cockpit briefing and those phases where he occupies the observer’s seat.

Appendix 2 to ANTR OPS 1.965

Recurrent training and checking – System Panel Operators

(a) The recurrent training and checking for System Panel Operators shall meet the requirements for pilots and any additional specific duties, omitting those items that do not apply to System Panel Operators.

(b) Recurrent training and checking for System Panel Operators shall, whenever possible, take place concurrently with a pilot undergoing recurrent training and checking.

(c) A line check shall be conducted by a commander nominated by the operator and acceptable to the BCAA or by a System Panel Operator Type Rating Instructor or Examiner.

Appendix 1 to ANTR OPS 1.968

Pilot qualification to operate in either pilot's seat

(a) Commanders whose duties also require them to operate in the right-hand seat and carry out the duties of co-pilot, or commanders required to conduct training or examining duties from the right-hand seat, shall complete additional training and checking as specified in the Operations Manual, concurrent with the operator proficiency checks prescribed in ANTR OPS 1.965(b). This additional training must include at least the following:

(1) An engine failure during take-off;

(2) A one engine inoperative approach and go-around; and

(3) A one engine inoperative landing.

(b) When engine-out manoeuvres are carried out in an aeroplane, the engine failure must be simulated.

(c) When operating in the right-hand seat, the checks required by ANTR OPS for operating in the left-hand seat must, in addition, be valid and current.

(d) A pilot relieving the commander shall have demonstrated, concurrent with the operator proficiency checks prescribed in ANTR OPS 1.965(b), practice of drills and procedures which would not, normally, be the relieving pilot's responsibility. Where the differences between left and right seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.

(e) A pilot other than the commander occupying the left-hand seat shall demonstrate practice of drills and procedures, concurrent with the operator proficiency checks prescribed in ANTR OPS 1.965(b), which would otherwise have been the commander's responsibility acting as pilot non-flying. Where the differences between left and right seats are not significant (for example because of use of autopilot) then practice may be conducted in either seat.

Appendix 1 to ANTR OPS 1.978
Alternative Training and Qualification Programme

(a) Documentation that details the scope and requirement of the operator's ATQP may apply to the following requirements that relate to training and qualifications:

(i) ANTR OPS 1.450 and Appendix 1 to ANTR OPS 1.450 - Low Visibility Operations – Training and Qualifications;

(ii) ANTR OPS 1.945 Conversion training and checking and Appendix 1 to ANTR OPS 1.945;

(iii) ANTR OPS 1.950 Differences training and familiarisation training;

(iv) ANTR OPS 1.955 paragraph (b) -Nomination as commander;

(v) ANTR OPS 1.965 Recurrent training and checking and Appendices 1 and 2 to ANTR OPS 1.965;

(vi) ANTR OPS 1.980 Operation on more than one type or variant and Appendix 1 to ANTR OPS 1.980.

(1) The operator's training needs and established operational and training objectives.

(2) 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.

(3) A description of how the programme will:

(i) enhance safety;

(ii) improve training and qualification standards of flight crew;

(iii) establish attainable training objectives;

(iv) integrate CRM in all aspects of training;

(v) develop a support and feedback process to form a self-correcting training system;

(vi) institute a system of progressive evaluations of all training to enable consistent and uniform monitoring of the training undertaken by flight crew;

(vii) enable the operator to be able to respond to new aeroplane technologies and changes in the operational environment;

(viii) foster the use of innovative training methods and technology for flight crew instruction and the evaluation of training systems; and

(ix) make efficient use of training resources, specifically to match the use of training media to the training needs.

(4) A task analysis to determine the tasks to be analysed in terms of:

(i) knowledge;

(ii) the required skills;

(iii) the associated skill based training; and,

(iv) the 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.

(5) Curricula – the curriculum structure and content shall be determined by task analysis, and shall include proficiency objectives including when and how those objectives shall be met. The process for curriculum development shall be acceptable to the BCAA;

(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.

(6) A specific training programme for:

(i) each aeroplane type/class within the ATQP;

(ii) the instructors (CRI/SFI/TRI), and other personnel undertaking flight crew instruction;

(iii) the examiners (CRE/SFE/TRE); to include a method for the standardisation of the instructors and examiners;

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 learnt 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).

(7) 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 programme's 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

(8) A method for the assessment of flight crew both during conversion and recurrent training and checking. The assessment process shall include event-based assessment as part of the LOE. The method of assessment shall comply with the provisions of ANTR OPS 1.965;

(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:

EVENT	**MARKER**
Awareness of aeroplane systems	1. Monitors and reports changes in automation status 2. Applies closed loop principle in all relevant situations 3. Uses all channels for updates 4. Is aware of remaining technical resources

(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.

(9) An integrated system of quality control, that ensures compliance with all the requirements processes and procedures of the programme;

(10) A process that describes the method to be used if the monitoring and evaluation programmes do not ensure compliance with the established proficiency and qualification standards for flight crew;

(11) A Data Monitoring/Analysis programme.

(i) A flight data monitoring (FDM) programme, as described in AMC1 ORO.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 competent 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 competent authority.

The purpose of an FDM or advanced FDM programme for ATQP is to enable the operator to:

(A) provide data to support the programme's 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,

(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 shall develop an evaluation and implementation strategy/process acceptable to the BCAA; the following requirements shall be fulfilled:

(1) The implementation process shall include the following stages:

(i) A safety case that substantiates the validity of:

(A) The revised training and qualification standards when compared with the standards achieved under ANTR OPS 1 prior to the introduction of ATQP.

(B) Any new training methods implemented as part of ATQP. If approved by the BCAA the operator may establish an equivalent method other than a formal safety case.

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.

(ii) Undertake a task analysis as required by paragraph (b)(2) above in order to establish the operator's programme of targeted training and the associated training objectives.

(iii) A period of operation whilst data is collected and analysed to ensure the efficacy of the safety case or equivalent and validate the task analysis. During this period the operator shall continue to operate to the pre-ATQP ANTR OPS 1 requirements. The length of this period shall be agreed with the authority;

(2) The operator may then be approved to conduct training and qualification as specified under the ATQP.

Appendix 1 to ANTR OPS 1.980

Operation on more than one type or variant

(See AMC OPS 1.980)

(a) When a flight crew member operates more than one aeroplane class, type or variant listed in ANTR-FCL and associated procedures for class-single pilot and/or ANTR-FCL and associated procedures for type-single pilot, but not within a single licence endorsement, the operator must comply with the following:

(1) A flight crew member shall not operate more than:

(i) Three piston engined aeroplane types or variants; or

(ii) Three turbo-propeller aeroplane types or variants; or

(iii) One turbo-propeller aeroplane type or variant and one piston engined aeroplane type or variant; or.

(vi) One turbo-propeller aeroplane type or variant and any aeroplane within a particular class.

(2) ANTR OPS 1.965 for each type or variant operated unless the operator has demonstrated specific procedures and/or operational restrictions which are acceptable to the BCAA.

(b) When a flight crew member operates more than one aeroplane type or variant within one or more licence endorsement, as defined by ANTR-FCL and associated procedures for type-multi pilot, the operator shall ensure that:

(1) The minimum flight crew complement specified in the Operations Manual is the same for each type or variant to be operated;

(2) A flight crew member does not operate more than two aeroplane types or variants for which a separate licence endorsement is required; and

(3) 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.

Note: In cases where more than one licence endorsement is involved, see sub-paragraphs (c) and (d) below.

(c) When a flight crew member operates more than one aeroplane type or variant listed in ANTR-FCL and associated procedures for type-single pilot and type-multi pilot, but not within a single licence endorsement, the operator must comply with:

(1) Subparagraphs (b)(1), (b)(2) and (b)(3) above; and

(2) Subparagraph (d) below.

(d) When a flight crew member operates more than one aeroplane type or variant listed in ANTR-FCL and associated procedures for type-multi pilot, but not within a single licence endorsement, the operator must comply with the following:

(1) Subparagraphs (b)(1), (b)(2) and (b)(3) above;

(2) Before exercising the privileges of 2 licence endorsements:

(i) Flight crew members must have completed two consecutive operator proficiency checks and must have 500 hours in the relevant crew position in commercial air transport operations with the same operator.

(ii) In the case of a pilot having experience with the operator and exercising the privileges of 2 licence endorsements, 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 must have completed 2 consecutive operator proficiency checks before again being eligible to exercise 2 licence endorsements.

(3) Before commencing training for and operation of another type or variant, flight crew members must have completed 3 months and 150 hours flying on the base aeroplane which must include at least one proficiency check.

(4) After completion of the initial line check on the new type, 50 hours flying, or 20 sectors must be achieved solely on aeroplanes of the new type rating.

(5) ANTR OPS 1.970 for each type operated unless credits have been allowed by the BCAA in accordance with sub-paragraph (7) below.

(6) The period within which line flying experience is required on each type must be specified in the Operations Manual.

(7) Where credits are sought to reduce the training and checking and recent experience requirements between aeroplane types, the operator must demonstrate to the BCAA which items need not be repeated on each type or variant because of similarities (See AMC OPS 1.980(b) and IEM OPS 1.980(b)).

(i) ANTR OPS 1.965(b) requires two operator proficiency checks every year. When credit is given in accordance with sub-paragraph (7) above for operator proficiency checks to alternate between the two types, each operator proficiency check revalidates the operator proficiency check for the other type. Provided that the period between proficiency checks for revalidation or renewal of type rating does not exceed that prescribed in ANTR-FCL for each type, the ANTR-FCL requirements will be satisfied. In addition, relevant and approved recurrent training must be specified in the Operations Manual.

(ii) ANTR OPS 1.965(c) requires one line check every year. When credit is given in accordance with sub-paragraph (7) above for line checks to alternate between types or variants, each line check revalidates the line check for the other type or variant.

(iii) Annual emergency and safety equipment training, and checking must cover all requirements for each type.

(8) ANTR OPS 1.965 for each type or variant operated unless credits have been allowed by the Authority in accordance with sub-paragraph (7) above.

(e) When a flight crew member operates combinations of aeroplane types or variants as defined in ANTR-FCL and associated procedures for class-single pilot and ANTR-FCL and associated procedures for type-multi pilot, the operator must demonstrate that specific procedures and/or operational restrictions are approved in accordance with ANTR OPS 1.980(d).

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SUBPART O – CABIN CREW

ANTR OPS 1.988 Applicability

(See IEM OPS 1.988)

(a) A cabin crew member is a person who is assigned by the operator to undertake tasks in the cabin and shall be identifiable by virtue of the operator's cabin crew uniform to passengers as a cabin crew member. Such persons shall comply with the requirements of this Subpart and any other applicable requirements of ANTR OPS 1.

(b) Other personnel, such as medical staff, security staff, child minders, escorts, technical staff, entertainers, interpreters, who undertake tasks in the cabin, shall not wear a uniform which might identify them to passengers as a cabin crew member unless they comply with the requirements of this Subpart and any other applicable requirements of ANTR OPS 1.

ANTR OPS 1.989 Terminology

Cabin Crew Member; A crew member, other than a Flight Crew Member, who performs in the interests of safety of passengers, duties assigned by the operator or the commander of the aeroplane.

ANTR OPS 1.990 Number and composition of cabin crew

(See IEM OPS 1.990)

(a) The operator shall not operate an aeroplane with a maximum approved passenger seating configuration of more than 19, when carrying one or more passengers, unless at least one cabin crew member is included in order to effect a safe and expeditious evacuation of the aeroplane, and the necessary functions to be performed in an emergency or a situation requiring emergency evacuation and for the purpose of performing duties, specified in the Operations Manual, in the interests of the safety of passengers. The operator shall assign these functions for each type of aeroplane.

(b) When complying with sub-paragraph (a) above, the operator shall ensure that the minimum number of cabin crew is the greater of:

(1) One cabin crew member for every 50, or fraction of 50, passenger seats installed on the same deck of the aeroplane; or

(2) The number of cabin crew who actively participated in the aeroplane cabin during the relevant emergency evacuation demonstration, or who were assumed to have taken part in the relevant analysis, except that, if the maximum approved passenger seating configuration is less than the number evacuated during the demonstration by at least 50 seats, the number of cabin crew may be reduced by 1 for every whole multiple of 50 seats by which the maximum approved passenger seating configuration falls below the certificated maximum capacity.

(c) The BCAA may under exceptional circumstances require the operator to include in the crew additional cabin crew members.

(d) In unforeseen circumstances the required minimum number of cabin crew may be reduced provided that:

(1) The number of passengers has been reduced in accordance with procedures specified in the Operations Manual; and

(2) A report is submitted to the BCAA after completion of the flight.

(e) The operator shall ensure that when engaging the services of cabin crew members who are self-employed and/or working on a freelance or part-time basis, the requirements of Subpart

O are complied with. In this respect, particular attention must be paid to the total number of aircraft types or variants that a cabin crew member may fly for the purposes of commercial air transportation, which must not exceed the requirements prescribed in ANTR OPS 1.1030, including when his services are engaged by another operator.

ANTR OPS 1.995 Minimum requirements

(See AMC OPS 1.995(b))

The operator shall ensure that each cabin crew member:

(a) is at least 18 years of age;

(b) has passed a medical examination or assessment at regular intervals as required by the BCAA so as to check the medical fitness to discharge his/her duties;

(c) has successfully completed initial training in accordance with ANTR OPS 1.1005 and holds an attestation of safety training;

(d) has completed the appropriate conversion and/or differences training covering at least the subjects listed in ANTR OPS 1.1010;

(e) shall undergo recurrent training in line with the provisions of ANTR OPS 1.1015;

(f) is competent to perform his/her duties in accordance with procedures specified in the Operations Manual.

ANTR OPS 1.996 Single cabin crew operations

(a) The operator shall ensure that each cabin crew member who does not have previous comparable experience, must complete the following before operating as a single cabin crew member:

(1) Training in addition to that required by ANTR OPS 1.1005 and ANTR OPS 1.1010 shall include particular emphasis on the following to reflect single cabin crew operations:

(i) Responsibility to the commander for the conduct of cabin safety and emergency procedure(s) specified in the Operations Manual,

(ii) Importance of co-ordination and communication with the flight crew, management of unruly or disruptive passengers,

(iii) Review of operator’s requirements and legal requirements,

(iv) Documentation,

(v) Accident and incident reporting,

(vi) Flight and duty time limitations.

(2) Familiarisation flying of at least 20 hours and 15 sectors. Familiarisation flights shall be conducted under the supervision of a suitably experienced cabin crew member on the aeroplane type to be operated. (See AMC OPS 1.1012).

(b) The operator shall ensure, before a cabin crew member is assigned to operate as a single cabin crew member, that this cabin crew member is competent to perform his duties in accordance with the procedures specified in the Operations Manual. Suitability for single cabin crew operations shall be addressed in the criteria for cabin crew selection, recruitment, training and assessment of competence.

ANTR OPS 1.1000 Senior cabin crew members

(a) The operator shall nominate a senior cabin crew member whenever more than one cabin crew member is assigned. For operations when more than one cabin crew member is assigned, but only one cabin crew member is required, the operator shall nominate one cabin crew member to be responsible to the commander.

(b) The senior cabin crew member shall have responsibility to the commander for the conduct and co-ordination of normal and emergency procedure(s) specified in the Operations Manual. During turbulence, in the absence of any instructions from the flight crew, the senior cabin crew member shall be entitled to discontinue non-safety related duties and advise the flight crew of the level of turbulence being experienced and the need for the fasten seat belt signs to be switched on. This should be followed by the cabin crew securing the passenger cabin and other applicable areas.

(c) Where required by ANTR OPS 1.990 to carry more than one cabin crew member, the operator shall not appoint a person to the post of senior cabin crew member unless that person has at least one year's experience as an operating cabin crew member and has completed an appropriate course. (See IEM OPS 1.1000 (c).)

(d) The operator shall establish procedures to select the next most suitably qualified cabin crew member to operate as senior cabin crew member in the event of the nominated senior cabin crew member becoming unable to operate. Such procedures must be acceptable to the BCAA and take account of a cabin crew member's operational experience.

(e) CRM Training: The operator shall ensure that all relevant elements in Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 Table 1, Column (a) are integrated into the training and covered to the level required by Column (f), Senior Cabin Crew Course.

ANTR OPS 1.1005 Initial training

(See Appendix 1 to ANTR OPS 1.1005)
(See Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015)
(See AC OPS 1.1005/1.1010/1.1015)
(See AC OPS 1.1005/1.1010/1.1015/1.1020)

The operator shall ensure that each cabin crew member successfully completes initial training. The training programme must be approved by the BCAA, in accordance with Appendix 1 to ANTR OPS 1.1005, and the checking prescribed in ANTR OPS 1.1025 before undertaking conversion training.

These training programmes shall ensure that each person is:

a) competent to execute those safety duties and functions which the cabin crew member is assigned to perform in the event of an emergency or in a situation requiring emergency evacuation;

b) drilled and capable in the use of emergency and life-saving equipment required to be carried, such as life jackets, life rafts, evacuation slides, emergency exits, portable fire extinguishers, oxygen equipment, first-aid and universal precaution kits, and automated external defibrillators;

c) when serving on aeroplanes operated above 3 000 m (10 000 ft), knowledgeable as regards the effect of lack of oxygen and, in the case of pressurized aeroplanes, as regards physiological phenomena accompanying a loss of pressurization;

d) aware of other crew members' assignments and functions in the event of an emergency so far as is necessary for the fulfillment of the cabin crew member's own duties;

e) aware of the types of dangerous goods which may, and may not, be carried in a passenger cabin; and

f) knowledgeable about human performance as related to passenger cabin safety duties including flight crew-cabinccrew coordination.

Note 1: Requirements for the training of cabin crew members in the transport of dangerous goods are included in the Dangerous Goods Training Programme contained in Annex 18 — The Safe Transport of Dangerous Goods by Air and the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284).

Note 2: For more information on dangerous goods operational requirements, see Chapter 14.

Note 3: Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Cabin Crew Safety Training Manual *(Doc 10002).*

At the discretion of the BCAA, the operator or the approved training organisation providing the training course, shall deliver an attestation of safety training to a cabin crew member after he/she has completed the initial safety training and successfully passed the check referred to in ANTR OPS 1.1025.

ANTR OPS 1.1010 Conversion and Differences training

(See Appendix 1 to ANTR OPS 1.1010)

(See Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015/1.1020)

(See AC OPS 1.1005/1.1010/1.1015/1.1020)

(a) The operator shall ensure that each cabin crew member has completed appropriate training, as specified in the Operations Manual, before undertaking assigned duties as follows:

(1) *Conversion training;* A conversion course must be completed before being:

(i) First assigned by the operator to operate as a cabin crew member; or

(ii) Assigned to operate another aeroplane type; and

(2) *Differences training.* Differences training must be completed before operating:

(i) On a variant of an aeroplane type currently operated; or

(ii) With different safety equipment, safety equipment location, or normal and emergency procedures on currently operated aeroplane types or variants.

(b) The operator shall determine the content of the conversion or differences training taking account of the cabin crew member's previous training as recorded in the cabin crew member's training records required by ANTR OPS 1.1035.

(c) The operator shall ensure that:

(1) Conversion training is conducted in a structured and realistic manner, in accordance with Appendix 1 to ANTR OPS 1.1010;

(2) Differences training is conducted in a structured manner; and

(3) Conversion training, and if necessary differences training, includes the use of all safety equipment and all normal and emergency procedures applicable to the type or variant of aeroplane and involves training and practice on either a representative training device or on the actual aeroplane.

(d) Conversion and Differences training programmes, in accordance with Appendix 1 to ANTR OPS 1.1010, must be approved by the BCAA.

(e) The operator shall ensure that each cabin crew member before being first assigned to duties, completes the Operator's CRM Training and Aeroplane Type Specific CRM, in accordance lwith Appendix 1 to ANTR OPS 1.1010(k). Cabin crew who are already operating as cabin crew members with the operator, shall complete the CRM training prior to being fully qualified and scheduled to operate with the present operator, regardless of their previous training and operational experience. The training will be in accordance with Appendix 1 to ANTR OPS 1.1010, including Aeroplane Type Specific CRM, as relevant.

ANTR OPS 1.1012 Familiarisation

(See AMC OPS 1.1012)

The operator shall ensure that, following completion of conversion training, each cabin crew member undertakes familiarisation prior to operating as one of the minimum numbers of cabin crew required by ANTR OPS 1.990.

ANTR OPS 1.1015 Recurrent training

(See Appendix 1 to ANTR OPS 1.1015)

(See Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015)

(See AC OPS 1.1005/1.1010/1.1015)

(See AC OPS 1.1005/1.1010/1.1015/1.1020)

(a) The operator shall ensure that each cabin crew member undergoes recurrent training, covering the actions assigned to each crew member in normal and emergency procedures and drills relevant to the type(s) and/or variant(s) of aeroplane on which they operate in accordance with Appendix 1 to ANTR OPS 1.1015.

(b) The operator shall ensure that the recurrent training and checking programme, approved by the BCAA, includes theoretical and practical instruction, together with individual practice, as prescribed in Appendix 1 to ANTR OPS 1.1015.

(c) The period of validity of recurrent training and the associated checking required by ANTR OPS 1.1025 shall be 12 calendar months in addition to the remainder of the month of issue. If issued within the final 3 calendar months of validity of a previous check, the period of validity shall extend from the date of issue until 12 calendar months from the expiry date of that previous check.

ANTR OPS 1.1020 Refresher training

(See Appendix 1 to ANTR OPS 1.1020)

(See AMC OPS 1.1020)

(See AC OPS 1.1005/1.1010/1.1015/1.1020)

(a) The operator shall ensure that each cabin crew member who has been absent from all flying duties for more than 6 months and still remains within the period of validity of the previous check required by ANTR OPS 1.1025(b)(3) completes refresher training specified in the Operations Manual as prescribed in Appendix 1 to ANTR OPS 1.1020 (See IEM OPS 1.1020(a)).

(b) The operator shall ensure that when a cabin crew member has not been absent from all flying duties, but has not, during the preceding 6 months, undertaken duties on a type of aeroplane as a cabin crew member required by ANTR OPS 1.990 (b), before undertaking such duties on that type, the cabin crew member either:

(1) Completes refresher training on the type; or

(2) Operates two re-familiarisation sectors as defined in AMC OPS 1.1012 paragraph 3.

ANTR OPS 1.1025 Checking

(See AMC OPS 1.1025)

(a) The operator shall ensure that during or following completion of the training required by ANTR OPS 1.1005, 1.1010 and 1.1015, each cabin crew member undergoes a check covering the training received in order to verify his proficiency in carrying out normal and emergency safety duties. These checks must be performed by personnel acceptable to the BCAA.

(b) The operator shall ensure that each cabin crew member undergoes checks as follows:

(1) *Initial training*. The items listed in Appendix 1 to ANTR OPS 1.1005;

(2) *Conversion and Differences training.* The items listed in Appendix 1 to ANTR OPS 1.1010;

(3) *Recurrent training.* The items listed in Appendix 1 to ANTR OPS 1.1015 as appropriate; and

(4) *Refresher training*. The items listed in Appendix 1 to ANTR-OPS 1.1020.

ANTR OPS 1.1030 Operation on more than one type or variant

(See AC OPS 1.1030)

(a) The operator shall ensure that each cabin crew member does not operate on more than three aeroplane types except that, with the approval of the BCAA, the cabin crew member may operate on four aeroplane types, provided that for at least two of the types:

(1) Non-type specific normal and emergency procedures are identical; and

(2) Safety equipment and type specific normal and emergency procedures are similar.

(b) For the purposes of sub-paragraph (a) above, variants of an aeroplane type are considered to be different types if they are not similar in each of the following aspects:

(1) Emergency exit operation;

(2) Location and type of portable safety equipment; and

(3) Type specific emergency procedures.

ANTR OPS 1.1035 Training records

(See IEM OPS 1.1035)

(a) The operator shall:

(1) Maintain records of all training and checking required by ANTR OPS 1.1005, 1.1010, 1.1015, 1.1020 and 1.1025; and

(2) keep a copy of the attestation of safety training; and

(3) keep the training records and records of medical examinations or assessments up to date, showing in the case of the training records the dates and contents of the conversion, differences and recurrent training received; and

(4) Make the records of all initial, conversion and recurrent training and checking available, on request, to the cabin crew member concerned.

Appendix 1 to ANTR OPS 1.1005

Initial training

See Appendix 3 to ANTR–OPS 1.1005/1.1010/1.1015

See IEM to Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020

(a) The operator shall ensure that all elements of initial training and all associated drills are conducted by suitably qualified persons.

(b) *Fire and Smoke Training.* The operator shall ensure that fire and smoke training includes:

(1) Emphasis on the responsibility of cabin crew to deal promptly with emergencies involving fire and smoke and, in particular, emphasis on the importance of identifying the actual source of the fire;

(2) The importance of informing the flight crew immediately, as well as the specific actions necessary for co-ordination and assistance, when fire or smoke is discovered;

(3) The necessity for frequent checking of potential fire-risk areas including toilets, and the associated smoke detectors;

(4) The classification of fires and the appropriate type of extinguishing agents and procedures for particular fire situations, the techniques of application of extinguishing agents, the consequences of misapplication, and of use in a confined space; and

(5) The general procedures of ground-based emergency services at aerodromes.

(c) *Water Survival Training*. The operator shall ensure that water survival training includes the actual donning and use of personal flotation equipment in water by each cabin crew member. Before first operating on an aeroplane fitted with life-rafts or other similar equipment, training must be given on the use of this equipment, as well as actual practice in water.

(d) *Survival Training.* The operator shall ensure that survival training is appropriate to the areas of operation, (e.g. polar, desert, jungle or sea).

(e) *Medical aspects and First Aid.* The operator shall ensure that medical and first aid training includes:

(1) Instruction on medical aspects and first aid, first-aid kits, emergency medical kits, their contents and emergency medical equipment;

(2) First aid associated with survival training and appropriate hygiene; and

(3) The physiological effects of flying and with particular emphasis on hypoxia.

(f) *Passenger handling.* The operator shall ensure that training for passenger handling includes the following:

(1) Advice on the recognition and management of passengers who are, or become, intoxicated with alcohol or are under the influence of drugs or are aggressive;

(2) Methods used to motivate passengers and the crowd control necessary to expedite an aeroplane evacuation;

(3) Regulations covering the safe stowage of cabin baggage (including cabin service items) and the risk of it becoming a hazard to occupants of the cabin or otherwise obstructing or damaging safety equipment or aeroplane exits;

(4) The importance of correct seat allocation with reference to aeroplane mass and balance. Particular emphasis shall also be given on the seating of disabled passengers, and the necessity of seating able-bodied passengers adjacent to unsupervised exits;

(5) Duties to be undertaken in the event of encountering turbulence including securing the cabin;

(6) Precautions to be taken when live animals are carried in the cabin;

(7) Dangerous Goods training as prescribed in Subpart R; and

(8) Security procedures, including the provisions of Subpart S.

(g) *Communication.* The operator shall ensure that, during training, emphasis is placed on the importance of effective communication between cabin crew and flight crew including technique, common language and terminology.

(h) *Discipline and responsibilities.* The operator shall ensure that each cabin crew member receives training on:

(1) The importance of cabin crew performing their duties in accordance with the Operations Manual;

(2) Continuing competence and fitness to operate as a cabin crew member with special regard to flight and duty time limitations and rest requirements;

(3) An awareness of the aviation regulations relating to cabin crew and the role of the BCAA;

(4) General knowledge of relevant aviation terminology, theory of flight, passenger distribution, meteorology and areas of operation;

(5) Pre-flight briefing of the cabin crew and the provision of necessary safety information with regard to their specific duties;

(6) The importance of ensuring that relevant documents and manuals are kept up-to-date with amendments provided by the operator;

(7) The importance of identifying when cabin crew members have the authority and responsibility to initiate an evacuation and other emergency procedures; and

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

(i) *Crew Resource Management*. The operator shall ensure that CRM training satisfies the following:

(1) Introductory CRM Course:

(i) The operator shall ensure that a cabin crew member has completed an Introductory CRM Course before being first assigned to operate as a cabin crew member. Cabin crew who are already operating as cabin crew members in commercial air transportation and who have not previously completed an introductory course, shall complete an Introductory CRM Course by the time of the next required recurrent training and/or checking.

When a cabin crew member has not previously completed initial Operator's Crew Resource Management (CRM) training (either new employees or existing staff), then the operator shall ensure that the cabin crew member completes an initial

Operator's CRM training course. New employees shall complete initial Operator's CRM, prior to being qualified and scheduled to operate with the present operator. Cabin crew who are already operating as flight crew members in commercial air transportation and who have not completed CRM training before shall complete an initial operator's CRM training course effective forthwith.

(ii) The training elements in Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 Table 1, Column (a) shall be covered to the level required in Column (b), Introductory training CRM Course.

(iii) The Introductory CRM Course shall be conducted by at least one cabin crew CRM instructor.

Appendix 1 to ANTR OPS 1.1010

Conversion and Differences training

(See IEM to Appendix 1 to ANTR OPS 1.1010/1.1015)

(See IEM to Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020)

(See Appendix 3 to ANTR-OPS 1.1005/1.1010/1.1015)

(a) *General.* The operator shall ensure that:

(1) Conversion and differences training is conducted by suitably qualified persons; and

(2) During conversion and differences training, training is given on the location, removal and use of all safety and survival equipment carried on the aeroplane, as well as all normal and emergency procedures related to the aeroplane type, variant and configuration to be operated.

(3) Training must also include all drills with respect to each applicable element of the training curriculum.

(b) *Fire and smoke training.* The operator shall ensure that:

(1) Each cabin crew member is given realistic and practical training in the use of all fire fighting equipment including protective clothing representative of that carried in the aeroplane. This training must include:

(i) Each cabin crew member extinguishing a fire characteristic of an aeroplane interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and

(ii) The donning and use of protective breathing equipment by each cabin crew member in an enclosed, simulated smoke-filled environment –

(c) *Operation of doors and exits.* The operator shall ensure that:

(1) Each cabin crew member operates and actually opens each type or variant of all normal and emergency exits for passenger evacuation in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted in an aeroplane or representative training device; and

(2) The operation of all other exits, such as flight deck windows is demonstrated.

(d) *Evacuation slide training.* The operator shall ensure that:

(1) Each cabin crew member descends an evacuation slide from a height representative of the aeroplane main deck sill height;

(2) The slide is fitted to an aeroplane or a representative training device.

(e) *Evacuation procedures and other emergency situations.* The operator shall ensure that:

(1) Emergency evacuation training includes the recognition of planned or unplanned evacuations on land or water. This training must include recognition of when exits are unusable or when evacuation equipment is unserviceable; and

(2) Each cabin crew member is trained to deal with the following:

(i) An in-flight fire, with particular emphasis on identifying the actual source of the fire;

(ii) Severe air turbulence;

(iii) Sudden decompression, including the donning of portable oxygen equipment by each cabin crew member; and

(iv) Other in-flight emergencies.

(f) *Crowd control.* The operator shall ensure that training is provided on the practical aspects of crowd control in various emergency situations, as applicable to the aeroplane type.

(g) *Pilot incapacitation.* The operator shall ensure that, unless the minimum flight crew is more than two, each cabin crew member is trained in the procedure for flight crew member incapacitation and shall operate the seat and harness mechanisms. Training in the use of flight crew members' oxygen system and use of the flight crew members' check lists, where required by the operator's SOP's, shall be conducted by a practical demonstration.

(h) *Safety equipment.* The operator shall ensure that each cabin crew member is given realistic training on, and demonstration of, the location and use of safety equipment including the following:

(1) Slides, and where non self-supporting slides are carried, the use of any associated ropes;

(2) Life-rafts and slide-rafts, including the equipment attached to, and/or carried in, the raft;

(3) Lifejackets, infant lifejackets and flotation cots;

(4) Dropout oxygen system;

(5) First-aid oxygen;

(6) Fire extinguishers;

(7) Fire axe or crow-bar;

(8) Emergency lights including torches;

(9) Communications equipment, including megaphones;

(10) Survival packs, including their contents;

(11) Pyrotechnics (Actual or representative devices);

(12) First-aid kits, emergency medical kits, their contents and emergency medical equipment; and

(13) Other cabin safety equipment or systems where applicable.

(i) *Passenger Briefing/Safety Demonstrations.* The operator shall ensure that training is given in the preparation of passengers for normal and emergency situations in accordance with ANTR OPS 1.285.

(j) The operator shall ensure that all appropriate OPS requirements are included in the training of cabin crew members.

(k) When initial medical aspects and first aid training has not included the avoidance of infectious diseases, especially in tropical and sub-tropical climates, such training shall be provided if the operator's route network is extended or changed to include such areas.

(l) Crew Resource Management. The operator shall ensure that:

(1) Each cabin crew member completes the Operator's CRM Training covering the training elements in Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 Table 1, Column (a) to the level required in Column (c) before undertaking subsequent Aeroplane Type Specific CRM and/or recurrent CRM Training.

(2) When a cabin crew member undertakes a conversion course on another aeroplane type, the training elements in Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 Table 1, Column (a) shall be covered to the level required in Column (d), Aeroplane Type Specific CRM.

(3) The Operator's CRM Training and Aeroplane Type Specific CRM shall be conducted by a least one cabin crew CRM instructor.

Appendix 1 to ANTR OPS 1.1015

Recurrent training

See IEM to Appendix 1 to ANTR OPS 1.1010/1.1015

See Appendix 3 to ANTR–OPS 1.1005/1.1010/1.1015

See IEM to Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020

(a) The operator shall ensure that recurrent training and checking is conducted by suitably qualified persons. Training must also include all drills with respect to each applicable element of the training curriculum.

(b) The operator shall ensure that every 12 calendar months the programme of practical training includes the following:

(1) Emergency procedures including pilot incapacitation;

(2) Evacuation procedures including crowd control techniques;

(3) Touch-drills by each cabin crew member for opening normal and emergency exits for passenger evacuation;

(4) The location and handling of emergency equipment, including oxygen systems, and the donning by each cabin crew member of lifejackets, portable oxygen and protective breathing equipment (PBE);

(5) Aero-Medical aspects and first aid, first-aid kits, emergency medical kits, their contents and emergency medical equipment;

(6) Stowage of articles in the cabin;

(7) Procedures related to aircraft surface contaminations;

(8) Security procedures;

(9) Incident and accident review; and

(10) Crew Resource Management. The operator shall ensure that CRM training satisfies the following:

(i) The training elements in Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 Table 1, Column (a) shall be covered within a three year cycle to the level required by Column (e), Annual Recurrent CRM Training.

(ii) The definition and implementation of this syllabus shall be managed by a cabin crew CRM instructor.

(iii) When CRM training is provided by stand-alone modules, it shall be conducted by at least one cabin crew CRM instructor.

(c) The operator shall ensure that, at intervals not exceeding 3 years, recurrent training also includes:

(1) Each cabin crew member operating and actually opening each type or variant of normal and emergency exit in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted in an aeroplane or representative training device;

(2) 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;

(3) Demonstration of the operation of all other exits including flight deck windows;

(4) Each cabin crew member being given realistic and practical training in the use of all fire-fighting equipment, including protective clothing, representative of that carried in the aeroplane. This training must include:

(i) Each cabin crew member extinguishing a fire characteristic of an aeroplane interior fire except that, in the case of Halon extinguishers, an alternative extinguishing agent may be used; and

(ii) The donning and use of protective breathing equipment by each cabin crew member in an enclosed, simulated smoke-filled environment.

(5) Use of pyrotechnics (Actual or representative devices); and

(6) Demonstration of the use of the life-raft, or slide-raft, where fitted.

(7) The operator shall ensure that, unless the minimum flight crew is more than two, each cabin crew member is trained in the procedure for flight crew member incapacitation and shall operate the flight crew members’ seat and harness mechanisms. Training in the use of the flight crew members’ oxygen system and use of flight crew member’s check lists, where required by the operator’s SOP’s, shall be conducted by a practical demonstration.

(d) The operator shall ensure that all appropriate OPS requirements are included in the training of cabin crew members.

(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), (c)(4), (c)(6) & (c)(7), the validity period shall be 36 calendar months counted from the end of the month when the checks were taken.

Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 - Training

(See AC OPS 1.1005/1.1010/1.1015)

1. The CRM training syllabi, together with CRM methodology and terminology, shall be included in the Operations Manual.

2. Table 1 indicates which elements of CRM shall be included in each type of training

<table>
<tr><th>Training Elements
(a)</th><th>Introductory CRM Course
(b)</th><th>Operator's CRM Training
(c)</th><th>Aeroplane Type Specific CRM
(d)</th><th>Annual Recurrent CRM Training
(e)</th><th>Senior Cabin Crew Course
(f)</th></tr>
<tr><td colspan="6">General Principles</td></tr>
<tr><td>Human factors in aviation
General instructions on CRM principles and objectives</td><td rowspan="2">In depth</td><td rowspan="2">Not required</td><td rowspan="2">Not required</td><td rowspan="2">Not required</td><td rowspan="2">Overview</td></tr>
<tr><td>Human performance and limitations</td></tr>
<tr><td colspan="6">From the perspective of the individual cabin crew member</td></tr>
<tr><td>Personality awareness, human error and reliability, attitudes and behaviours, self-assessment</td><td rowspan="5">In depth</td><td rowspan="5">Not required</td><td rowspan="5">Not required</td><td rowspan="5">Overview (3 year cycle)</td><td rowspan="5">Not required</td></tr>
<tr><td>Stress and stress management</td></tr>
<tr><td>Fatigue and vigilance</td></tr>
<tr><td>Assertiveness</td></tr>
<tr><td>Situation awareness, information acquisition and processing</td></tr>
<tr><td colspan="6">From the perspective of the whole aeroplane crew</td></tr>
<tr><td>Error prevention and detection</td><td rowspan="8">Not required</td><td rowspan="7">In depth</td><td rowspan="7">Relevant to the type(s)</td><td rowspan="8">Overview (3 year cycle)</td><td rowspan="8">Reinforcement (relevant to the Senior cabin crew duties)</td></tr>
<tr><td>Shared situation awareness, information acquisition & processing</td></tr>
<tr><td>Workload management</td></tr>
<tr><td>Effective communication and coordination between all crew members including the flight crew as well as inexperienced cabin crew members, cultural differences</td></tr>
<tr><td>Leadership, co-operation, synergy, decision-making, delegation</td></tr>
<tr><td>Individual and team responsibilities, decision making, and actions</td></tr>
<tr><td>Identification and management of the passenger human factors: crowd control, passenger stress, conflict management, medical factors</td></tr>
<tr><td>Specifics related to aeroplane types (narrow / wide bodies, single / multi deck) flight crew and cabin crew composition and number of passengers</td><td>Not required</td><td>In depth</td></tr>
<tr><td colspan="6">From the perspective of the operator and the organisation</td></tr>
<tr><td>Company safety culture, SOPs, organisational factors, factors linked to the type of operations</td><td rowspan="4">Not required</td><td rowspan="3">In depth</td><td rowspan="4">Relevant to the type(s)</td><td rowspan="3">Overview (3 year cycle)</td><td rowspan="4">Reinforcement (relevant to the Senior cabin crew duties)</td></tr>
<tr><td>Effective communication and coordination with other operational personnel and ground services</td></tr>
<tr><td>Participation in cabin safety incident and accident reporting</td></tr>
<tr><td>Case based studies (see note)</td><td>Required</td><td>Required</td></tr>
</table>

3. **Table 1 CRM Training:**

Note: In Column (d), if relevant aeroplane type specific case based studies are not available, then case based studies relevant to the scale and scope of the operation shall be considered

Appendix 3 to ANTR-OPS 1.1005/1.1010/1.1015

Medical Aspects and First Aid Training

(See Appendix 1 to ANTR-OPS 1.1005)

(See Appendix 1 to ANTR-OPS 1.1010)

(See Appendix 1 to ANTR-OPS 1.1015)

(a) Medical aspects and first aid training shall include the following subjects:

(1) Physiology of flight including oxygen requirements and hypoxia;

(2) Medical emergencies in aviation including:

(i) Asthma;

(ii) Choking;

(iii) Heart attacks;

(iv) Stress reactions and allergic reactions;

(v) Shock;

(vi) Stroke;

(vii) Epilepsy;

(vii) Diabetes;

(ix) Air sickness;

(x) Hyperventilation;

(xi) Gastro-intestinal disturbances; and

(xii) Emergency childbirth;

(3) Practical cardio - pulmonary resuscitation by each cabin crew member having regard to the aeroplane environment and using a specifically designed dummy;

(4) Basic first aid and survival training including care of:

(i) The unconscious;

(ii) Burns;

(iii) Wounds; and

(iv) Fractures and soft tissue injuries;

(5) Travel health and hygiene including:

(i) The risk of contact with infectious diseases especially when operating into tropical and sub-tropical areas. Reporting of infectious diseases, protection from infection and avoidance of water-borne and food-borne illness. Training shall include the means to reduce such risks;

(ii) Hygiene on board;

(iii) Death on board;

(iv) Handling of clinical waste;

(v) Aircraft disinsection; and

(vi) Alertness management, physiological effects of fatigue, sleep physiology, circadian rhythm and time zone changes;

(6) The use of appropriate aeroplane equipment including first aid kits, emergency medical kits, first aid oxygen and emergency medical equipment.

Appendix 1 to ANTR OPS 1.1020

Refresher training

(See IEM to Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020) – Training Methods

(a) The operator shall ensure that refresher training is conducted by suitably qualified persons and, for each cabin crew member, includes at least the following:

(1) Emergency procedures including pilot incapacitation;

(2) Evacuation procedures including crowd control techniques;

(3) The operation and actual opening of each type or variant of normal and emergency exit in the normal and emergency modes, including failure of power assist systems where fitted. This is to include the action and forces required to operate and deploy evacuation slides. This training shall be conducted The operation and actual opening of all normal and emergency exits for passenger evacuation in an aeroplane or representative training device;

(4) Demonstration of the operation of all other exits including flight deck windows; and

(5) The location and handling of emergency equipment, including oxygen systems, and the donning of lifejackets, portable oxygen and protective breathing equipment.

SUBPART P – MANUALS, LOGS AND RECORDS

ANTR OPS 1.1040 General Rules for Operations Manuals

(a) The operator shall ensure that the Operations Manual contains all instructions and information necessary for operations personnel to perform their duties.

(b) The operator shall ensure that the contents of the Operations Manual, including all amendments or revisions, do not contravene the conditions contained in the Air Operator Certificate (AOC) or any applicable regulations and are acceptable to, or, where applicable, approved by, the BCAA. (See IEM OPS 1.1040(b).)

(c) Unless otherwise approved by the BCAA, the operator must prepare the Operations Manual in the English language. In addition, the operator may translate and use that manual, or parts thereof, into another language. (See IEM OPS 1.1040(c).)

(d) Should it become necessary for the operator to produce new Operations Manuals or major parts/volumes thereof, he must comply with sub-paragraph (c) above.

(e) The operator may issue an Operations Manual in separate volumes.

(f) The operator shall ensure that all operations personnel have easy access to a copy of each part of the Operations Manual which is relevant to their duties. In addition, the operator shall supply crew members with a personal copy of, or sections from, Parts A and B of the Operations Manual as are relevant for personal study.

(g) The operator shall ensure that the Operations Manual is amended or revised so that the instructions and information contained therein are kept up to date. The operator shall ensure that all operations personnel are made aware of such changes that are relevant to their duties.

(h) Each holder of an Operations Manual, or appropriate parts of it, shall keep it up to date with the amendments or revisions supplied by the operator.

(i) The operator shall supply the BCAA with intended amendments and revisions in advance of the effective date. When the amendment concerns any part of the Operations Manual which must be approved in accordance with ANTR–OPS, this approval shall be obtained before the amendment becomes effective. When immediate amendments or revisions are required in the interest of safety, they may be published and applied immediately, provided that any approval required has been applied for.

(j) The operator shall incorporate all amendments and revisions required by the BCAA.

(k) The operator must ensure that information taken from approved documents, and any amendment of such approved documentation, is correctly reflected in the Operations Manual and that the Operations Manual contains no information contrary to any approved documentation. However, this requirement does not prevent the operator from using more conservative data and procedures.

(l) The operator must ensure that the contents of the Operations Manual are presented in a form in which they can be used without difficulty. The design of the Operations Manual shall observe Human Factors principles.

(m) The operator may be permitted by the BCAA to present the Operations Manual or parts thereof in a form other than on printed paper. In such cases, an acceptable level of accessibility, usability and reliability must be assured.

(n) The use of an abridged form of the Operations Manual does not exempt the operator from the requirements of ANTR OPS 1.130.

ANTR OPS 1.1045 Operations Manual – structure and contents

(See Appendix 1 to ANTR OPS 1.1045)

(See AMC OPS 1.1045)

(a) The operator shall provide, for the use and guidance of operations personnel concerned, an operation manual in accordance with Appendix 1 to ANTR OPS 1.1045. The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be issued to all personnel that are required to use this manual.

(b) The operator shall provide a copy of the operations manual together with all amendments and/or revisions, for review and acceptance and, where required, approval by BCAA. The operator shall incorporate in the operations manual such mandatory material as the State of the Operator may require.

Note 1: Requirements for the organization and content of an operations manual are provided in Appendix 2.

Note 2: Specific items in the operations manual require the approval of the State of the Operator in accordance with the Standards with respect to Aerodrome Operating Minima, MEL, Flight Crew Training Programmes, Cabin Crew Training and Security Training.

(c) The operator shall ensure that the main structure of the Operations Manual is as follows:

Part A. *General*

This part shall comprise all non type-related operational policies, instructions and procedures needed for a safe operation.

Part B. *Aircraft operating information*

This part shall comprise all type-related instructions and procedures needed for a safe operation. It shall take account of any differences between types, variants or individual aeroplanes used by the operator.

Part C. *Area, routes and aerodromes*

This part shall comprise all instructions and information needed for the area of operation.

Part D. *Training*

This part shall comprise all training instructions for personnel required for a safe operation.

The operator shall ensure that the detailed structure of the Operations Manual is acceptable to the BCAA.

The Operations Manual shall be prepared in accordance with the Appendix 1 to ANTR OPS 1.1045.

ANTR OPS 1.1050 Aeroplane Flight Manual

The operator shall keep a current approved Aeroplane Flight Manual or equivalent document for each aeroplane by its serial number / registration that it operates. The Flight Manual must be as approved by the state of design / manufacturer and as defined by the Type Certificate accepted by BCAA for that type. This Aeroplane Flight Manual shall be updated and implemented with the changes mandated by the State of Registry.

ANTR OPS 1.1055 Journey log

(a) The operator shall retain the following information for each flight in the form of a Journey Log:

(1) Aeroplane registration;

(2) Date;

(3) Name(s) of crew member(s);

(4) Duty assignment of crew member(s);

(5) Place of departure;

(6) Place of arrival;

(7) Time of departure (off-block time);

(8) Time of arrival (on-block time);

(9) Hours of flight;

(10) Nature of flight;

(11) Incidents, observations (if any); and

(12) Commander’s signature (or equivalent). (See IEM OPS 1.1055 (a)(12).)

(b) The operator may be permitted not to keep an aeroplane journey log, or parts thereof, by the BCAA if the relevant information is available in other documentation. (See IEM OPS 1.1055(b).)

(c) The operator shall ensure that all entries are made concurrently and that they are permanent in nature.

ANTR OPS 1.1060 Operational flight plan

(a) The operator must ensure that the operational flight plan used and the entries made during flight contain the following items:

(1) Aeroplane registration;

(2) Aeroplane type and variant;

(3) Date of flight;

(4) Flight identification;

(5) Names of flight crew members;

(6) Duty assignment of flight crew members;

(7) Place of departure;

(8) Time of departure (actual off-block time, take-off time);

(9) Place of arrival (planned and actual);

(10) Time of arrival (actual landing and on-block time);

(11) Type of operation (EDTO, VFR, Ferry flight, etc.);

(12) Route and route segments with checkpoints/waypoints, distances, time and tracks;

(13) Planned cruising speed and flying times between check-points/waypoints. Estimated and actual times overhead;

(14) Safe altitudes and minimum levels;

(15) Planned altitudes and flight levels;

(16) Fuel calculations (records of in-flight fuel checks);

(17) Fuel on board when starting engines;

(18) Alternate(s) for destination and, where applicable, take-off and en-route, including information required in sub-paragraphs (12), (13), (14), and (15) above;

(19) Initial ATS Flight Plan clearance and subsequent re-clearance;

(20) In-flight re-planning calculations; and

(21) Relevant meteorological information.

(b) Items which are readily available in other documentation or from another acceptable source or are irrelevant to the type of operation may be omitted from the operational flight plan.

(c) The operator must ensure that the operational flight plan and its use are described in the Operations Manual.

(d) The operator shall ensure that all entries on the operational flight plan are made concurrently and that they are permanent in nature.

(e) The operational flight plan shall be completed for every intended flight and shall be approved by the pilot in command, and where applicable, by the flight operations officer/flight dispatcher.

(f) The operator shall determine the most efficient means of lodging the operational flight plan and a copy shall be filed with the operator or a designated agent, or, if these procedures are not possible, it shall be left with the aerodrome authority or on record in a suitable place at the point of departure.

ANTR OPS 1.1065 Document storage periods

The operator shall ensure that all records and all relevant operational and technical information for each individual flight, are stored for the periods prescribed in Appendix 1 to ANTR OPS 1.1065.

ANTR OPS 1.1070 Operator’s Airworthiness management exposition

The operator shall keep a current approved airworthiness management exposition as prescribed in ANTR M.A.704 Continuing airworthiness management exposition

ANTR OPS 1.1071 Aeroplane Technical Log

The operator shall keep an aeroplane technical log as prescribed in ANTR M.A.306 Operator’s technical log system.

Appendix 1 to ANTR OPS 1.1045

Operations Manual Contents

The operator shall ensure that the Operations Manual contains the following:

A. GENERAL

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/Authorisation.

(b) A statement that the manual contains operational instructions that are to be complied with by the relevant personnel.

(c) A list and brief description of the various parts, their contents, applicability and use.

(d) Explanations and definitions of terms and words needed for the use of the manual.

0.2 *System of amendment and revision*

(a) Details of the person(s) responsible for the issuance and insertion of amendments and revisions.

(b) A record of amendments and revisions with insertion dates and effective dates.

(c) A statement that handwritten amendments and revisions are not permitted except in situations requiring immediate amendment or revision in the interest of safety.

(d) A description of the system for the annotation of pages and their effective dates.

(e) A list of effective pages.

(f) Annotation of changes (on text pages and, as far as practicable, on charts and diagrams).

(g) Temporary revisions.

(h) A description of the distribution system for the manuals, amendments and revisions.

1 ORGANISATION AND RESPONSIBILITIES

1.1 *Organisational structure.* A description of the organisational structure including the general company organigram and operations department organigram. The organigram must depict the relationship between the Operations Department and the other Departments of the company. In particular, the subordination and reporting lines of all Divisions, Departments etc, which pertain to the safety of flight operations, must be shown.

1.2 *Nominated postholders.* The name of each nominated postholder responsible for flight operations, the maintenance system, crew training and ground operations, as prescribed in ANTR OPS 1.175(i). A description of their function and responsibilities must be included.

1.3 *Responsibilities and duties of operations management personnel.* A description of the duties, responsibilities and authority of operations management personnel pertaining to the safety of flight operations and the compliance with the applicable regulations.

1.4 *Authority, duties and responsibilities of the commander.* A statement defining the authority, duties and responsibilities of the commander.

1.5. *Duties and responsibilities of crew members other than the commander.*

2 OPERATIONAL CONTROL AND SUPERVISION

2.1 *Supervision of the operation by the operator.* A description of the system for supervision of the operation by the operator (See ANTR OPS 1.175(g)). This must show how the safety of flight operations and the qualifications of personnel are supervised. In particular, the procedures related to the following items must be described:

(a) Licence and qualification validity;

(b) Competence of operations personnel; and

(c) Control, analysis and storage of records, flight documents, additional information and data.

2.2 *System of promulgation of additional operational instructions and information.* A description of any system for promulgating information which may be of an operational nature but is supplementary to that in the Operations Manual. The applicability of this information and the responsibilities for its promulgation must be included.

2.3 *Safety Management System*. A description of the main aspects of the flight safety programme.

2.4 *Operational control.* A description of the procedures and responsibilities necessary to exercise operational control with respect to flight safety.

2.5 *Powers of the Authority.* A description of the powers of the Authority and guidance to staff on how to facilitate inspections by Authority personnel.

3 QUALITY SYSTEM

A description of the quality system adopted including at least:

(a) Quality policy;

(b) A description of the organisation of the Quality System; and

(c) Allocation of duties and responsibilities.

4 CREW COMPOSITION

4.1 *Crew Composition.* An explanation of the method for determining crew compositions taking account of the following:

(a) The type of aeroplane being used;

(b) The area and type of operation being undertaken;

(c) The phase of the flight;

(d) The minimum crew requirement and flight duty period planned;

(e) Experience (total and on type), recency and qualification of the crew members; and

(f) The designation of the flight crew/commander for each type of operation and, if necessitated by the duration of the flight, the procedures for the relief of the commander or other members of the flight crew. (See Appendix 1 to ANTR OPS 1.940)

(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 commander.* The rules applicable to the designation of the commander.

4.3 *Flight crew incapacitation.* Instructions on the succession of command in the event of flight crew incapacitation.

4.4 *Operation on more than one type.* A statement indicating which aeroplanes are considered as one type for the purpose of:

(a) Flight crew scheduling; and

(b) Cabin crew scheduling.

5 QUALIFICATION REQUIREMENTS

5.1 A description of the required licence, rating(s), qualification/competency (e.g. for routes and aerodromes), experience, training, checking and recency for operations personnel to conduct their duties. Consideration must be given to the aeroplane type, kind of operation and composition of the crew.

5.2 *Flight crew*

(a) Commander.

(b) Pilot relieving the commander.

(c) Co-pilot.

(d) Pilot under supervision.

(e) System panel operator.

(f) Operation on more than one type or variant.

5.3 *Cabin crew.*

(a) Senior cabin crew member.

(b) Cabin crew member.

(1) Required cabin crew member.

(2) Additional cabin crew member and cabin crew member during familiarisation flights.

(c) Operation on more than one type or variant.

5.4 *Training, checking and supervision personnel.*

(a) For flight crew.

(b) For cabin crew.

5.5 *Other operations personnel*

6 CREW HEALTH PRECAUTIONS

6.1 *Crew health precautions.* The relevant regulations and guidance to crew members concerning health including:

(a) Alcohol and other intoxicating liquor;

(b) Narcotics;

(c) Drugs;

(d) Sleeping tablets;

(e) Pharmaceutical preparations;

(f) Immunisation;

(g) Deep diving;

(h) Blood donation;

(i) Meal precautions prior to and during flight;

(j) Sleep and rest; and

(k) Surgical operations.

7 INFORMATION AND POLICY RELATING TO FATIGUE MANAGEMENT/FLIGHT TIME LIMITATIONS

7.1 *Flight and Duty Time Limitations and Rest Requirements.* The scheme developed by the operator in accordance with Subpart Q.

7.2 *Exceedances of flight and duty time limitations and/or reductions of rest periods.* Conditions under which flight and duty time may be exceeded or rest periods may be reduced and the procedures used to report these modifications.

8 OPERATING PROCEDURES

8.1 *Flight Preparation Instructions.* As applicable to the operation:

8.1.1 *Minimum Flight Altitudes.* A description of the method of determination and application of minimum altitudes including:

(a) A procedure to establish the minimum altitudes/flight levels for VFR flights; and

(b) A procedure to establish the minimum altitudes/flight levels for IFR flights.

8.1.2 *Criteria and responsibilities for the authorisation of the use of aerodromes taking into account the applicable requirements of Subparts D, E, F, G, H, I and J.*

8.1.3 *Methods for establishing aerodrome operating minima*. The method for establishing aerodrome operating minima for IFR flights in accordance with ANTR OPS 1 Subpart E. Reference must be made to procedures for the determination of the visibility and/or runway visual range and for the applicability of the actual visibility observed by the pilots, the reported visibility and the reported runway visual range.

8.1.4 En-route Operating Minima for VFR Flights or VFR portions of a flight and, where single engined aeroplanes are used, instructions for route selection with respect to the availability of surfaces which permit a safe forced landing.

8.1.5 *Presentation and Application of Aerodrome and En-route Operating Minima*

8.1.6 *Interpretation of meteorological information.* Explanatory material on the decoding of MET forecasts and MET reports relevant to the area of operations, including the interpretation of conditional expressions.

8.1.7 *Determination of the quantities of fuel, oil and water methanol carried.* The methods by which the quantities of fuel, oil and water methanol to be carried are determined and monitored in flight taking into account all circumstances of the operation including the possibility of loss of pressurization and the failure of one or more engines while en route. This section must also include instructions on the measurement and distribution of the fluid carried on board. Such instructions must take account of all circumstances likely to be encountered on the flight, including the possibility of in-flight replanning and of failure of one or more of the aeroplane's power plants. The system for maintaining fuel and oil records must also be described.

8.1.8 *Mass and Centre of Gravity.* The general principles of mass and centre of gravity including:

(a) Definitions;

(b) Methods, procedures and responsibilities for preparation and acceptance of mass and centre of gravity calculations;

(c) The policy for using standard and/or actual masses;

(d) The method for determining the applicable passenger, baggage and cargo mass;

(e) The applicable passenger and baggage masses for various types of operations and aeroplane type;

(f) General instruction and information necessary for verification of the various types of mass and balance documentation in use;

(g) Last Minute Changes procedures;

(h) Specific gravity of fuel, oil and water methanol; and

(i) Seating policy/procedures.

8.1.9 *ATS Flight Plan.* Procedures and responsibilities for the preparation and submission of the air traffic services flight plan. Factors to be considered include the means of submission for both individual and repetitive flight plans.

8.1.10 *Operational Flight Plan.* Specification, procedures and responsibilities for the preparation and acceptance of the operational flight plan. The use of the operational flight plan must be described including samples of the operational flight plan formats in use.

8.1.11 *Operator's Aeroplane Technical Log.* The responsibilities and the use of the operator's Aeroplane Technical Log must be described, including samples of the format used.

8.1.12 *List of documents, forms and additional information to be carried.*

8.2 *Ground Handling arrangements and procedures/Instructions*

8.2.1 *Fuelling procedures.* A description of fuelling procedures, including:

(a) Safety precautions during refuelling and defueling including when an APU is in operation or when a turbine engine is running and the prop-brakes are on;

(b) Refuelling and defueling when passengers are embarking, on board or disembarking; and

(c) Precautions to be taken to avoid mixing fuels.

8.2.2 *Aeroplane, passengers and cargo handling procedures related to safety.* A description of the handling procedures to be used when allocating seats and embarking and disembarking passengers and when loading and unloading the aeroplane. Further procedures, aimed at achieving safety whilst the aeroplane is on the ramp, must also be given. Handling procedures must include:

(a) Children/infants, sick passengers and Persons with Reduced Mobility;

(b) Transportation of inadmissible passengers, deportees or persons in custody;

(c) Permissible size and weight of hand baggage;

(d) Loading and securing of items in the aeroplane;

(e) Special loads and classification of load compartments;

(f) Positioning of ground equipment;

(g) Operation of aeroplane doors;

(h) Safety on the ramp, including fire prevention, blast and suction areas;

(i) Start-up, ramp departure and arrival procedures including push-back and towing operations;

(j) Servicing of aeroplanes;

(k) Documents and forms for aeroplane handling; and

(l) Multiple occupancy of aeroplane seats.

8.2.3 *Procedures for the refusal of embarkation.* Procedures to ensure that persons who appear to be intoxicated or who demonstrate by manner or physical indications that they are under the influence of drugs, are refused embarkation. This does not apply to medical patients under proper care.

8.2.4 *De-icing and Anti-icing on the ground.* A description of the de-icing and anti-icing policy and procedures for aeroplanes on the ground. These shall include descriptions of the types and effects of icing and other contaminants on aeroplanes whilst stationary, during ground movements and during take-off. In addition, a description of the fluid types used must be given including:

(a) Proprietary or commercial names;

(b) Characteristics;

(c) Effects on aeroplane performance;

(d) Hold-over times; and

(e) Precautions during usage.

8.3 *Flight Procedures*

8.3.1 *VFR/IFR Policy.* A description of the policy for allowing flights to be made under VFR, or of requiring flights to be made under IFR, or of changing from one to the other.

8.3.2 *Navigation Procedures.* A description of all navigation procedures relevant to the type(s) and area(s) of operation. Consideration must be given to:

(a) Standard navigational procedures including policy for carrying out independent cross-checks of keyboard entries where these affect the flight path to be followed by the aeroplane;

(b) NAT HLA and POLAR navigation and navigation in other designated areas;

(c) RNAV;

(d) In-flight replanning;

(e) Procedures in the event of system degradation; and

(f) RVSM.

8.3.3 *Altimeter setting procedures including use, where appropriate, of*

- metric altimetry and conversion tables, and

- QFE operating procedures.

8.3.4 *Altitude alerting system procedures*

8.3.5 *Ground Proximity Warning System/ Terrain Avoidance Warning System*. Procedures and instructions required for the avoidance of controlled flight into terrain, including limitations on high rate of descent near the surface (the related training requirements are covered in D.2.1).

8.3.6 *Policy, instruction, procedure and training for the avoidance of collisions and the use of TCAS/ACAS*

Note: Procedures for the operation of ACAS are contained in PANS-OPS (Doc 8168), Volume I, and in PANS-ATM (Doc 4444), Chapters 12 and 15.

8.3.7 *Policy and procedures for in-flight fuel management*

8.3.8 *Adverse and potentially hazardous atmospheric conditions.* Procedures for operating in, and/or avoiding, adverse and potentially hazardous atmospheric conditions including:

(a) Thunderstorms;

(b) Icing conditions;

(c) Turbulence;

(d) Windshear;

(e) Jetstream;

(f) Volcanic ash clouds;

(g) Heavy precipitation;

(h) Sand storms;

(i) Mountain waves; and

(j) Significant Temperature inversions.

8.3.9 *Wake Turbulence.* Wake turbulence separation criteria, taking into account aeroplane types, wind conditions and runway location.

8.3.10 *Crew members at their stations.* The requirements for crew members to occupy their assigned stations or seats during the different phases of flight or whenever deemed necessary in the interest of safety and also include procedures for controlled rest on the flight deck.

8.3.11 *Use of safety belts for crew and passengers.* The requirements for crew members and passengers to use safety belts and/or harnesses during the different phases of flight or whenever deemed necessary in the interest of safety.

8.3.12 *Admission to Flight Deck.* The conditions for the admission to the flight deck of persons other than the flight crew. The policy regarding the admission of Inspectors from the Authority must also be included.

8.3.13 *Use of vacant crew seats.* The conditions and procedures for the use of vacant crew seats.

8.3.14 *Incapacitation of crew members.* Procedures to be followed in the event of incapacitation of crew members in flight. Examples of the types of incapacitation and the means for recognising them must be included.

8.3.15 *Cabin Safety Requirements.* Procedures covering:

(a) Cabin preparation for flight, in-flight requirements and preparation for landing including procedures for securing the cabin and galleys;

(b) Procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they may best assist and not hinder evacuation from the aeroplane;

(c) Procedures to be followed during passenger embarkation and disembarkation; and

(d) Procedures when refuelling/defueling with passengers embarking, on board or disembarking.

(e) Smoking on board.

8.3.16 *Passenger briefing procedures.* The contents means and timing of passenger briefing in accordance with ANTR OPS 1.285.

8.3.17 *Procedures for aeroplanes operated whenever required cosmic or solar radiation detection equipment is carried.* Procedures for the use of cosmic or solar radiation detection equipment and for recording its readings including actions to be taken in the event that limit values specified in the Operations Manual are exceeded. In addition, the procedures, including ATS procedures, to be followed in the event that a decision to descend or re-route is taken.

8.3.18 *Policy on the use of Autopilot and Auto-throttle in general and in IMC*

Note: Instruction on the use of autopilots and auto-throttles, together with limitation on high rates of descent near the surface and instructions & training requirements for the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system (GPWS) are essential for avoidance of approach and landing accidents and controlled flight into terrain accidents.

8.3.19 *Other Policy and Procedures*. The addition of policy and procedures for the following;

(a) Implementation of Flight Manual changes made mandatory or approved by the Authority or State of Registry;

(b) Retention of Flight Recorder recording and flight recorders in safe custody pending disposition in accordance with ANTR Part VI.

(c) Standard Operating procedures for each phase of flight;

(d) Instructions on the clarification and acceptance of air traffic clearances particularly where terrain clearance is involved;

(e) Recording and reporting by flight crew on routine meteorological observations during en-route and climb phases of the flight and special and other non-routine observations during any phase of flight; and

(f) Recording and reporting by flight crew on volcanic activity.

8.3.20 *The operations procedure* shall ensure that the Commander shall not take off unless the airplane has been inspected for icing and, if necessary, has been given appropriate de-icing/anti-icing treatment and when the flight planned to be operated or expected to operate in suspected or known ground icing conditions.

8.4 *AWO.* A description of the operational procedures associated with All Weather Operations. (See also OPS Subparts D & E) including instructions and training requirements for the use of automatic landing systems, a head-up display (HUD) or equivalent displays and SVS or CVS equipment as applicable. Instructions and training requirements for the use of the EFB, as applicable.

8.5 *EDTO.* A description of the EDTO operational procedures. (See CAP 04).

8.6 *Use of the Minimum Equipment and Configuration Deviation List(s)*

8.7 *Non revenue flights.* Procedures and limitations for:

(a) Training flights;

(b) Test flights;

(c) Delivery flights;

(d) Ferry flights;

(e) Demonstration flights; and

(f) Positioning flights, including the kind of persons who may be carried on such flights.

8.8 *Oxygen Requirements*

8.8.1 An explanation of the conditions under which oxygen must be provided and used.

8.8.2 The oxygen requirements specified for:

(a) Flight crew;

(b) Cabin crew; and

(c) Passengers.

8.9 Allocation of flight crew duties and procedures for the management of crew workload during night and IMC instrument approach operations.

8.10 Information and instructions relating to the interception of civil aircraft including:
a) procedures, as prescribed in Annex 2, for pilots-in-command of intercepted aircraft; and
b) visual signals for use by intercepting and intercepted aircraft, as contained in ICAO, Annex 2.

8.11 For aeroplanes intended to be operated above 15 000 m (49 000 ft):

a) information which will enable the pilot to determine the best course of action to take in the event of exposure to solar cosmic radiation; and

b) procedures in the event that a decision to descend is taken, covering:

1) the necessity of giving the appropriate ATS unit prior warning of the situation and of obtaining a provisional descent clearance; and

2) the action to be taken in the event that communication with the ATS unit cannot be established or is interrupted.

Note: Guidance material on the information to be provided is contained in Circular 126 - Guidance Material on SST Aircraft Operations.

8.12 Details of the safety management system (SMS) provided in accordance with Chapters 3 and 4 of Annex 19.

9 DANGEROUS GOODS AND WEAPONS

9.1 Information, instructions and general guidance on the transport of dangerous goods including:

(a) Operator's policy on the transport of dangerous goods;

(b) Guidance on the requirements for acceptance, labelling, handling, stowage and segregation of dangerous goods;

(c) 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 as per ANTR OPS 1.1215; and

(f) Instructions on the carriage of the operator's employees.

9.2 The conditions under which weapons, munitions of war and sporting weapons may be carried.

10 SECURITY

10.1 Security instructions and guidance of a non-confidential nature which must include the authority and responsibilities of operations personnel. Policies and procedures for handling and reporting crime on board such as unlawful interference, sabotage, bomb threats, and hijacking must also be included.

10.2 A description of preventative security measures and training.

Note: Parts of the security instructions and guidance may be kept confidential.

10.3 The search procedure checklist provided in accordance with Chapter 13, 13.3 of ICAO Annex 6, Part-I.

11 HANDLING, NOTIFYING AND REPORTING OCCURRENCES

Procedures for the handling, notifying and reporting occurrences. This section must include:

(a) Definition of occurrences and of the relevant responsibilities of all persons involved;

(b) Illustrations of forms used for reporting all types of occurrences (or copies of the forms themselves), instructions on how they are to be completed, the addresses to which they should be sent and the time allowed for this to be done;

(c) In the event of an accident, descriptions of which company departments, Authorities and other organisations that have to be notified, how this will be done and in what sequence;

(d) Procedures for verbal notification to air traffic service units of incidents involving ACAS RAs, bird hazards, and hazardous conditions;

(e) Procedures for submitting written reports on air traffic incidents, ACAS RAs, bird strikes, dangerous goods incidents or accidents, and unlawful interference;

(f) Reporting procedures to ensure compliance with ANTR OPS 1.085(b) and 1.420. These procedures must include internal safety related reporting procedures to be followed by crew members, designed to ensure that the commander is informed immediately of any incident that has endangered, or may have endangered, safety during flight and that he is provided with all relevant information.

12 RULES OF THE AIR

Rules of the Air including:

(a) Visual and instrument flight rules;

(b) Territorial application of the Rules of the Air;

(c) Communication procedures including COM-failure procedures;

(d) Information and instructions relating to the interception of civil aeroplanes;

(e) The circumstances in which a radio listening watch is to be maintained;

(f) Signals;

(g) Time system used in operation;

(h) ATC clearances, adherence to flight plan and position reports; particularly where terrain clearance is involved;

(i) Visual signals used to warn an unauthorised aeroplane flying in or about to enter a restricted, prohibited or danger area;

(j) Procedures for pilots observing an accident or receiving a distress transmission;

(k) The ground/air visual codes for use by survivors, description and use of signal aids; and

(l) Distress and urgency signals.

Note: Refer to ICAO Annex 12 for the details of visual codes/distress signals.

13 LEASING

A description of the operational arrangements for leasing, associated procedures and management responsibilities.

B. AEROPLANE OPERATING MATTERS – TYPE RELATED

Taking account of the differences between types, and variants of types, under the following headings:

0 GENERAL INFORMATION AND UNITS OF MEASUREMENT

0.1 General Information (e.g. aeroplane dimensions), including a description of the units of measurement used for the operation of the aeroplane type concerned and conversion tables.

1 LIMITATIONS

1.1 A description of the certified limitations and the applicable operational limitations including:

(a) Certification status (e.g. CS–23, CS–25, ICAO Annex 16 (CS–36 and CS–34 etc);

(b) Passenger seating configuration for each aeroplane type including a pictorial presentation;

(c) Types of operation that are approved (e.g. VFR/IFR, CAT II/III, PBN, flights in known icing conditions etc.);

(d) Crew composition;

(e) Mass and centre of gravity;

(f) Speed limitations;

(g) Flight envelope(s);

(h) Wind limits including operations on contaminated runways;

(i) Performance limitations for applicable configurations;

(j) Runway slope;

(k) Limitations on wet or contaminated runways;

(l) Airframe contamination; and

(m) System limitations.

(n) The maximum crosswind and tailwind components for each aeroplane type operated and the reductions to be applied to these values having regard to gusts, low visibility, runway surface conditions, crew experience, use of autopilot, abnormal or emergency circumstances, or any other relevant operational factors.

2 NORMAL PROCEDURES

2.1 The normal procedures and duties assigned to the crew, the appropriate check-lists, the system for use of the check-lists and a statement covering the necessary coordination procedures between flight and cabin crew. The following normal procedures and duties must be included:

(a) Pre-flight;

(b) Pre-departure;

(c) Altimeter setting and checking;

(d) Taxi, Take-Off and Climb;

(e) Noise abatement;

(f) Cruise and descent;

(g) Briefing on departure, Approach, Landing preparation and briefing;

(h) VFR Approach;

(i) Instrument approach;

(j) Visual Approach and circling;

(k) Missed Approach;

(l) Normal Landing;

(m) Post Landing; and

(n) Operation on wet and contaminated runways.

(o) Where relevant to the operations,

(i) the long-range navigation procedures,

(ii) engine failure procedure for EDTO and

(v) the nomination and utilization of diversion aerodromes.

(p) familiarization with areas, routes and aerodromes.

3 ABNORMAL AND EMERGENCY PROCEDURES

3.1 The abnormal and emergency procedures and duties assigned to the crew, the appropriate check-lists, the system for use of the check-lists and a statement covering the necessary co-ordination procedures between flight and cabin crew. The following abnormal and emergency procedures and duties must be included:

(a) Crew Incapacitation;

(b) Fire and Smoke Drills;

(c) Unpressurised and partially pressurised flight;

(d) Exceeding structural limits such as overweight landing;

(e) Exceeding cosmic radiation limits;

(f) Lightning Strikes;

(g) Distress Communications and alerting ATC to Emergencies;

(h) Engine failure;

(i) System failures;

(j) Guidance for Diversion in case of Serious Technical Failure;

(k) Ground Proximity Warning;

(l) TCAS Warning;

(m) Windshear;

(n) Emergency Landing/Ditching; and

(o) Departure Contingency Procedures

(p) Conditions required to commence or to continue an instrument approach.

4 PERFORMANCE

4.0 Performance data must be provided in a form in which it can be used without difficulty.

4.1 *Performance data.* Performance material which provides the necessary data for compliance with the performance requirements prescribed in ANTR OPS 1 Subparts F, G, H and I must be included to allow the determination of:

(a) Take-off climb limits – Mass, Altitude, Temperature;

(b) Take-off field length (dry, wet, contaminated);

(c) Net flight path data for obstacle clearance calculation or, where applicable, take-off flight path;

(d) The gradient losses for banked climb outs;

(e) En-route climb limits;

(f) Approach climb limits;

(g) Landing climb limits;

(h) Landing field length (dry, wet, contaminated) including the effects of an in-flight failure of a system or device, if it affects the landing distance;

(i) Brake energy limits; and

(j) Speeds applicable for the various flight stages (also considering wet or contaminated runways).

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

4.1.1. *Supplementary data covering flights in icing conditions.* Any certificated performance related to an allowable configuration, or configuration deviation, such as anti-skid inoperative, must be included.

4.1.2. If performance Data, as required for the appropriate performance class, is not available in the approved AFM, then other data acceptable to the BCAA must be included. Alternatively, the Operations Manual may contain cross-reference to the approved Data contained in the AFM where such Data is not likely to be used often or in an emergency.

4.2 *Additional Performance Data.* Additional performance data where applicable including:

(a) All engine climb gradients;

(b) Drift-down data;

(c) Effect of de-icing/anti-icing fluids;

(d) Flight with landing gear down;

(e) For aeroplanes with 3 or more engines, one engine inoperative ferry flights; and

(f) Flights conducted under the provisions of the CDL.

5 FLIGHT PLANNING

5.1 Data and instructions necessary for pre-flight and in-flight planning with different speed schedules and power settings. Where applicable, procedures for engine(s)-out operations, EDTO (particularly the one-engine-inoperative cruise speed and maximum distance to an adequate aerodrome determined in accordance with ANTR OPS 1.245) and flights to isolated aerodromes must be included.

5.2 The method for calculating fuel needed for the various stages of flight, in accordance with ANTR OPS 1.255.

6 MASS AND BALANCE CONTROL

Instructions and data for the calculation of the mass and balance including:

(a) Calculation system (e.g. Index system);

(b) Information and instructions for completion of mass and balance documentation, including manual and computer generated types;

(c) Limiting masses and centre of gravity for the types, variants or individual aeroplanes used by the operator; and

(d) Dry Operating mass and corresponding centre of gravity or index.

7 LOADING

Procedures and provisions for loading and securing the load in the aeroplane.

8 CONFIGURATION DEVIATION LIST

The Configuration Deviation List(s) (CDL), if provided by the manufacturer, taking account of the aeroplane types and variants operated including procedures to be followed when an aeroplane is being despatched under the terms of its CDL.

9 A LIST OF THE NAVIGATIONAL EQUIPMENT TO BE CARRIED INCLUDING ANY REQUIREMENTS RELATING TO OPERATIONS WHERE PERFORMANCE-BASED NAVIGATION IS PRESCRIBED.

10 MINIMUM EQUIPMENT LIST

The Minimum Equipment List (MEL) and configuration deviation list taking account of the aeroplane types and variants operated and the type(s)/area(s) of operation/specific operations authorised. The MEL must include the navigational equipment and take into account the required performance-based navigation for the route and area of operation prescribed.

11 SURVIVAL AND EMERGENCY EQUIPMENT INCLUDING OXYGEN

11.1 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 instruction for the use of survival and emergency equipment and its associated check list(s) must also be included.

11.2 The condition under which oxygen shall be used and procedure for determining the amount of oxygen required and the quantity that is available. The flight profile, number of occupants and possible cabin decompression must be considered. The information provided must be in a form in which it can be used without difficulty. Refer to ANTR OPS 1.770 for details on Oxygen requirement.

12 EMERGENCY EVACUATION PROCEDURES

12.1 Instructions forEmergency evacuation procedures, including type-specific procedures, crew coordination, assignment of crew’s emergency positions and the emergency duties assigned to each crew member.

12.2 *Emergency evacuation procedures.* The normal, abnormal and emergency procedures to be used by the cabin crew, the checklists relating thereto and aircraft systems information as required, including a statement related to the necessary procedures for the coordination between flight and cabin crew.

13 AEROPLANE SYSTEMS

A description of the aeroplane systems, related controls and indications and operating instructions.

C. ROUTE AND AERODROME INSTRUCTIONS AND INFORMATION

1 Instructions and information relating to communications, navigation and aerodromes including minimum flight levels and altitudes for each route to be flown and operating minima for each aerodrome planned to be used, including:

(a) Minimum flight level/altitude for each route to be flown;

(b) Operating minima for departure, destination and alternate aerodromes, the increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities;

(c) Instructions for determining aerodrome operating minima for instrument approaches using eligible equipment for operational credit.

(c) Communication facilities and navigation aids;

(d) Runway data and aerodrome facilities;

(e) Approach/stabilised approach, precision, non-precision instrument approach, missed approach and departure/instrument departure procedures including noise abatement procedures;

(f) shall contain the procedure for the operations to ensure that an aeroplane being used to conduct 3D instrument approach operations crosses the threshold by a safe margin, with aeroplane in the landing configuration and attitude.

(g) COM-failure procedures;

(h) Search and rescue facilities in the area over which the aeroplane is to be flown;

(i) Information related to the level of RFFS (Rescue and Fire Fighting Services) protection that is deemed acceptable by the operator shall be contained in the Operations Manual.

(j) A description of the aeronautical charts that must be carried on board in relation to the type of flight and the route to be flown, including the method to check their validity;

(k) Availability of aeronautical information and MET services;

(l) En-route COM/NAV procedures;

(m) Aerodrome categorisation for flight crew competence qualification (See AMC OPS 1.975); and

(n) Special aerodrome limitations (performance limitations and operating procedures etc.).

(o) Instructions on the maintenance of altitude awareness and the use of automated or flight crew altitude call-out.

(p) Where relevant to the operations,

(i) the long-range navigation procedures,

(ii) engine failure procedure for EDTO and

(iii) the nomination and utilization of diversion aerodromes.

(q) familiarization with areas, routes and aerodromes.

(r) The necessary information for compliance with all flight profiles required by regulations, including but not limited to, the determination of:

1) take-off runway length requirements for dry, wet and contaminated conditions, including those dictated by system failures which affect the take-off distance;

2) take-off climb limitations;

3) en-route climb limitations;

4) approach climb limitations and landing climb limitations;

5) landing runway length requirements for dry, wet and contaminated conditions, including systems failures which affect the landing distance; and

6) supplementary information, such as tire speed limitations.

D. TRAINING

1 The operator shall establish and maintain a ground and flight training programme, approved by the BCAA, which ensures that all flight crew members are adequately trained to perform their assigned duties. The training programme shall:

(a) include ground and flight training facilities and properly qualified instructors as determined by the State of the Operator;

(b) consist of ground and flight training in the type(s) of aeroplane on which the flight crew member serves;

(c) include proper flight crew coordination and training in all types of emergency and abnormal situations or procedures caused by engine, airframe or systems malfunctions, fire or other abnormalities;

(d) include upset prevention and recovery training;

(e) include training in knowledge and skills related to visual and instrument flight procedures for the intended area of operation, charting, human performance including threat and error management and in the transport of dangerous goods;

(f) ensure that all flight crew members know the functions for which they are responsible and the relation of these functions to the functions of other crew members, particularly in regard to abnormal or emergency procedures; and

(g) be given on a recurrent basis, as determined by BCCA and shall include an assessment of competence.

Note 1: The in-flight simulation of emergency or abnormal situations are prohibited when passengers or cargo are being carried.

Note 2: Flight training may, to the extent deemed appropriate by BCCA, be given in flight simulation training devices approved by BCAA for that purpose.

Note 3: The scope of the recurrent training on flight crew member emergency duties may be varied and need not be as extensive as the initial training given in a particular type of aeroplane.

Note 4: The use of correspondence courses and written examinations as well as other means may, to the extent deemed feasible by BCCA, be utilized in meeting the requirements for periodic ground training.

Note 5: For more information on dangerous goods operational requirements, see Chapter 14 of ICAO Annex 6, Part-I.

Note 6: Guidance material to design training programmes to develop knowledge and skills in human performance can be found in the Human Factors Training Manual (Doc 9683).

Note 7: Information for pilots and flight operations personnel on flight procedure parameters and operational procedures is contained in PANS-OPS (Doc 8168), Volume I. Criteria for the construction of visual and instrument flight procedures are contained in PANS-OPS (Doc 8168), Volume II. Obstacle clearance criteria and procedures used in certain States may differ from PANS-OPS, and knowledge of these differences is important for safety reasons.

Note 8: Guidance material to design flight crew training programmes can be found in the Manual of Evidence-based Training (Doc 9995).

Note 9: Guidance material on the different means used to assess competence can be found in the Attachment to Chapter 2 of the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868).

Note 10: Procedures for upset prevention and recovery training in a flight simulation training device are contained in the Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868).

Note 11: Guidance on upset prevention and recovery training in a flight simulation training device is contained in the Manual on Aeroplane Upset Prevention and Recovery Training (Doc 10011).

2 The requirement for recurrent flight training in a particular type of aeroplane shall be considered fulfilled by:

(a) the use, to the extent deemed feasible by the State of the Operator, of flight simulation training devices approved by BCAA for that purpose; or

(b) the completion within the appropriate period of the proficiency check required in that type of aeroplane

3 Training syllabi and checking programmes must include:

3.1 *For flight crew.* All relevant items prescribed in Subparts E and N;

3.2 *For cabin crew.* All relevant items prescribed in Subpart O;

3.3 *For operations personnel concerned, including crew members:*

(a) All relevant items prescribed in Subpart R (Transport of Dangerous Goods by Air); and

(b) All relevant items prescribed in Subpart S (Security).

3.4 *For operations personnel other than crew members (e.g. dispatcher, handling personnel etc.).* All other relevant items prescribed in OPS pertaining to their duties.

4 *Procedures*

4.1 Procedures for training and checking.

4.2 Procedures to be applied in the event that personnel do not achieve or maintain the required standards.

4.3 Procedures to ensure that abnormal or emergency situations requiring the application of part or all of abnormal or emergency procedures and simulation of IMC by artificial means, are not simulated during commercial air transportation flights.

5 Description of documentation to be stored and storage periods. (See Appendix 1 to ANTR OPS 1.1065.)

Appendix 1 to ANTR OPS 1.1065

Document storage periods

The operator shall ensure that the following information/documentation is stored in an acceptable form, accessible to the BCAA, for the periods shown in the Tables below.

Note: Additional information relating to maintenance records is prescribed in ANTR M.A.306(c) - Operator's technical log system.

Table 1 – Information used for the preparation and execution of a flight

Information used for the preparation and execution of the flight as described in ANTR OPS 1.135	
Operational flight plan	3 months
Aeroplane Technical log	24 months after the date of the last entry
Route specific NOTAM/AIS briefing documentation if edited by the operator	3 months
Mass and balance documentation	3 months
Notification of special loads including written information to the commander about dangerous goods	3 months

Table 2 – Reports/Records

Journey log	6 months
Flight report(s) for recording details of any occurrence, as prescribed in ANTR OPS 1.420, or any event which the commander deems necessary to report/record	3 months
Reports on exceedances of duty and/or reducing rest periods	3 months
Fuel and oil records	3 months

Table 3 – Flight crew records

Flight Crew Records	
Flight, Duty and Rest time	24 months
Licence	As long as the flight crew member is exercising the privileges of the licence for the operator
Conversion training and checking	3 years
Command course (including checking)	3 years

Recurrent training and checking	3 years
Training and checking to operate in either pilot's seat	3 years
Recent experience (ANTR OPS 1.970 refers)	15 months
Route and aerodrome competence (ANTR OPS 1.975 refers)	3 years
Training and qualification for specific operations when required by OPS (e.g. EDTO CATII/III operations)	3 years
Dangerous Goods training as appropriate	3 years

Table 4 – Cabin crew records

Cabin Crew Records	
Flight, Duty and Rest Time Initial training, conversion and differences training (including checking)	24 months As long as the cabin crew member is employed by the operator
Recurrent training and refresher (including checking)	Until 12 months after the cabin crew member has left the employ of the operator
Dangerous Goods training as appropriate	3 years

Table 5 – Records for other operations personnel

Records for other operations personnel	
Training/qualification records of other personnel for whom an approved training programme is required by ANTR–OPS	Last 2 training records

Table 6 – Other records

Other Records	
Records on cosmic and solar radiation dosage	Until 12 months after the crew member has left the employ of the operator
Quality System records	5 years
Dangerous Goods Transport Document	3 months after completion of the flight
Dangerous Goods Acceptance Checklist	3 months after completion of the flight

SUBPART Q FTL – FLIGHT AND DUTY TIME LIMITATIONS AND REST REQUIREMENTS

ANTR OPS FTL 1.1100 Scope

This Subpart establishes the requirements to be met by an operator and its crew members with regard to flight and duty time limitations and rest requirements for crew members under prescriptive methodology.

ANTR OPS FTL CS 1.1100 Applicability

The Certification Specifications are applicable to commercial air transport operations.

The BCAA has introduced the subject regulations, based upon scientific principles, knowledge and operational experience, specifying the limitations applicable to the flight time and flight duty periods for crew members as encompassed by ICAO through their studies and research. This regulations establishes the Flight Time, Flight Duty Time, Duty Period, adequate Rest Period and when authorized, the operators to manage the **Fatigue Risk Management System** (FRMS) to ensure that fatigue occurring either in a flight or successive flights, or accumulated over a period of time due to these and other tasks, does not endanger the safety of a flight.

ANTR OPS FTL 1.1105 Definitions

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

(1) 'acclimatised' means a state in which a crew member's circadian biological clock is synchronised to the time zone where the crew member is. A crew member is considered to be acclimatised to a 2-hour wide time zone surrounding the local time at the point of departure. When the local time at the place where a duty commences differs by more than 2 hours from the local time at the place where the next duty starts, the crew member, for the calculation of the maximum daily flight duty period, is considered to be acclimatised in accordance with the values in the Table 1.

Table 1

Time difference (h) between reference time and local time where the crew member starts the next duty	**Time elapsed since reporting at reference time**				
	<48	**48–71:59**	**72–95:59**	**96–119:59**	**≥120**
< 4	B	D	D	D	D
≤6	B	X	D	D	D
≤9	B	X	X	D	D
≤12	B	X	X	X	D

'B' means acclimatised to the local time of the departure time zone,

'D' means acclimatised to the local time where the crew member starts his/her next duty, and

'X' means that a crew member is in an unknown state of acclimatisation.

(2) 'reference time' means the local time at the reporting point situated in a 2-hour wide time zone band around the local time where a crew member is acclimatised;

(3) ‘accommodation’ means, for the purpose of standby and split duty, a quiet and comfortable place not open to the public with the ability to control light and temperature, equipped with adequate furniture that provides a crew member with the possibility to sleep, with enough capacity to accommodate all crew members present at the same time and with access to food and drink;

(4) ‘suitable accommodation’ means, for the purpose of standby, split duty and rest, a separate room for each crew member located in a quiet environment and equipped with a bed, which is sufficiently ventilated, has a device for regulating temperature and light intensity, and access to food and drink;

(5) ‘augmented flight crew’ means a flight crew which comprises more than the minimum number required to operate the aircraft, allowing each flight crew member to leave the assigned post, for the purpose of in-flight rest, and to be replaced by another appropriately qualified flight crew member;

(6) ‘break’ means a period of time within an flight duty period, shorter than a rest period, counting as duty and during which a crew member is free of all tasks;

(7) ‘delayed reporting’ means the postponement of a scheduled FDP by the operator before a crew member has left the place of rest;

(8) ‘disruptive schedule’ means a crew member’s roster which disrupts the sleep opportunity during the optimal sleep time window by comprising an FDP or a combination of FDPs which encroach, start or finish during any portion of the day or of the night where a crew member is acclimatised. A schedule may be disruptive due to early starts, late finishes or night duties.

(a) ‘early type’ of disruptive schedule means:

(i) for ‘early start’ a duty period starting in the period between 05:00 and 05:59 in the time zone to which a crew member is acclimatised, and

(ii) for ‘late finish’ a duty period finishing in the period between 23:00 and 01:59 in the time zone to which a crew member is acclimatised;

(b) ‘late type’ of disruptive schedule means:

(i) for ‘early start’ a duty period starting in the period between 05:00 and 06:59 in the time zone to which a crew member is acclimatised; and

(ii) for ‘late finish’ a duty period finishing in the period between 00:00 and 01:59 in the time zone to which a crew member is acclimatised;

(9) ‘night duty’ means a duty period encroaching any portion of the period between 02:00 and 04:59 in the time zone to which the crew is acclimatised;

(10) ‘duty’ means any task that a crew member performs for the operator, including flight duty, administrative work, giving or receiving training and checking, positioning, and some elements of standby;

(11) ‘duty period’ means a period which starts when a crew member is required by an operator to report for or to commence a duty and ends when that person is free of all duties, including post- flight duty;

(12) ‘flight duty period ('FDP')’ means a period that commences when a 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 crew member acts as an operating crew member;

(13) ‘flight time’ means, for aeroplanes and touring motor gliders, the time between an aircraft 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 shut down.

(14) ‘home base’ means the location, assigned by the operator to the crew member, from where the crew member normally starts and ends a duty period or a series of duty periods and where, under normal circumstances, the operator is not responsible for the accommodation of the crew member concerned;

(15) ‘local day’ means a 24-hour period commencing at 00:00 local time;

(16) ‘local night’ means a period of 8 hours falling between 22:00 and 08:00 local time;

(17) ‘operating crew member’ means a crew member carrying out duties in an aircraft during a sector;

(18) ‘positioning’ means the transferring of a non-operating crew member from one place to another, at the behest of the operator, excluding:

– the time of travel from a private place of rest to the designated reporting place at home base and vice versa, and

– the time for local transfer from a place of rest to the commencement of duty and vice versa;

(19) ‘rest facility’ means a bunk or seat with leg and foot support suitable for crew members' sleeping on board an aircraft.

(20) ‘reserve’ means a period of time during which a crew member is required by the operator to be available to receive an assignment for an FDP, positioning or other duty notified at least 10 hours in advance.

(21) ‘rest period’ means a continuous, uninterrupted and defined period of time, following duty or prior to duty, during which a crew member is free of all duties, standby and reserve.

(22) ‘rotation’ is a duty or a series of duties, including at least one flight duty, and rest periods out of home base, starting at home base and ending when returning to home base for a rest period where the operator is no longer responsible for the accommodation of the crew member.

(23) ‘single day free of duty’ means, a time free of all duties and standby consisting of one day and two local nights, which is notified in advance. A rest period may be included as part of the single day free of duty.

(24) ‘sector’ means the segment of an FDP between an aircraft first moving for the purpose of taking off until it comes to rest after landing on the designated parking position.

(25) ‘standby’ means a pre-notified and 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.

(26) ‘airport standby’ means a standby performed at the airport;

(27) ‘other standby’ means a standby either at home or in a suitable accommodation;

(28) ‘window of circadian low ('WOCL') means the period between 02:00 and 05:59 hours in the time zone to which a crew member is acclimatised.

(29) ‘Certification Specifications’ (CS) means technical standards adopted by the Agency indicating means to show compliance with Regulation (EC) No 216/2008 and its Implementing Rules and which can be used by an organisation for the purpose of certification.

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

ANTR OPS FTL 1.1110 Operator Responsibilities

An operator shall:

(a) publish duty rosters sufficiently in advance to provide the opportunity for crew members to plan adequate rest;

(b) ensure that flight duty periods are planned in a way that enables crew members to remain sufficiently free from fatigue so that they can operate to a satisfactory level of safety under all circumstances;

(c) specify reporting times that allow sufficient time for ground duties;

(d) take into account the relationship between the frequency and pattern of flight duty periods and rest periods and give consideration to the cumulative effects of undertaking long duty hours combined with minimum rest periods;

(e) allocate duty patterns which avoid practices that cause a serious disruption of an established sleep/work pattern, such as alternating day/night duties;

(f) comply with the provisions concerning disruptive schedules in accordance with the definitions of "early type" and "late type" [defined at ANTR OPS FTL 1.1105, Para (8) (a & b)] of disruptive schedules;

(g) provide rest periods of sufficient time to enable crew members to overcome the effects of the previous duties and to be rested by the start of the following flight duty period;

(h) plan recurrent extended recovery rest periods and notify crew members sufficiently in advance;

(i) plan flight duties in order to be completed within the allowable flight duty period taking into account the time necessary for pre-flight duties, the sector and turnaround times;

(j) change a schedule and/or crew arrangement if the actual operation exceeds the maximum flight duty period on more than 33% of the flight duties in that schedule during a scheduled seasonal period.

ANTR OPS FTL 1.1115 Crew Member Responsibilities

Crew members shall:

(a) 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;

(b) 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;

(c) comply with the relevant requirements of the operator's occurrence reporting schemes in specific to ensuring that the remedial action necessary to maintain an acceptable level of safety is implemented, in accordance with ANTR OPS 1.037(a) (2);

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

(e) 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. and

(f) make optimum use of the opportunities and facilities for rest provided and plan and use their rest periods properly.

A crew member shall not act as a member of the crew of an aircraft if he knows or suspects that he is suffering from, or, having regard to the circumstances of the flight to be undertaken, is likely to suffer from, such fatigue as may endanger the safety of the aircraft or of its occupants.

ANTR OPS FTL 1.1120 Fatigue Risk Management (FRM)

(a) When FRM is required by this Subpart or an applicable certification specification, the operator shall establish, implement and maintain a FRM as an integral part of its management system. The FRM shall ensure compliance with the essential requirements that -

No crew member must allow their task achievement/decision making to deteriorate to the extent that flight safety is endangered because of the effects of fatigue, taking into account, inter alia, fatigue accumulation, sleep deprivation, number of sectors flown, night duties or time zone changes. Rest periods must provide sufficient time to enable crew members to overcome the effects of the previous duties and to be well rested by the start of the following flight duty period.

A crew member must not perform allocated duties on board an aircraft when under the influence of psychoactive substances or alcohol or when unfit due to injury, fatigue, medication, sickness or other similar causes.

The prevention of fatigue must be managed through a rostering system. For a flight, or series of flights, such a rostering system needs to address flight time, flight-duty periods, duty and adapted rest periods. Limitations established within the rostering system must take into account all relevant factors contributing to fatigue such as, in particular, number of sectors flown, time-zone crossing, sleep deprivation, disruption of circadian cycles, night hours, positioning, cumulative duty time for given periods of time, sharing of allocated tasks between crew members, and also the provision of augmented crews.

The FRM shall be described in the operations manual.

(b) The FRM established, implemented and maintained shall provide for continuous improvement to the overall performance of the FRM and shall include:

(1) a description of the philosophy and principles of the operator with regard to FRM, referred to as the FRM policy;

(2) documentation of the FRM processes, including a process for making personnel aware of their responsibilities and the procedure for amending this documentation;

(3) scientific principles and knowledge;

(4) a hazard identification and risk assessment process that allows managing the operational risk(s) of the operator arising from crew member fatigue on a continuous basis;

(5) a risk mitigation process that provides for remedial actions to be implemented promptly, which are necessary to effectively mitigate the operator's risk(s) arising from crew member fatigue and for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions;

(6) FRM safety assurance processes;

(7) FRM promotion processes.

(c) The FRM shall correspond to the flight time specification scheme, the size of the operator and the nature and complexity of its activities, taking into account the hazards and associated risks inherent in those activities and the applicable flight time specification scheme.

(d) The operator shall take mitigating actions when the FRM safety assurance process shows that the required safety performance is not maintained.

ANTR OPS FTL 1.1125 Flight Time Specification Scheme

(a) Operators shall establish, implement and maintain flight time specification schemes that are appropriate for the type(s) of operation performed and that comply with this Subpart and other applicable regulations.

(b) Before being implemented, flight time specification schemes, including any related FRM where required, shall be approved by BCAA.

(c) To demonstrate compliance with this Subpart, the operator shall apply to BCAA.

ANTR OPS FTL 1.1200 Home Base

An operator shall assign a home base to each crew member.

ANTR OPS FTL CS 1.1200 Home Base

(a) The home base is a single airport location assigned with a high degree of permanence.

(b) In the case of a change of home base, the first recurrent extended recovery rest period prior to starting duty at the new home base is increased to 72 hours, including 3 local nights. Travelling time between the former home base and the new home base is positioning.

ANTR OPS FTL 1.1205 Flight Duty Period (FDP)

(a) The operator shall:

(1) define reporting times appropriate to each individual operation taking into account ANTR OPS FTL 1.1110(c);

(2) establish procedures specifying how the commander shall, in case of special circumstances which could lead to severe fatigue, and after consultation with the crew members concerned, reduce the actual FDP and/or increase the rest period in order to eliminate any detrimental effect on flight safety.

(b) Basic maximum daily FDP.

(1) The maximum daily FDP without the use of extensions for acclimatised crew members shall be in accordance with the following table:

Table 2

Maximum daily FDP — Acclimatised crew members

Start of FDP at reference time	**1–2 Sectors**	**3 Sectors**	**4 Sectors**	**5 Sectors**	**6 Sectors**	**7 Sectors**	**8 Sectors**	**9 Sectors**	**10 Sectors**
0600–1329	13:00	12:30	12:00	11:30	11:00	10:30	10:00	09:30	09:00
1330–1359	12:45	12:15	11:45	11:15	10:45	10:15	09:45	09:15	09:00
1400–1429	12:30	12:00	11:30	11:00	10:30	10:00	09:30	09:00	09:00
1430–1459	12:15	11:45	11:15	10:45	10:15	09:45	09:15	09:00	09:00
1500–1529	12:00	11:30	11:00	10:30	10:00	09:30	09:00	09:00	09:00
1530–1559	11:45	11:15	10:45	10:15	09:45	09:15	09:00	09:00	09:00
1600–1629	11:30	11:00	10:30	10:00	09:30	09:00	09:00	09:00	09:00
1630–1659	11:15	10:45	10:15	09:45	09:15	09:00	09:00	09:00	09:00
1700–0459	11:00	10:30	10:00	09:30	09:00	09:00	09:00	09:00	09:00
0500–0514	12:00	11:30	11:00	10:30	10:00	09:30	09:00	09:00	09:00
0515–0529	12:15	11:45	11:15	10:45	10:15	09:45	09:15	09:00	09:00
0530–0544	12:30	12:00	11:30	11:00	10:30	10:00	09:30	09:00	09:00
0545–0559	12:45	12:15	11:45	11:15	10:45	10:15	09:45	09:15	09:00

(2) The maximum daily FDP when crew members are in an unknown state of acclimatisation shall be in accordance with the following table:

Table 3

Crew members in an unknown state of acclimatisation

Maximum daily FDP according to sectors						
1–2	3	4	5	6	7	8
11:00	10:30	10:00	09:30	09:00	09:00	09:00

(3) The maximum daily FDP when crew members are in an unknown state of acclimatisation and the operator has implemented a FRM, shall be in accordance with the following table:

Table 4

Crew members in an unknown state of acclimatisation under FRM

The value in the following table may apply provided the operator's FRM continuously monitors that the required safety performance is maintained.

Maximum daily FDP according to sectors						
1–2	3	4	5	6	7	8
12:00	11:30	11:00	10:30	10:00	09:30	09:00

(c) FDP with different reporting time for flight crew and cabin crew.

Whenever cabin crew requires more time than the flight crew for their pre-flight briefing for the same sector or series of sectors, the FDP of the cabin crew may be extended by the difference in reporting time between the cabin crew and the flight crew. The difference shall not exceed 1 hour. The maximum daily FDP for cabin crew shall be based on the time at which the flight crew report for their FDP, but the FDP shall start at the reporting time of the cabin crew.

(d) Maximum daily FDP for acclimatised crew members with the use of extensions without in-flight rest.

(1) The maximum daily FDP may be extended by up to 1 hour not more than twice in any 7 consecutive days. In that case:

(i) the minimum pre-flight and post-flight rest periods shall be increased by 2 hours; or

(ii) the post-flight rest period shall be increased by 4 hours.

(2) When extensions are used for consecutive FDPs, the additional pre- and post-flight rest between the two extended FDPs required under subparagraph 1 shall be provided consecutively.

(3) The use of the extension shall be planned in advance, and shall be limited to a maximum of:

(i) 5 sectors when the WOCL is not encroached; or

(ii) 4 sectors, when the WOCL is encroached by 2 hours or less; or

(iii) 2 sectors, when the WOCL is encroached by more than 2 hours.

(4) Extension of the maximum basic daily FDP without in-flight rest shall not be combined with extensions due to in-flight rest or split duty in the same duty period.

(5) Flight time specification schemes shall specify the limits for extensions of the maximum basic daily FDP in accordance with the certification specifications applicable to the type of operation, taking into account:

(i) the number of sectors flown; and

(ii) WOCL encroachment.

(e) Maximum daily FDP with the use of extensions due to in-flight rest.

Flight time specification schemes shall specify the conditions for extensions of the maximum basic daily FDP with in-flight rest in accordance with the certification specifications applicable to the type of operation, taking into account:

(1) the number of sectors flown;

(2) the minimum in-flight rest allocated to each crew member;

(3) the type of in-flight rest facilities; and

(4) the augmentation of the basic flight crew.

(f) Unforeseen circumstances in flight operations — commander’s discretion.

(1) The conditions to modify the limits on flight duty, duty and rest periods by the commander in the case of unforeseen circumstances in flight operations, which start at or after the reporting time, when not in home base shall comply with the following:

(i) the maximum daily FDP which results after applying points (b) and (e) of point ANTR OPS FTL 1.1205 or point ANTR OPS FTL 1.1220 may not be increased by more than 2 hours unless the flight crew has been augmented, in which case the maximum flight duty period may be increased by not more than 3 hours;

(ii) if on the final sector within an FDP the allowed increase is exceeded because of unforeseen circumstances after take-off, the flight may continue to the planned destination or alternate aerodrome; and

(iii) the rest period following the FDP may be reduced but can never be less than 10 hours.

(2) In case of unforeseen circumstances which could lead to severe fatigue, the commander shall reduce the actual flight duty period and/or increase the rest period in order to eliminate any detrimental effect on flight safety.

(3) The commander shall consult all crew members on their alertness levels before deciding the modifications under subparagraphs 1 and 2.

(4) The commander shall submit a report to the operator when an FDP is increased or a rest period is reduced at his or her discretion.

(5) Where the increase of an FDP or reduction of a rest period exceeds 1 hour, a copy of the report, to which the operator shall add its comments, shall be sent by the operator to the competent authority not later than 28 days after the event.

(6) The operator shall implement a non-punitive process for the use of the discretion described under this provision and shall describe it in the operations manual.

(g) Unforeseen circumstances in flight operations — delayed reporting.

The operator shall establish procedures, in the operations manual, for delayed reporting in the event of unforeseen circumstances, in accordance with the certification specifications applicable to the type of operation.

ANTR OPS FTL CS 1.1205 Flight Duty Period (FDP)

(a) Night duties under the provisions of ANTR OPS FTL 1.1205 (b) and (d) comply with the following:

(1) When establishing the maximum FDP for consecutive night duties, the number of sectors is limited to 4 sectors per duty.

(2) The operator applies appropriate fatigue risk management to actively manage the fatiguing effect of night duties of more than 10 hours in relation to the surrounding duties and rest periods.

(b) Extension of FDP without in-flight rest

The extension of FDP without in-flight rest under the provisions of ANTR OPS FTL 1.1205 (d)(5) is limited to the values specified in the table below.

Maximum daily FDP with extension

Starting time of FDP	1–2 sectors (in hours)	3 sectors (in hours)	4 sectors (in hours)	5 sectors (in hours)
0600–0614	Not allowed	Not allowed	Not allowed	Not allowed
0615–0629	13:15	12:45	12:15	11:45
0630–0644	13:30	13:00	12:30	12:00
0645–0659	13:45	13:15	12:45	12:15
0700–1329	14:00	13:30	13:00	12:30
1330–1359	13:45	13:15	12:45	Not allowed
1400–1429	13:30	13:00	12:30	Not allowed
1430–1459	13:15	12:45	12:15	Not allowed
1500–1529	13:00	12:30	12:00	Not allowed
1530–1559	12:45	Not allowed	Not allowed	Not allowed
1600–1629	12:30	Not allowed	Not allowed	Not allowed
1630–1659	12:15	Not allowed	Not allowed	Not allowed
1700–1729	12:00	Not allowed	Not allowed	Not allowed
1730–1759	11:45	Not allowed	Not allowed	Not allowed
1800–1829	11:30	Not allowed	Not allowed	Not allowed
1830–1859	11:15	Not allowed	Not allowed	Not allowed
1900–0359	Not allowed	Not allowed	Not allowed	Not allowed
0400–0414	Not allowed	Not allowed	Not allowed	Not allowed
0415–0429	Not allowed	Not allowed	Not allowed	Not allowed
0430–0444	Not allowed	Not allowed	Not allowed	Not allowed
0445–0459	Not allowed	Not allowed	Not allowed	Not allowed
0500–0514	Not allowed	Not allowed	Not allowed	Not allowed
0515–0529	Not allowed	Not allowed	Not allowed	Not allowed
0530–0544	Not allowed	Not allowed	Not allowed	Not allowed
0545–0559	Not allowed	Not allowed	Not allowed	Not allowed

(c) Extension of FDP due to in-flight rest

In-flight rest facilities in accordance with ANTR OPS FTL 1.1205 (e)(iii) fulfill the following minimum standards:

— 'Class 1 rest facility' means a bunk or other surface that allows for a flat or near flat sleeping position. It reclines to at least 80° back angle to the vertical and is located separately from both the flight crew compartment and the passenger cabin in an area that allows the crew member to control light, and provides isolation from noise and disturbance;

— 'Class 2 rest facility' means a seat in an aircraft cabin that reclines at least 45° back angle to the vertical, has at least a pitch of 55 inches (137,5 cm), a seat width of at least 20 inches (50 cm) and provides leg and foot support. It is separated from passengers by at least a curtain to provide darkness and some sound mitigation, and is reasonably free from disturbance by passengers or crew members;

— 'Class 3 rest facility' means a seat in an aircraft cabin or flight crew compartment that reclines at least 40° from the vertical, provides leg and foot support and is separated from passengers by at least a curtain to provide darkness and some sound mitigation, and is not adjacent to any seat occupied by passengers.

(d) The extension of FDP with in-flight rest under the provisions of ANTR OPS FTL 1.1205(e)

(1) Complies with the following:

(i) the FDP is limited to 3 sectors; and

(ii) the minimum in-flight rest period is a consecutive 90-minute period for each crew member and 2 consecutive hours for the flight crew members at control during landing.

(2) The maximum daily FDP under the provisions of ANTR OPS FTL 1.1205 (e) may be extended due to in-flight rest for flight crew:

(i) with one additional flight crew member:

(A) up to 14 hours with class 3 rest facilities;

(B) up to 15 hours with class 2 rest facilities; or

(C) up to 16 hours with class 1 rest facilities;

(ii) with two additional flight crew members:

(A) up to 15 hours with class 3 rest facilities;

(B) up to 16 hours with class 2 rest facilities; or

(C) up to 17 hours with class 1 rest facilities.

(3) The minimum in-flight rest for each cabin crew member is:

Maximum extended FDP	Minimum in-flight rest (in hours)		
	Class 1	Class 2	Class 3
up to 14:30 hrs	1:30	1:30	1:30
14:31 – 15:00 hrs	1:45	2:00	2:20
15:01 – 15:30 hrs	2:00	2:20	2:40
15:31 – 16:00 hrs	2:15	2:40	3:00
16:01 – 16:30 hrs	2:35	3:00	Not allowed
16:31 – 17:00 hrs	3:00	3:25	Not allowed
17:01 – 17:30 hrs	3:25	Not allowed	Not allowed
17:31 – 18:00 hrs	3:50	Not allowed	Not allowed

(4) The limits specified in (2) may be increased by 1 hour for FDPs that include 1 sector of more than 9 hours of continuous flight time and a maximum of 2 sectors.

(5) All time spent in the rest facility is counted as FDP.

(6) The minimum rest at destination is at least as long as the preceding duty period, or 14 hours, whichever is greater.

(7) A crew member does not start a positioning sector to become part of this operating crew on the same flight.

(e) Unforeseen circumstances in flight operations — delayed reporting

(1) The operator may delay the reporting time in the event of unforeseen circumstances, if procedures for delayed reporting are established in the operations manual. The operator keeps records of delayed reporting. Delayed reporting procedures establish a notification time allowing a crew member to remain in his/her suitable accommodation when the delayed reporting procedure is activated. In such a case, if the crew member is informed of the delayed reporting time, the FDP is calculated as follows:

(i) one notification of a delay leads to the calculation of the maximum FDP according to (iii) or (iv);

(ii) if the reporting time is further amended, the FDP starts counting 1 hour after the second notification or at the original delayed reporting time if this is earlier;

(iii) when the delay is less than 4 hours, the maximum FDP is calculated based on the original reporting time and the FDP starts counting at the delayed reporting time;

(iv) when the delay is 4 hours or more, the maximum FDP is calculated based on the more limiting of the original or the delayed reporting time and the FDP starts counting at the delayed reporting time;

(v) as an exception to (i) and (ii), when the operator informs the crew member of a delay of 10 hours or more in reporting time and the crew member is not further disturbed by the operator, such delay of 10 hours or more counts as a rest period.

ANTR OPS FTL 1.1210 Flight Times and Duty Periods

(a) The total duty periods to which a crew member may be assigned shall not exceed:

(1) 60 duty hours in any 7 consecutive days;

(2) 110 duty hours in any 14 consecutive days; and

(3) 190 duty hours in any 28 consecutive days, spread as evenly as practicable throughout that period.

(b) The total flight time of the sectors on which an individual crew member is assigned as an operating crew member shall not exceed:

(1) 100 hours of flight time in any 28 consecutive days;

(2) 900 hours of flight time in any calendar year; and

(3) 1000 hours of flight time in any 12 consecutive calendar months.

(c) Post-flight duty shall count as duty period. The operator shall specify in its operations manual the minimum time period for post-flight duties.

ANTR OPS FTL 1.1215 Positioning

If an operator positions a crew member, the following shall apply:

(a) positioning after reporting but prior to operating shall be counted as FDP but shall not count as a sector;

(b) all time spent on positioning shall count as duty period.

ANTR OPS FTL 1.1220 Split Duty

The conditions for extending the basic maximum daily FDP due to a break on the ground shall be in accordance with the following:

(a) flight time specification schemes shall specify the following elements for split duty in accordance with the certification specifications applicable to the type of operation:

(1) the minimum duration of a break on the ground; and

(2) the possibility to extend the FDP prescribed under point ANTR OPS FTL CS 1.1205 (b) taking into account the duration of the break on the ground, the facilities provided to the crew member to rest and other relevant factors;

(b) the break on the ground shall count in full as FDP;

(c) split duty shall not follow a reduced rest.

ANTR OPS FTL CS 1.1220 Split Duty

The increase of limits on flight duty, under the provisions of ANTR OPS FTL 1.1220, complies with the following:

(a) The break on the ground within the FDP has a minimum duration of 3 consecutive hours.

(b) The break excludes the time allowed for post and pre-flight duties and travelling. The minimum total time for post and pre-flight duties and travelling is 30 minutes. The operator specifies the actual times in its operations manual.

(c) The maximum FDP specified in ANTR OPS FTL 1.1205 (b) may be increased by up to 50 % of the break.

(d) Suitable accommodation is provided either for a break of 6 hours or more or for a break that encroaches the window of circadian low (WOCL).

(e) In all other cases:

(1) accommodation is provided; and

(2) any time of the actual break exceeding 6 hours or any time of the break that encroaches the WOCL does not count for the extension of the FDP.

(f) Split duty cannot be combined with in-flight rest.

ANTR OPS FTL 1.1225 Standby and Duties at the Airport

If an operator assigns crew members to standby or to any duty at the airport, the following shall apply in accordance with the certification specifications applicable to the type of operation:

(a) standby and any duty at the airport shall be in the roster and the start and end time of standby shall be defined and notified in advance to the crew members concerned to provide them with the opportunity to plan adequate rest;

(b) a crew member is considered on airport standby from reporting at the reporting point until the end of the notified airport standby period;

(c) airport standby shall count in full as duty period for the purpose of points ANTR OPS FTL 1.1210 and ANTR OPS FTL 1.1235;

(d) any duty at the airport shall count in full as duty period and the FDP shall count in full from the airport duty reporting time;

(e) the operator shall provide accommodation to the crew member on airport standby;

(f) flight time specification schemes shall specify the following elements:

(1) the maximum duration of any standby;

(2) the impact of the time spent on standby on the maximum FDP that may be assigned, taking into account facilities provided to the crew member to rest, and other relevant factors such as:

– the need for immediate readiness of the crew member,

– the interference of standby with sleep, and

– sufficient notification to protect a sleep opportunity between the call for duty and the assigned FDP;

(3) the minimum rest period following standby which does not lead to assignment of an FDP;

(4) how time spent on standby other than airport standby shall be counted for the purpose of cumulative duty periods.

ANTR OPS FTL CS 1.1225 Standby and Duties at the Airport

The modification of limits on flight duty, duty and rest periods under the provisions of ANTR OPS 1.1225 complies with the following:

(a) Airport standby

(1) If not leading to the assignment of an FDP, airport standby is followed by a rest period as specified in ANTR OPS FTL 1.1235

(2) If an assigned FDP starts during airport standby, the following applies:

(i) the FDP counts from the start of the FDP. The maximum FDP is reduced by any time spent on standby in excess of 4 hours;

(ii) the maximum combined duration of airport standby and assigned FDP as specified in ANTR OPS FTL 1.1205 (b) and (d) is 16 hours.

(b) Standby other than airport standby:

(1) the maximum duration of standby other than airport standby is 16 hours;

(2) the operator’s standby procedures are designed to ensure that the combination of standby and FDP do not lead to more than 18 hours awake time;

(3) 25 % of time spent on standby other than airport standby counts as duty time for the purpose of ANTR OPS FTL 1.1210;

(4) standby is followed by a rest period in accordance with ANTR OPS FTL 1.1235;

(5) standby ceases when the crew member reports at the designated reporting point;

(6) if standby ceases within the first 6 hours, the maximum FDP counts from reporting;

(7) if standby ceases after the first 6 hours, the maximum FDP is reduced by the amount of standby time exceeding 6 hours;

(8) if the FDP is extended due to in-flight rest according to ANTR OPS FTL CS 1.1205 (c), or to split duty according to, ANTR OPS FTL CS 1.1220 the 6 hours of paragraph (6) and (7) are extended to 8 hours;

(9) if standby starts between 23:00 and 07:00, the time between 23:00 and 07:00 does not count towards the reduction of the FDP under (6), (7) and (8) until the crew member is contacted by the operator; and

(10) the response time between call and reporting time established by the operator allows the crew member to arrive from his/her place of rest to the designated reporting point within a reasonable time.

ANTR OPS FTL 1.1230 Reserve

If an operator assigns crew members to reserve, the following requirements shall apply in accordance with the certification specifications applicable to the type of operation:

(a) reserve shall be in the roster;

(b) flight time specification schemes shall specify the following elements:

(1) the maximum duration of any single reserve period;

(2) the number of consecutive reserve days that may be assigned to a crew member.

ANTR OPS FTL CS 1.1230 Reserve

The operator assigns duties to a crew member on reserve under the provisions of **ANTR OPS FTL 1.1230** complying with the following:

(a) An assigned FDP counts from the reporting time.

(b) Reserve times do not count as duty period for the purpose of ANTR OPS FTL CS 1.1210 and ANTR OPS FTL 1.1235.

(c) The operator defines the maximum number of consecutive reserve days within the limits of ANTR OPS FTL 1.1235 (d).

(d) To protect an 8-hour sleep opportunity, the operator rosters a period of 8 hours, taking into account fatigue management principles, for each reserve day during which a crew member on reserve is not contacted by the operator.

ANTR OPS FTL 1.1235 Rest Periods

(a) Minimum rest period at home base.

(1) The minimum rest period provided before undertaking an FDP starting at home base shall be at least as long as the preceding duty period, or 12 hours, whichever is greater.

(2) By way of derogation from point (1), the minimum rest provided under point (b) applies if the operator provides suitable accommodation to the crew member at home base.

(b) Minimum rest period away from home base.

The minimum rest period provided before undertaking an FDP starting away from home base shall be at least as long as the preceding duty period, or 10 hours, whichever is greater. This period shall include an 8-hour sleep opportunity in addition to the time for travelling and physiological needs.

(c) Reduced rest

By derogation from points (a) and (b), flight time specification schemes may reduce the minimum rest periods in accordance with the certification specifications applicable to the type of operation and taking into account the following elements:

(1) the minimum reduced rest period;

(2) the increase of the subsequent rest period; and

(3) the reduction of the FDP following the reduced rest.

(d) Recurrent extended recovery rest periods

Flight time specification schemes shall specify recurrent extended recovery rest periods to compensate for cumulative fatigue. The minimum recurrent extended recovery rest period shall be 36 hours, including 2 local nights, and in any case the time between the end of one recurrent extended recovery rest period and the start of the next extended recovery rest period shall not be more than 168 hours. The recurrent extended recovery rest period shall be increased to 2 local days twice every month.

(e) Flight time specification schemes shall specify additional rest periods in accordance with the applicable certification specifications to compensate for:

(1) the effects of time zone differences and extensions of the FDP;

(2) additional cumulative fatigue due to disruptive schedules; and

(3) a change of home base.

ANTR OPS FTL CS 1.1235 Rest Periods

(a) Disruptive schedules

(1) If a transition from a late finish/night duty to an early start is planned at home base, the rest period between the 2 FDPs includes 1 local night.

(2) If a crew member performs 4 or more night duties, early starts or late finishes between 2 extended recovery rest periods as defined in ANTR OPS FTL 1.1235(d), the second extended recovery rest period is extended to 60 hours.

(b) Time zone differences

(1) For the purpose of ANTR OPS FTL 1.1235 (e)(1), ‘rotation’ is a series of duties, including at least one flight duty, and rest period out of home base, starting at home base and ending when returning to home base for a rest period where the operator is no longer responsible for the accommodation of the crew member.

(2) The operator monitors rotations and combinations of rotations in terms of their effect on crew member fatigue, and adapts the rosters as necessary.

(3) Time zone differences are compensated by additional rest, as follows:

(i) At home base, if a rotation involves a 4 hour time difference or more, the minimum rest is as specified in the following table.

Minimum local nights of rest at home base to compensate for time zone differences

Maximum time difference (h) between reference time and local time where a crew member rests during a rotation	Time elapsed (h) since reporting for the first FDP in a rotation involving at least 4 hour time difference to the reference time			
	<48	48 – 71:59	72 – 95:59	≥96
≤6	2	2	3	3
≤9	2	3	3	4
≤12	2	3	4	5

(ii) Away from home base, if an FDP involves a 4-hour time difference or more, the minimum rest following that FDP is at least as long as the preceding duty period, or 14 hours, whichever is greater. By way of derogation from point (b)(3)(i) and only once between 2 recurrent extended recovery rest periods as specified in ANTR OPS FTL 1.1235 (d), the minimum rest provided under this point (b)(3)(ii) may also apply to home base if the operator provides suitable accommodation to the crew member.

(4) In case of an Eastward-Westward or Westward-Eastward transition, at least 3 local nights of rest at home base are provided between alternating rotations.

(5) The monitoring of combinations of rotations is conducted under the operator's management system provisions.

(c) Reduced rest

(1) The minimum reduced rest periods under reduced rest arrangements are 12 hours at home base and 10 hours out of base.

(2) Reduced rest is used under fatigue risk management.

(3) The rest period following the reduced rest is extended by the difference between the minimum rest period specified in ANTR OPS FTL 1.1235 (a) or (b) and the reduced rest.

(4) The FDP following the reduced rest is reduced by the difference between the minimum rest period specified in ANTR OPS FTL 1.1235 (a) or (b) as applicable and the reduced rest.

(5) There is a maximum of 2 reduced rest periods between 2 recurrent extended recovery rest periods specified in accordance with ANTR OPS FTL 1.1235 (d).

ANTR OPS FTL 1.1240 Nutrition

(a) During the FDP there shall be the opportunity for a meal and drink in order to avoid any detriment to a crew member's performance, especially when the FDP exceeds 6 hours.

(b) An operator shall specify in its operations manual how the crew member's nutrition during FDP is ensured.

ANTR OPS FTL 1.1245 Records of Home Base, Flight Times, Duty and Rest Periods

(a) An operator shall maintain, for a period of 24 months:

(1) individual records for each crew member including:
(i) flight times;
(ii) start, duration and end of each duty period and FDP;
(iii) rest periods and days free of all duties; and
(iv) assigned home base;

(2) reports on extended flight duty periods and reduced rest periods.

(b) Upon request, the operator shall provide copies of individual records of flight times, duty periods and rest periods to:

(1) the crew member concerned; and

(2) to another operator, in relation to a crew member who is or becomes a crew member of the operator concerned.

(c) Records with respect to crew members who undertake duties for more than one operator shall be kept for a period of 24 months.

(1) In such cases,

(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.

ANTR OPS FTL 1.1250 Fatigue Management Training

(a) The operator shall provide initial and recurrent fatigue management training to crew members, personnel responsible for preparation and maintenance of crew rosters and management personnel concerned.

(b) This training shall follow a training programme established by the operator and described in the operations manual. The training syllabus shall cover the possible causes and effects of fatigue and fatigue countermeasure.

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SUBPART R – TRANSPORT OF DANGEROUS GOODS BY AIR

ANTR OPS 1.1150 General

The operator shall comply with the applicable provisions contained in this Subpart and the Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Doc. 9284), irrespective of whether:

(a) the flight is wholly or partly within or wholly outside the territory of the Kingdom of Bahrain; or

(b) an approval to carry dangerous goods in accordance with ANTR OPS 1.1155 is held.

Note 1: Operator responsibilities and requirements for the transport of dangerous goods and for incident and accident reporting are contained in this Subpart and Part 7 of the Technical Instructions).

Note 2: The requirements pertaining to crew members or passengers carrying dangerous goods on aircraft are also set forth in this Subpart and Part 8, Chapter 1, of the Technical Instructions.

Note 3: COMAT that meets the classification criteria of the Technical Instructions for dangerous goods are considered cargo and shall be transported in accordance with this Subpart and Part 1.2.2.2 or Part 1.2.2.3 of the Technical Instructions (e.g. aircraft parts such as chemical oxygen generators, fuel control units, fire extinguishers, oils, lubricants, cleaning products).

ANTR OPS 1.1152 Terminology

(a) Terms used in this Subpart have the following meanings:

(1) *Acceptance Check List.* A document used to assist in carrying out a check on the external appearance of packages of dangerous goods and their associated documents to determine that all appropriate requirements have been met.

(2) Approval. For the purposes only of compliance with ANTR OPS 1.1165(b)(2), an authorisation referred to in the Technical Instructions and issued by an authority, for the transport of dangerous goods which are normally forbidden for transport or for other reasons, as specified in the Technical Instructions;

(3) *Cargo Aircraft.* Any aircraft which is carrying goods or property but not passengers. In this context the following are not considered to be passengers:

(i) A crew member;

(ii) The operator’s employee permitted by, and carried in accordance with, the instructions contained in the Operations Manual;

(iii) An authorised representative of an Authority; or

(iv) A person with duties in respect of a particular shipment on board.

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

(5) *Dangerous Goods Accident.* An occurrence associated with and related to the transport of dangerous goods which results in fatal or serious injury to a person or major property damage. (See AC OPS (IEM) 1.1150(a)(5) & (a)(6).)

(6) *Dangerous Goods Incident.* An occurrence, other than a dangerous goods accident, associated with and related to the transport of dangerous goods, not necessarily

occurring on board an aircraft, which results in injury to a person, property damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardises the aircraft or its occupants is also deemed to constitute a dangerous goods incident. (See AC OPS (IEM) 1.1150(a)(5) & (a)(6).)

(7) *Dangerous Goods Transport Document.* A document which is specified by the Technical Instructions. It is completed by the person who offers dangerous goods for air transport and contains information about those dangerous goods.

(8) *Exemption.* For the purposes only of compliance with this Subpart, an authorisation referred to in the Technical Instructions and issued by all the authorities concerned, providing relief from the requirements of the Technical Instructions.

(9) *Freight Container.* A freight container is an article of transport equipment for radioactive materials, designed to facilitate the transport of such materials, either packaged or unpackaged, by one or more modes of transport.

Note: See Unit Load Device where the dangerous goods are not radioactive materials.

(10) *Handling Agent.* An agency which performs on behalf of the operator some or all of the latter's functions including receiving, loading, unloading, transferring or other processing of passengers or cargo.

(11) *Overpack.* An enclosure used by a single shipper to contain one or more packages and to form one handling unit for convenience of handling and stowage. (Note: a unit load device is not included in this definition.)

(12) *Package.* The complete product of the packing operation consisting of the packaging and its contents prepared for transport.

(13) *Packaging.* Receptacles and any other components or materials necessary for the receptacle to perform its containment function.

(14) *Serious Injury.* An injury which is sustained by a person in an accident and which:

(i) Requires hospitalisation for more than 48 hours, commencing within seven days from the date the injury was received; or

(ii) Results in a fracture of any bone (except simple fractures of fingers, toes or nose); or

(iii) Involves lacerations which cause severe haemorrhage, nerve, muscle or tendon damage; or

(iv) Involves injury to any internal organ; or

(v) Involves second or third degree burns, or any burns affecting more than 5% of the body surface; or

(vi) Involves verified exposure to infectious substances or injurious radiation.

(15) *Technical Instructions.* The latest effective edition of the Technical Instructions for the Safe Transport of Dangerous Goods by Air, including the Supplement and any Addendum, approved and published by decision of the Council of the International Civil Aviation Organization (Doc 9284–AN/905).

(16) *Unit Load Device.* Any type of aircraft container, aircraft pallet with a net, or aircraft pallet with a net over an igloo. (

Note: An overpack is not included in this definition; for a container containing radioactive materials see the definition for freight container.

ANTR OPS 1.1155 Operators with a specific approval for the transport of dangerous goods as cargo

The operator shall not transport dangerous goods unless a specific approval issued by BCAA to do so.

Before the issue of a specific approval for the transport of dangerous goods, the operator shall satisfy the BCAA that:

(a) an adequate dangerous goods training programme has been established that meets the requirements of ANTR OPS 1.1220 and the Technical Instructions, Part 1, Chapter 4, Table 1-4, as appropriate. Details of the dangerous goods training programme shall be included in the operator's operations manuals;

(b) that all relevant documents (e.g. for ground handling, aeroplane handling, training) contain information and instructions on dangerous goods, and that there are dangerous goods policies and procedures in its operations manual to meet, at a minimum, the requirements of this Subpart and the Technical Instructions to enable operator personnel to:

(1) identify and reject undeclared or misdeclared dangerous goods, including COMAT classified as dangerous goods;

(2) report to the BCAA and the State in which it occurred any:

(i) occasions when undeclared or misdeclared dangerous goods are discovered in cargo or mail; and

(ii) dangerous goods accidents and incidents;

(3) report to the BCAA and the State of Origin any occasions when dangerous goods are discovered to have been carried;

(i) when not loaded, segregated, separated or secured in accordance with the Technical Instructions, Part 7, Chapter 2; and

(ii) without information having been provided to the pilot-in-command;

(4) accept, handle, store, transport, load and unload dangerous goods, including COMAT classified as dangerous goods as cargo on board an aircraft; and

(5) provide the pilot-in-command with accurate and legible written or printed information concerning dangerous goods that are to be carried as cargo.

Note 1: The exemption or approval indicated in ANTR OPS 1.1165(b) (1) or (2) is in addition to the above and the conditions in (b) may not necessarily apply.

Note 2: Article 35 of the Convention refers to certain classes of cargo restrictions.

ANTR OPS 1.1160 Scope

Articles and substances which would otherwise be classed as dangerous goods, but which are not subject to the Technical Instructions in accordance with Part 1 and 8 of those Instructions are excluded from the provisions of this subpart providing that:

(a) when placed on board with the approval of the operator to provide, during flight, medical aid to a patient (See AC OPS 1.1160(a)), they are:

(1) carried for use in flight; or are part of the permanent equipment of the aeroplane when it has been adapted for specialized use for medical evacuation; or carried on a flight made by the same aeroplane to collect a patient or after that patient has been delivered when it is impracticable to load or unload the goods at the time of the flight on which the patient is carried but with the intention that they be off-loaded as soon as practicable; and

(2) when placed on board with the approval of the operator to provide, during flight, medical aid to a patient the dangerous goods shall be restricted to the following and which must be kept in the position in which they are used or stowed securely when not in use and they are secured properly during take off and landing and at all other times when deemed necessary by the commander in the interests of safety:

(i) Gas cylinders which must have been manufactured specifically for the purpose of containing and transporting that particular gas;

(ii) Medications and other medical matter which must be under the control of trained personnel during the time when they are in use in the aeroplane;

(iii) Equipment containing wet cell batteries which must be kept and, when necessary secured, in an upright position to prevent spillage of the electrolyte

(b) they are required to be aboard the aeroplane and are in accordance with the relevant ANTRs or for operating reasons (See AC OPS 1.1160(b)), although articles and substances intended as replacements or which have been removed for replacement must be transported on an aeroplane as specified in the Technical Instructions.

(c) they are in baggage:

(1) carried by passengers or crew members in accordance with the Technical Instructions. (See AC OPS 1.1160(c)(1)); or

(2) which has been separated from its owner during transit (e.g: lost baggage or improperly routed baggage) but which is carried by the operator. (See AC OPS 1.1160(c)(1)).

ANTR OPS 1.1165 Limitations on the Transport of Dangerous Goods

(a) The operator shall take all reasonable measures to ensure that articles and substances or other goods declared as dangerous goods that are specifically identified by name or generally described in the Technical Instructions as being forbidden for transport under any circumstances are not carried on any aeroplane.

(b) (see AC OPS (IEM) 1.1165(b)) The operator shall not carry articles and substances or other goods declared as dangerous goods that are identified in the Technical Instructions as being forbidden for transport in normal circumstances unless the following requirements of those Instructions have been met:

(1) The necessary exemptions have been granted by all the States concerned under the requirements of the Technical Instructions;

or

(2) an approval has been granted by all the State(s) concerned on those occasions when the Technical Instructions indicate that only such approval is required.

ANTR OPS 1.1190 Operators with no specific approval for the transport of dangerous goods as cargo

The operator with no specific approval to transport dangerous goods shall:

(a) establish a dangerous goods training programme that meets the requirements of ANTR OPS 1.1220 and the Technical Instructions, Part 1, Chapter 4, as appropriate. Details of the dangerous goods training programme shall be included in the operator's operations manuals.

(b) establish dangerous goods policies and procedures in its operations manual to meet, at a minimum, the requirements of this Subpart and the Technical Instructions to allow operator personnel to:

(1) identify and reject undeclared dangerous goods, including COMAT classified as dangerous goods; and

(2) report to the BCAA and the State in which it occurred any:

(i) occasions when undeclared dangerous goods are discovered in cargo or mail; and

(ii) dangerous goods accidents and incidents.

ANTR OPS 1.1195 Acceptance of Dangerous Goods

(a) The operator shall 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) except when otherwise specified in the Technical Instructions, they are accompanied by two copies of a dangerous goods transport document.

(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 requirements.

(b) The operator shall use an acceptance check list which shall allow for all relevant details to be checked and shall be in such form as will allow for the recording of the results of the acceptance check by manual, mechanical or computerised means.

ANTR OPS 1.1200 Inspection for Damage, Leakage or Contamination

(a) The operator shall ensure that:

(1) Packages, overpacks and freight containers are inspected for evidence of leakage or damage immediately prior to loading on an aeroplane or into a unit load device, as specified in the Technical Instructions;

(2) A unit load device is not loaded on an aeroplane unless it has been inspected as required by the Technical Instructions and found free from any evidence of leakage from, or damage to, the dangerous goods contained therein;

(3) Leaking or damaged packages, overpacks or freight containers are not loaded on an aeroplane;

(4) Any package of dangerous goods found on an aeroplane and which appears to be damaged or leaking is removed or arrangements made for its removal by an appropriate authority or organisation. In this case the remainder of the consignment shall be inspected to ensure it is in a proper condition for transport and that no damage or contamination has occurred to the aeroplane or its load; and

(5) Packages, overpacks and freight containers are inspected for signs of damage or leakage upon unloading from an aeroplane or from a unit load device and, if there is evidence of damage or leakage, the area where the dangerous goods were stowed is inspected for damage or contamination.

ANTR OPS 1.1205 Removal of Contamination

(a) The operator shall ensure that:

(1) Any contamination resulting from found as a result of the leakage from, or damage to articles or packages containing of dangerous goods is removed without delay; and steps are taken to nullify any hazard as specified in the Technical Instructions

(2) An aeroplane which has been contaminated by radioactive materials is immediately taken out of service and not returned until the radiation level at any accessible surface and the non-fixed contamination are not more than the values specified in the Technical Instructions.

(b) In the event of a non-compliance with any limit in the Technical Instructions applicable to radiation level or contamination,

(1) the operator must:

(i) ensure the shipper is informed if the non-compliance is identified during transport;

(ii) take immediate steps to mitigate the consequences of the non-compliance;

(iii) communicate the non-compliance to the shipper and relevant competent authority(ies), respectively, as soon as practicable and immediately whenever an emergency situation has developed or is developing;

(2) the operator must also, within the scope of his responsibilities:

(i) investigate the non-compliance and its causes, circumstances and consequences;

(ii) take appropriate action, to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance;

(iii) communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventative actions taken or to be taken.

ANTR OPS 1.1210 Loading Restrictions

(a) Passenger Cabin and Flight Deck. The operator shall ensure that dangerous goods are not carried in an aeroplane cabin occupied by passengers or on the flight deck, except as specified in the Technical Instructions.

(b) Cargo Compartments. The operator shall ensure that dangerous goods are loaded, segregated, stowed and secured on an aeroplane as specified in the Technical Instructions.

(c) Dangerous Goods Designated for Carriage Only on Cargo Aircraft. The operator shall ensure that packages of dangerous goods bearing the ‘Cargo Aircraft Only’ label are carried on a cargo aircraft and loaded as specified in the Technical Instructions.

ANTR OPS 1.1215 Provision of Information

(a) Information to personnel. The operator must provide such information in the operations manual and/or other appropriate manuals as will enable personnel, including third-party personnel, involved in the acceptance, handling, loading and unloading of cargo, to carry out their responsibilities and operator’s specific approval and limitations with regard to the transport of dangerous goods as specified in the Technical Instructions, including the actions to be taken in the event of emergencies involving dangerous goods. Where applicable, such information must also be provided to his handling agent.

(b) Information to Passengers and Other Persons

(1) The operator shall ensure that information is promulgated as required by the Technical Instructions so that passengers are warned as to the types of goods which they are forbidden from transporting aboard an aeroplane; and

(2) The operator shall ensure that notices are provided at acceptance points for cargo giving information about the transport of dangerous goods.

(c) Information to the Commander. The operator shall ensure that:

(1) written information is provided to the commander about the dangerous goods to be carried on an aeroplane, as specified in the Technical Instructions;

(2) information for use in responding to in-flight emergencies is provided, as specified in the Technical Instructions;

(3) a legible copy of the written information to the commander is retained on the ground at a readily accessible location until after the flight to which the written information refers. This copy, or the information contained in it, must be readily accessible to the aerodromes of last departure and next scheduled arrival point, until after the flight to which the information refers;

(4) where dangerous goods are carried on a flight which takes place wholly or partially outside the territory of a State, the English language is used for the written information to the commander in addition to any other language requirements. (See Table 1 of Appendix 1 to ANTR OPS 1.1065 for the document storage period).

(d) Information in the Event of an Aeroplane Incident or Accident.

(1) The operator of an aeroplane which is involved in an aeroplane incident shall, on request, provide any information as required by the Technical Instructions.

(2) The operator of an aeroplane which is involved in an aeroplane accident or serious incident shall without delay, provide any information as required by the Technical Instructions.

(3) The operator of an aeroplane shall include procedures in appropriate manuals and accident contingency plans to enable this information to be provided.

(e) Information in the Event of an In-flight Emergency (See AC OPS 1.1215(e)).

(1) If an in-flight emergency occurs the commander shall, as soon as the situation permits, inform the appropriate air traffic services unit of any dangerous goods carried as cargo on board the aeroplane as specified in the Technical Instructions.

ANTR OPS 1.1220 Training programmes
(See AC OPS (AMC) 1.1220)

(a) The operator shall establish and maintain staff training programmes, as required by the Technical Instructions, which shall be approved by the BCAA.

(b) The operator must ensure that staff receive training in the requirements commensurate with their responsibilities.

(c) The operator must ensure that training is provided or verified upon the employment of a person in a position involving the transport of dangerous goods by air.

(d) The operator shall ensure that all staff who receive training undertake a test to verify understanding of their responsibilities.

(e) The operator shall ensure that all staff who require dangerous goods training receive recurrent training at intervals of not longer than 2 years.

(f) The operator shall ensure that records of dangerous goods training are maintained for all staff as required by the Technical Instructions.

(g) The operator shall ensure that his handling agent's staff are trained as required by the Technical Instructions.

ANTR OPS 1.1225 Dangerous Goods Incident and Accident Reports
(See AC OPS (AMC) 1.1225)

(a) The operator shall report dangerous goods incidents and accidents to the BCAA and the appropriate Authority in the State where the accident or incident occurred, as provided for in Appendix 1 to ANTR OPS 1.1225. The first report shall be despatched within 72 hours of the event unless exceptional circumstances prevent this and include the details that are known at that time. If necessary, a subsequent report must be made as soon as possible giving whatever additional information has been established.

(b) The operator shall also report to the BCAA and the appropriate Authority in the State where the event occurred, the finding of undeclared or misdeclared dangerous goods discovered in cargo or passengers’ baggage as provided for in Appendix 1 to ANTR OPS 1.1225. The first report must be despatched within 72 hours of the discovery unless exceptional circumstances prevent this and include the details that are known at that time. If necessary, a subsequent report must be made as soon as possible giving whatever additional information has been established.

ANTR OPS 1.1230 Domestic Commercial Air Transport Operations

The operator shall establish policy and procedure for transportation of dangerous goods by air also in the case of domestic commercial air transport operations in accordance with the requirements set forth in this Section-1, Subpart R.

ANTR OPS 1.1233 Cargo Compartment Safety

a. Transport of items in the cargo compartment

(1) The operator shall establish policy and procedures for the transport of items in the cargo compartment, which include the conduct of a specific safety risk assessment. The risk assessment shall include at least the:

(i) hazards associated with the properties of the items to be transported;

(ii) capabilities of the operator;

(iii) operational considerations (e.g. area of operations, diversion time);

(iv) capabilities of the aeroplane and its systems (e.g. cargo compartment fire suppression capabilities);

(v) containment characteristics of unit load devices;

(vi) packing and packaging;

(vii) safety of the supply chain for items to be transported; and

(viii) quantity and distribution of dangerous goods items to be transported.

Note 1: Additional operational requirements for the transport of dangerous goods are contained in ANTR OPS 1.1150, 1.1155, 1.1190, 1.1215 & 1.1230.

Note2: Guidance on the hazards associated with the transport of items in the cargo compartment, the conduct of a specific safety risk assessment in accordance with the Safety Management Manual (SMM) (Doc 9859), and the responsibilities for the transport of dangerous goods, is contained in the Cargo Compartment Operational Safety Manual (ICAO Doc 10102).

b. Fire protection

(1) The elements of the cargo compartment(s) fire protection system as approved by the State of Design or BCAA, and a summary of the demonstrated cargo compartment fire protection certification standards, shall be provided in the aeroplane flight manual or other documentation supporting the operation of the aeroplane.

Note: Guidance on the elements of cargo compartment fire protection and associated demonstrated standards are provided in the Cargo Compartment Operational Safety Manual (Doc 10102).

(2) The Operator shall establish policy and procedures that address the items to be transported in the cargo compartment. These shall ensure to a reasonable certainty that in the event of a fire involving those items, it can be detected and sufficiently suppressed or contained by the elements of the aeroplane design associated with cargo compartment fire protection, until the aeroplane makes a safe landing.

Note: Guidance on policy and procedures that address the items to be transported in the cargo compartment are provided in the Cargo Compartment Operational Safety Manual (Doc 10102).

Appendix 1 to ANTR OPS 1.1225

Dangerous goods incident and accident reports

1. The operator shall ensure that any type of dangerous goods incident or accident is reported, irrespective of whether the dangerous goods are contained in cargo, mail, passengers' baggage or crew baggage. The finding of undeclared or misdeclared dangerous goods in cargo, mail or baggage shall also be reported.

2. The first report shall be despatched within 72 hours of the event unless exceptional circumstances prevent this. It may be sent by any means, including e-mail, telephone or fax. This report shall include the details that are known at that time, under the headings identified in paragraph 3. If necessary, a subsequent report shall be made as soon as possible giving all the details that were not known at the time the first report was sent. If a report has been made verbally, written confirmation shall be sent as soon as possible.

3. The first and any subsequent report shall be as precise as possible and contain such of the following data that are relevant:

   a. Date of the incident or accident or the finding of undeclared or misdeclared dangerous goods;

   b. Location, the flight number and flight date;

   c. Description of the goods and the reference number of the air waybill, pouch, baggage tag, ticket, etc;

   d. Proper shipping name (including the technical name, if appropriate) and UN/ID number, when known;

   e. Class or division and any subsidiary risk;

   f. Type of packaging, and the packaging specification marking on it;

   g. Quantity;

   h. Name and address of the shipper, passenger, etc;

   i. Any other relevant details;

   j. Suspected cause of the incident or accident;

   k. Action taken;

   l. Any other reporting action taken; and

   m. Name, title, address and telephone number of the person making the report.

4 Copies of relevant documents and any photographs taken should be attached to a report.

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SUBPART S - SECURITY

ANTR OPS 1.1235 Security requirements

The operator shall ensure that all appropriate personnel are familiar, and comply, with the relevant requirements of the national security programmes of the State of the operator.

ANTR OPS 1.1240 Training programmes

(See AC OPS 1.1240)

(a) The operator shall establish, maintain and conduct approved training programmes which enable the operator's crew members to take appropriate action to prevent acts of unlawful interference, such as sabotage or unlawful seizure of aeroplanes and to minimise the consequences of such events, should they occur. The training programme shall be compatible with the National Aviation Security Programme. Individual crew member shall have knowledge and competence of all relevant elements of the training programme.

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.

(b) The 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.

ANTR OPS 1.1245 Reporting acts of unlawful interference

Following an act of unlawful interference on board an aeroplane the commander or, in his absence the operator, shall submit, without delay, a report of such an act to the designated local authority and the Authority in the State of the operator.

ANTR OPS 1.1250 Aeroplane search procedure checklist

The operator shall ensure that there is on board a checklist of the procedures to be followed in search of a bomb or Improvised Explosive Device (IED) in case of suspected sabotage and for inspecting aeroplanes for concealed weapons, explosives or other dangerous devices where a well founded suspicion exists that the aeroplane may be the object of an act of unlawful interference. The checklist shall be supported by guidance on the appropriate course of action to be taken including that of providing means of attenuating and directing the blast should a bomb or suspicious object be found and information on the least-risk bomb location specific to the aeroplane where provided by the Type Certificate holder.

ANTR OPS 1.1255 Flight crew compartment security

(a) In all aeroplanes which are equipped with a flight crew compartment door, this door shall be capable of being locked, and means shall be provided or established by which the cabin crew can notify the flight crew in the event of suspicious activity or security breaches in the cabin.

(b) All passenger-carrying aeroplanes that are engaged in the commercial transportation of passengers:

(1) of a maximum certificated take-off mass in excess of 54 500 kg; or

(2) of a maximum certificated take-off mass in excess of 45 500 kg with a passenger seating capacity greater than 19; or

(3) with a passenger seating capacity greater than 60

shall be equipped with an approved flight crew compartment door that is designed to resist penetration by small arms fire and grenade shrapnel, and to resist forcible intrusions by unauthorized persons. This door shall be capable of being locked and unlocked from either pilot’s station.

(c) In all aeroplanes which are equipped with a flight crew compartment door in accordance with sub-paragraph (b):

(1) This door shall be closed and locked from the time all external doors are closed following embarkation until any such door is opened for disembarkation, except when necessary to permit access and egress by authorized persons; and;

(2) means shall be provided for monitoring from either pilot’s station the entire door area outside the flight crew compartment to the extent necessary to identify persons requesting entry to the flight crew compartment and to detect suspicious behaviour or potential threat.

(d) All passenger-carrying aeroplanes under Commercial Air Transport Operation should be equipped with an approved flight crew compartment door, where practicable, that is designed to resist penetration by small arms fire and grenade shrapnel, and to resist forcible intrusions by unauthorized persons. This door should be capable of being locked and unlocked from either pilot’s station.

(e) In all aeroplanes which are equipped with a flight crew compartment door in accordance with sub-paragraph (d):

i) the door should be closed and locked from the time all external doors are closed following embarkation until any such door is opened for disembarkation, except when necessary to permit access and egress by authorized persons; and

ii) means should 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.

SECTION 2

ADVISORY CIRCULARS (AC), ACCEPTABLE MEANS OF COMPLIANCE (AMC) AND INTERPRETATIVE/EXPLANATORY MATERIAL (IEM)

1 *GENERAL*

1.1 This Section contains Advisory Circulars (AC), Acceptable Means of Compliance and Interpretative/Explanatory Material that has been agreed for inclusion in ANTR OPS 1.

1.2 Where a particular ANTR paragraph does not have an Advisory Circular, Acceptable Means of Compliance or any Interpretative/Explanatory Material, it is considered that no supplementary material is required.

2 *PRESENTATION*

2.1 The Advisory Circular, Acceptable Means of Compliance and Interpretative/Explanatory Material are presented in full page width on loose pages, each page being identified by the date of issue.

2.2 A numbering system has been used in which the Advisory Circular, Acceptable Means of Compliance or Interpretative/Explanatory Material uses the same number as the ANTR paragraph to which it refers. The number is introduced by the letters AMC or IEM to distinguish the material from the ANTR itself.

2.3 The acronyms AMC and IEM also indicate the nature of the material and for this purpose the two types of material are defined as follows:

Advisory Circulars (AC) provide guidelines on a subject matter, such as how to comply with a regulation.

Acceptable Means of Compliance (AMC) illustrate a means, or several alternative means, but not necessarily the only possible means by which a requirement can be met. It should however be noted that where a new AMC is developed, any such AMC (which may be additional to an existing AMC) will be amended into the document following consultation under the NPRM procedure.

Interpretative/Explanatory Material (IEM) helps to illustrate the meaning of a requirement.

2.4 New AMC or IEM material may, in the first place, be made available rapidly by being published as a Temporary Guidance Leaflet (TGL) or Civil Aviation Publication (CAP).

Note: Any person who considers that there may be alternative AMCs or IEMs to those published should submit details to the BCAA, for alternatives to be properly considered. Possible alternative AMCs or IEMs may not be used until published as AMCs, IEMs or TGLs.

2.5 New, amended and corrected text will be enclosed within heavy brackets until a subsequent “amendment” is issued.

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AC/AMC/IEM B – GENERAL

AC to Appendix 1 to ANTR OPS 1.005 (a)
Operations of performance class B aeroplanes
See Appendix 1 to ANTR OPS 1.005(a)

1 ANTR OPS 1.037; Safety management system

For operations of performance class B aeroplanes, a simplified programme is sufficient which may consist of the following.

Collecting case based material (such as accident reports relating to the type of operation) and submit/distribute that information material to the crew members concerned; or

Collection and use of information from flight safety seminars (such as AOPA flight safety seminars etc.)

2 Appendix 2 to ANTR OPS 1.175; The management and organisation of an AOC holder

Supervision - The supervision of personnel may be undertaken by the appropriate nominated postholder(s) subject to time available.

3 ANTR OPS 1.1071; Technical Log

Refer to ANTR M ; M.A.306

4 ANTR OPS 1.1070; CAME – Continuing Airworthiness Management Exposition:

The operator shall keep a current approved continuing airworthiness management exposition as prescribed in ANTR M.A.704 Continuing airworthiness management exposition and the manual to describe the interface procedures adopted between the Operator, CAMO & AMO.

5 Subpart R; Transport of Dangerous goods by air

ANTR OPS 1.1155, 1.1160, 1.1165, 1.1215, 1.1220 and 1.1225 are applicable to all operators. The requirement in ANTR OPS 1.1165 may be fulfilled by the use of information pamphlets. The remainder of this Subpart applies only when the operator seeks or holds an approval to carry dangerous goods.

The requirement in ANTR OPS 1.1165 may be fulfilled by the use of information pamphlets.

6 Subpart S; Security

ANTR OPS 1.1235 - Security requirements are applicable when operating in states where the national security programme applies to the operations covered in this Appendix.

ANTR OPS 1.1240 - Training programmes shall be adapted to the kind of operations performed. A self-study training programme may be acceptable for VFR operations.

7 Appendix 1 to ANTR OPS 1.005(a), subparagraph (a)(3)

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

8 ANTR OPS 1.290(b)(2)

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

AC OPS 1.010
Exemptions
See ANTR OPS 1.010

1 General

1.1 Compliance with BCAA's regulatory requirements is obligatory. However, on some occasions, there might be instances where full compliance is not feasible. In those instances, BCAA may grant an exemption from the Air Navigation Technical Regulations (ANTRs) when satisfied that there is a need and subject to compliance with any supplementary condition that BCAA considers necessary in order to ensure an acceptable level of safety in the particular case. Such measures must be supported by appropriate, robust and documented safety risk assessments or aeronautical studies and imposition of limitations, conditions or mitigation measures, as appropriate.

1.2 Any interested person may apply to BCAA for an exemption from the regulations.

1.3 Only BCAA may issue exemptions, and no person may take or cause to be taken any action not in compliance with the regulations unless BCAA has issued an applicable exemption to the person.

1.4 An exemption should not be regarded by applicants as a means to circumvent the requirements. Similarly, it should not be regarded as the primary solution to an operational difficulty faced by an operator. An exemption should only be requested by an operator or maintenance organisation (and considered by BCAA) based on due technical cause. Exemptions shall, under no circumstance, be issued in retrospect as a means to alleviate against a breach of a requirement.

Exemptions will only be granted in extraordinary circumstances

Note: The term "exemptions" also includes exceptions.

2 Petitions for Exemptions

2.1 The following policy applies;

(a) Any interested person may petition the Undersecretary of BCAA to issue, amend or delete any regulation or technical standard.

(b) Any person affected by any regulation who feels he has just cause for relief, may petition the Undersecretary of BCAA for temporary exemption.

(c) Each petition filed under this section must:

(i) Be submitted at least 60 days before the proposed effective date of the regulation.

(ii) Include the text or substance of the regulation from which the exemption is sought, or specify the regulation that the petitioner seeks to have deleted.

(iii) Explain the interests of the petitioner in the action requested and in the case of an exemption, include the nature and extent of the relief sought, a description of each aircraft or persons to be covered by the exemption and:

(iv) Contain any information, views, or arguments available to the petitioner to support the action sought, the reasons why granting of the request would be in the public interest and, if appropriate, in the case of an exemption, the reason why the exemption would not adversely affect safety, or the action to be taken by the petitioner to provide a level of safety equal to that provided by the regulation from which the exemption is sought. Such a petition shall be supported by an appropriate, robust and documented safety risk assessment or safety case that shall include any imposition of limitations, conditions or mitigation measures, as appropriate.

3 Requirements for Application

3.1 General

(a) Applications for an exemption should be submitted at least 60 days in advance of the proposed effective date, to obtain timely review.

(b) The request must contain the applicant's:

(i) Name and address;

(ii) Details of any relevant authorization,

(iii) A citation of the specific requirement from which the applicant seeks relief;

(iv) Description of the type of operations to be conducted under the proposed exemption;

(v) The proposed duration of the exemption;

(vi) Explain the interests of the applicant in the exemption requested, including the nature and extent of the exemption requested and a description of each person or thing to be covered by the exemption;

(vii) An explanation of how the exemption would be in the public interest, that is, benefit the public as a whole;

(viii) A detailed description of the alternative means by which the applicant shall ensure a level of safety equivalent to that established by the Regulation in question;

(ix) A review and discussion of any known safety concerns with the requirement, including information about any relevant accidents or incidents of which the applicant is aware;

(x) A safety risk assessment to justify the application of the exemption as well as the continuing need for the exemption;

(xi) If the applicant seeks to operate under the proposed exemption outside of the kingdom of Bahrain airspace, the application shall also indicate whether the exemption would contravene any provision of the Standards and Recommended Practices of the International Civil Aviation Organisation (ICAO).

(c) Unless BCAA agrees otherwise, an application for an exemption shall be submitted no less than sixty days in advance of the proposed effective date of the exemption.

(d) Where an applicant seeks urgent processing, the application must contain supporting facts and reasons why the application was not filed in a timely manner and the reasons it is an urgent application may be rejected if BCAA finds that the applicant has not justified the failure to apply in a timely manner.

(e) If the applicant is not a citizen or legal resident of the Kingdom of Bahrain, the application must specify a Bahraini agent for service.

3.2 Action on Petitions for Rule Making or Exemptions

(a) Except for the written notice of proposed rule-making and comment procedures provided in this section, no public hearing, argument, or other formal proceeding will be conducted.

(b) Except in cases of urgency, written notice of proposed rule-making will be distributed to affected aviation interests. A period of 30 days will normally be allowed for interested persons to submit comments to BCAA.

(c) Comments concerning proposed rule-making must be submitted in a form acceptable to BCAA.

(d) BCAA will consider all comments pertinent to proposed rule-making when they are submitted in the prescribed manner and within the established time limits.

(e) Exemptions may be granted by BCAA if it determines after a technical evaluation that a petition is in the public interest and it provides a level of safety equivalent to that established by the regulation, the exemption will be in the form of a letter and will include:

(i) Name of petitioner.

(ii) A citation of each rule from which relief is requested.

(iii) A brief description of the general nature of the relief granted.

(iv) Disposition of the petition.

Note: All exemptions must be controlled.

(f) If BCAA determines that a petition for an exemption cannot be justified, he will provide the petitioner with written notification of that decision.

(g) The applicant shall regularly review any exemptions/variations with a view to removing the need for such exemptions, where possible, as well as check the validity and robustness of any mitigating measures in place.

4 Review, Publication, and Issue or Denial of the Exemption

4.1 Initial Review by the Authority

(a) BCAA will review the application for accuracy and compliance with the requirements of paragraph 3 above.

(b) If the application appears on its face to satisfy the provisions of paragraph 3 and BCAA determines that a review of its merits is justified, BCAA will publish a detailed summary of the application for comment and specify the date by which comments must be received by BCAA for consideration.

(c) If the filing requirements of paragraph 3 have not been met, BCAA will notify the applicant and take no further action until the applicant complies with the requirements of paragraph 3 above.

4.2 Evaluation of the Request

(a) After initial review, if the filing requirements have been satisfied, BCAA shall conduct an evaluation of the request to include:

(i) A determination of whether an exemption would be in the public interest;

(ii) A determination, after a technical evaluation, of whether the applicant's proposal would provide a level of safety equivalent to that established by the Regulation:

(1) A safety risk assessment or safety case shall be developed by the applicant to demonstrate whether an equivalent level of safety or an alternative acceptable means of compliance can be achieved.

(2) BCAA shall carry out a technical evaluation of the application for grant of exemption and review the applicant's risk assessment or safety case for acceptance. The exemption, if granted, shall contain conditions/limitations for the person/organisation to follow while operating under the exemption. In all cases, before granting exemption, it shall be ascertained that an equivalent level of safety is maintained.

(3) If it appears to BCAA that a technical evaluation of the request would impose a significant burden on BCAA technical resources, BCAA may deny the exemption on that basis.

(4) The issuance of an exemption which is not supported by a safety risk assessment or safety case and by a thorough review by BCAA is not acceptable.

(iii) A determination, if the applicant seeks to operate under the exemption outside of the Bahrain FIR, of whether a grant of the exemption would contravene the applicable ICAO Standards and Recommended Practices, and, if so, ensure that ICAO is notified of the differences.

(iv) An evaluation of comments received from interested parties concerning the proposed exemption.

(v) A recommendation, based on the preceding elements, of whether the request should be granted or denied, and of any conditions or limitations that shall be part of the exemption.

4.3 Notification of Determination

(a) BCAA shall notify the applicant by letter and publish a detailed summary of its evaluation and decision to grant the request. The summary shall specify the duration of the exemption and any conditions or limitations to the exemption.

(b) If the request is for urgent relief, BCAA will publish the application and/or BCAA's decision as soon as possible after processing the application.

(c) All cases involving the granting of exemptions shall be fully documented and recorded and all exemptions shall be published on BCAA website, www.mtt.gov.bh and/or in the AIP. The publication shall include the following particulars in respect of the exemption granted:

(i) the reference number of the application;

(ii) the full name of the applicant;

(iii) a reference to the requirement for which exemption is granted;

(iv) references to relevant limitations, conditions or mitigation measures; and

(v) the expiry date of the exemption.

After the expiry of the period of exemption, all notifications shall be removed.

4.4 Extension of the Exemption to other Interested Parties

(a) If BCAA determines that an exemption should be granted, other persons or organizations may apply to BCAA to be included in the relief granted.

(b) Such applications shall be in accordance with the requirements of paragraph 3.

(c) If BCAA determines that the request merits extension of the exemption to the applicant, it shall notify the applicant by letter, specifying the duration of the exemption, and listing any additional conditions that may pertain to the applicant that are not addressed in the underlying exemption.

4.5 Validity of Exemption

(a) An exemption granted shall cease -

(1) at the end of the date specified in the instrument of exemption; or

(2) if no date is specified for that purpose in the instrument, one year after the commencement of the exemption.

(b) An exemption granted to an applicant shall be in the name of that applicant and shall be non-transferable.

AMC OPS 1.035
Quality System
See ANTR OPS 1.035

1 Introduction

1.1 In order to show compliance with ANTR OPS 1.035, the operator should establish his Quality System in accordance with the instructions and information contained in the following paragraphs:

2 General

2.1 Terminology

a. The terms used in the context of the requirement for the operator's Quality System have the following meanings:

i. Accountable Manager. The person acceptable to the BCAA who has corporate authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the BCAA, and any additional requirements defined by the operator.

ii. Quality Assurance. All those planned and systematic actions necessary to provide adequate confidence that operational and maintenance practices satisfy given requirements.

iii. Quality Manager. The manager, acceptable to the BCAA, responsible for the management of the Quality System, monitoring function and requesting corrective actions.

2.2 Quality Policy

2.2.1 The operator should establish a formal written Quality Policy Statement that is a commitment by the Accountable Manager as to what the Quality System is intended to achieve. The Quality Policy should reflect the achievement and continued compliance with ANTR OPS 1 together with any additional standards specified by the operator.

2.2.2 The Accountable Manager is an essential part of the AOC holder's management organisation. With regard to the text in ANTR OPS 1.175 (h) and the above terminology, the term 'Accountable Manager' is intended to mean the Chief Executive / President / Managing Director / Director General / General Manager etc. of the operator's organisation, who by virtue of his position has overall responsibility (including financial) for managing the organisation .

2.2.3 The Accountable Manager will have overall responsibility for the AOC holder's Quality System including the frequency, format and structure of the internal management evaluation activities as prescribed in paragraph 4.9 below.

2.3 Purpose of the Quality System

2.3.1 The Quality System should enable the operator to monitor compliance with ANTR OPS 1, the Operations Manual, the Operator's Maintenance Management Exposition, and any other standards specified by that operator, or the BCAA, to ensure safe operations and airworthy aircraft.

2.4 Quality Manager

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

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

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

2.4.4 The Quality Manager should:

a. Have direct access to the Accountable Manager;

b. Have access to all parts of the operator's and, as necessary, any sub-contractor's organisation.

2.4.5 In the case of small/very small operators (see paragraph 7.3 below), the posts of the Accountable Manager and the Quality Manager may be combined. However, in this event, quality audits should be conducted by independent personnel. In accordance with paragraph 2.4.4.b above, it will not be possible for the Accountable Manager to be one of the nominated postholders.

3 Quality System

3.1 Introduction

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

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

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

3.2 Scope

3.2.1 As a minimum, the Quality System should address the following:

a. The provisions of ANTR-OPS;

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

c. The operator's Quality Policy;

d. The operator's organisational structure;

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

f. Documentation, including manuals, reports and records;

g. Quality Procedures;

h. Quality Assurance Programme;

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

j. Training requirements.

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

3.3 Relevant Documentation

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

3.3.2 In addition, relevant documentation should also include the following:

a. Quality Policy;

b. Terminology;

c. Specified operational standards;

d. A description of the organisation;

e. The allocation of duties and responsibilities;

f. Operational procedures to ensure regulatory compliance;

g. Safety Management System;

h. The Quality Assurance Programme, reflecting;

   i. Schedule of the monitoring process;

   ii. Audit procedures;

   iii. Reporting procedures;

   iv. Follow-up and corrective action procedures;

   v. Recording system;

i. The training syllabus; and

j. Document control.

4 Quality Assurance Programme (See ANTR OPS 1.035(b).)

4.1 Introduction

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

4.1.2 When establishing a Quality Assurance Programme, consideration should, at least, be given to the paragraphs 4.2 to 4.9 below:

4.2 Quality Inspection

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

4.2.2 Typical subject areas for quality inspections are:

a. Actual flight operations;

b. Ground De-icing/Anti-icing;

c. Flight Support Services;

d. Load Control;

e. Maintenance;

f. Technical Standards; and

g. Training Standards.

4.3 Audit

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

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

a. A statement explaining the scope of the audit;

b. Planning and preparation;

c. Gathering and recording evidence; and

d. Analysis of the evidence.

4.3.3 Techniques which contribute to an effective audit are:

a. Interviews or discussions with personnel;

b. A review of published documents;

c. The examination of an adequate sample of records;

d. The witnessing of the activities which make up the operation; and

e. The preservation of documents and the recording of observations.

4.4 Auditors

4.4.1 The operator should decide, depending on the complexity of the operation, whether to make use of a dedicated audit team or a single auditor. In any event, the auditor or audit team should have relevant operational and/or maintenance experience.

4.4.2 The responsibilities of the auditors should be clearly defined in the relevant documentation.

4.5 Auditor's Independence

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

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

a. Perform quality inspections and audits as part of ongoing Quality Assurance;

b. Identify and record any concerns or findings, and the evidence necessary to substantiate such concerns or findings;

c. Initiate or recommend solutions to concerns or findings through designated reporting channels;

d. Verify the implementation of solutions within specific timescales;

e. Report directly to the Quality Manager.

4.6 Audit Scope

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

a. Organisation;

b. Plans and Company objectives;

c. Operational Procedures;

d. Flight Safety;

e. Operator certification (AOC/Operations specification);

f. Supervision;

g. Aircraft Performance;

h. All Weather Operations;

i. Communications and Navigational Equipment and Practices;

j. Mass, Balance and Aircraft Loading;

k. Instruments and Safety Equipment;

l. Manuals, Logs, and Records;

m. Flight and Duty Time Limitations, Rest Requirements, and Scheduling;

n. Aircraft Maintenance/Operations interface;

o. Use of the MEL;

p. Maintenance Programmes and Continued Airworthiness;

q. Airworthiness Directives management;

r. Maintenance Accomplishment;

s. Defect Deferral;

t. Flight Crew;

u. Cabin Crew;

v. Dangerous Goods;

w. Security;

x. Training.

4.7 Audit Scheduling

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

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

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

4.8 Monitoring and Corrective Action

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

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

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

4.8.4 Corrective action

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

i. The seriousness of any findings and any need for immediate corrective action;

ii. The origin of the finding;

iii. What corrective actions are required to ensure that the non-compliance does not recur;

iv. A schedule for corrective action;

v. The identification of individuals or departments responsible for implementing corrective action;

vi. Allocation of resources by the Accountable Manager, where appropriate.

4.8.5 The Quality Manager should:

a. Verify that corrective action is taken by the manager responsible in response to any finding of non-compliance;

b. Verify that corrective action includes the elements outlined in paragraph 4.8.4 above;

c. Monitor the implementation and completion of corrective action;

d. Provide management with an independent assessment of corrective action, implementation and completion;

e. Evaluate the effectiveness of corrective action through the follow-up process.

4.9 Management Evaluation

4.9.1 A management evaluation is a comprehensive, systematic, documented review by the management of the quality system, operational policies and procedures, and should consider:

a. The results of quality inspections, audits and any other indicators;

b. The overall effectiveness of the management organisation in achieving stated objectives.

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

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

4.10 Recording

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

4.10.2 The following records should be retained for a period of 5 years:

a. Audit Schedules;

b. Quality inspection and Audit reports;

c. Responses to findings;

d. Corrective action reports;

e. Follow-up and closure reports; and

f. Management Evaluation reports.

5 Quality Assurance Responsibility for Sub-Contractors

5.1 Sub-Contractors

5.1.1 Operators may decide to sub-contract out certain activities to external agencies for the provision of services related to areas such as:

a. Ground De-icing/Anti-icing;

b. Maintenance;

c. Ground handling;

d. Flight Support (including Performance calculations, flight planning, navigation database and despatch);

e. Training;

f. Manual preparation.

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

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

6 Quality System Training

6.1 General

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

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

a. An introduction to the concept of the Quality System;

b. Quality management;

c. The concept of Quality Assurance;

d. Quality manuals;

e. Audit techniques;

f. Reporting and recording; and

g. The way in which the Quality System will function in the company.

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

6.2 Sources of Training

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

7 Organisations with 20 or less full time employees

7.1 Introduction

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

7.2 Scale of Operation

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

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

7.3 Quality Systems for small/very small Operators

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

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

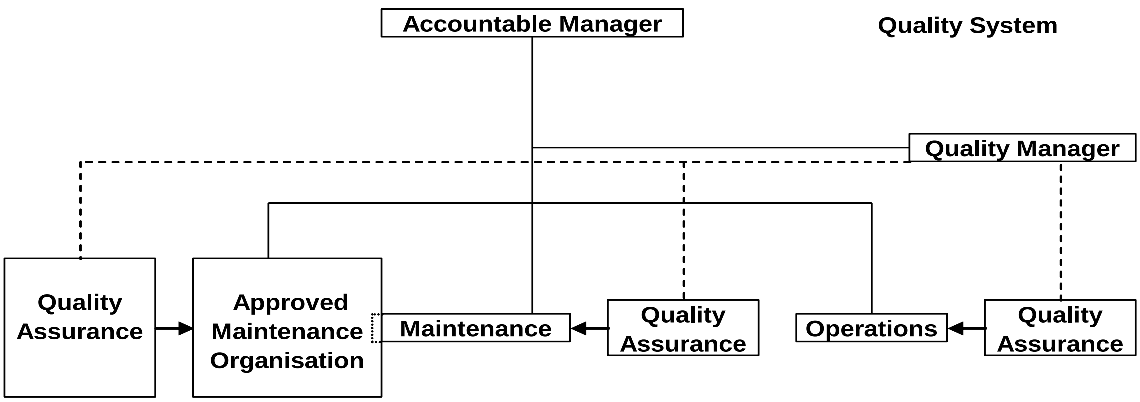
7.3.3 If the independent quality audit function is being conducted by external auditors, the audit schedule should be shown in the relevant documentation.

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

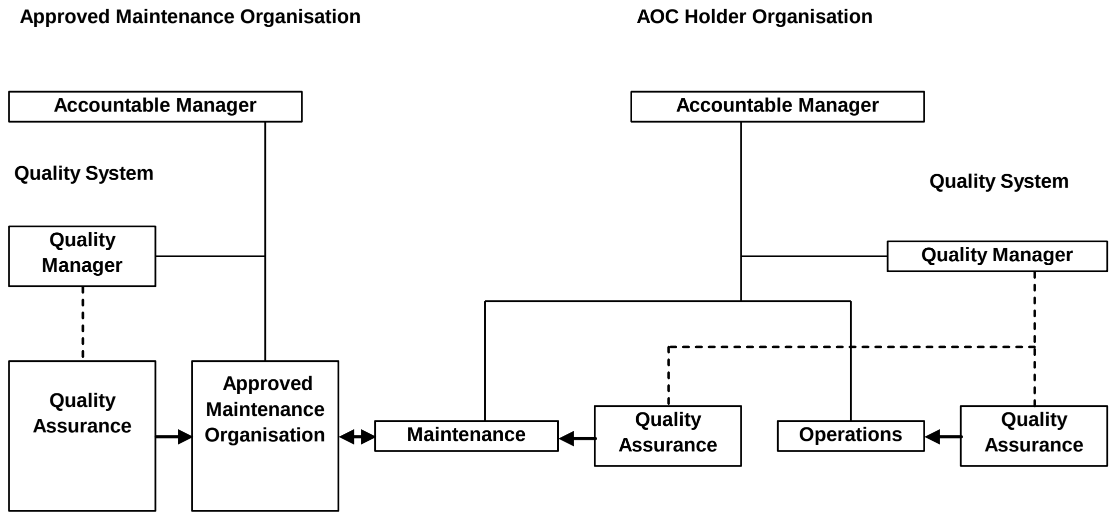
IEM OPS 1.035
Quality System – Organisation examples
See ANTR OPS 1.035

The following diagrams illustrate two typical examples of Quality organisations.

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



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



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

IEM OPS 1.037
Safety Management Systems (See ANTR OPS 1.037)

1. Guidance material for the establishment of a Safety Management System and Flight Data Monitoring can be found in:

   a. ICAO Annex 6, Part 1, Appendix 2 (Organisation and contents of an operations Manual) and Attachment F to Annex 6, Part 1.

   b. ICAO Doc 9859 (Safety Management Manual)

   c. EASA – Easy Access Rules for Air Operations – ORO.AOC.130 and its AMC/GM

   d. ANTR Volume III Part 19.

2. Guidance material for prescriptive compliance and managing fatigue-related risks within SMS requirements can be found in:

   a. ICAO Doc 9966 (Manual for the Oversight of Fatigue Management Approaches, 2nd Edition 2016.

AC OPS 1.037(c)
Occurrence Reporting Scheme
See ANTR OPS 1.037(c)

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

2. The detailed objectives of the scheme are:

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

   b. To ensure that knowledge of relevant incidents and accidents is disseminated so that other persons and organisations may learn from them.

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

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

AC OPS 1.037(d)
Flight Data Analysis Programme (FDAP)
See ANTR OPS 1.037(d)

1. Flight Data Analysis Programme (FDAP) is the pro-active use of digital flight data from routine operations to improve aviation safety. A flight data analysis programme shall contain adequate safeguards to protect the source(s) of the data in accordance with Appendix 3 to Annex 19.

2. The manager of the safety management system, which includes the FDAP programme, is accountable for the discovery of issues and the transmission of these to the relevant manager(s) responsible for the process(es) concerned. The latter are accountable for taking appropriate and practicable safety action within a reasonable period of time that reflects the severity of the issue.

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

3. An FDAP programme will allow the operator to:

3.1 Identify areas of operational risk and quantify current safety margins.

3.2 Identify and quantify operational risks by highlighting when non-standard, unusual or unsafe circumstances occur.

3.3 Use the FDAP information on the frequency of occurrence, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues.

3.4 Put in place appropriate procedures for remedial action once an unacceptable risk, either actually present or predicted by trending, has been identified.

3.5 Confirm the effectiveness of any remedial action by continued monitoring.

4. Flight Data Monitoring Analysis Techniques:

4.1 Exceedence Detection: This looks for deviations from flight manual limits, and standard operating procedures. A set of core events should be selected to cover the main areas of interest to the operator. A sample list is given in ANTR OPS 1.037(e). The event detection limits should be continuously reviewed to reflect the operator‟s current operating procedures.

(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.

4.2 All Flights Measurement: A system that defines what is normal practice. This may be accomplished by retaining various snapshots of information from each flight.

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.

4.3 Statistics: A series of measures collected to support the analysis process. These would be expected to include the numbers of flights flown and analysed, aircraft and sector details sufficient to generate rate and trend information.

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.

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

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

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

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 overtemperatures); 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.

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

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

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

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

Continuing airworthiness

Data of all-flight measurements and exceedance detections can be utilised 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.

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

a) The aim of the FDAP programme.

b) A data access and security policy that should restrict access to information to specifically authorised persons identified by their position.

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

d) The data retention policy and accountability including the measures taken to ensure the security of the data.

e) The conditions under which, on rare occasions, advisory briefing or remedial training should take place; this should always be carried out in a constructive and non-punitive manner.

f) The conditions under which the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern.

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

h) The policy for publishing the findings resulting from FDAP.

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

a. 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 visualisation 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 specialised 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.

b. 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 actions 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 learnt 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 competent 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 programme objectives with expected results. This provides a basis for review of the FDM programme and the foundation for future programme development.

c. 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 covers 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.

d. 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

AC OPS 1.037(l)
Safety Risk Register
See ANTR OPS 1.037(l)

Hazard		Incident Sequence Description	Existing Controls	Outcome Pre-Mitigation			Additional Mitigation required	Outcome Post Mitigation			Actions and Owners	Monitoring and Review Requirements
No.	Description			Severity	Likelihood	Risk		Severity	Likelihood	Risk		

IEM OPS 1.065
Carriage of weapons of war and munitions of war
See ANTR OPS 1.065

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

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

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

IEM OPS 1.070
Carriage of sporting weapons
See ANTR OPS 1.070

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

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

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

a. Those designed for shooting game, birds and other animals;

b. Those used for target shooting, clay-pigeon shooting and competition shooting, providing the weapons are not those on standard issue to military forces;

c. Airguns, dart guns, starting pistols, etc.

4 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 aeroplane.

5 Other procedures for the carriage of sporting weapons may need to be considered if the aeroplane does not have a separate compartment in which the weapons can be stowed. These procedures should take into account the nature of the flight, its origin and destination, and the possibility of unlawful interference. As far as possible, the weapons should be stowed so they are not immediately accessible to the

passengers (e.g. in locked boxes, in checked baggage which is stowed under other baggage or under fixed netting). If procedures other than those in ANTR OPS 1.070(b)(1) are applied, the commander should be notified accordingly.

AC OPS 1.085(e)(3)
Crew responsibilities
See ANTR OPS 1.085(e)(3)

Information on the effects of medication, drugs, other treatments and alcohol, is to be found in ANTR FCL Part 3 Medical, IEM FCL 3.040.

AMC OPS 1.110
Portable Electronic Devices
(See ANTR OPS 1.110 and IEM OPS 1.110)

1. GENERAL

(a) Scope

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

(b) Restrictions on the use of PEDs in the passenger compartment

If the 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 above general principle may be granted under the responsibility of the operator:

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

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

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

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

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

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

(3) Announcements 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, 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 competent 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.

The BCAA reminds the industry to consider the applicable telecommunication regulations before allowing the use of transmitting functions on-board aircraft.

IEM OPS 1.110
Portable Electronic Devices
(See ANTR OPS 1.110 and AMC OPS 1.110)

(a) Definition and categories of PEDs

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

PEDs fall into three categories:

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

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

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

(b) Definition of the switched-off status

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

(c) 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.

AMC OPS 1.130
Manuals to be carried
See ANTR OPS 1.130 (a) (1)

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

AC OPS 1.160(a)(1) and (2)
Preservation of Recordings
See ANTR OPS 1.060(a)(1) and (2)

In ANTR OPS 1.160(a)(1) and (2), the phrase ‘to the extent possible’ means that either:

1 There may be technical reasons why all of the data cannot be preserved; or

2 The aeroplane may have been despatched with unserviceable recording equipment as permitted by the MEL Policy.

AC OPS 1.165(c)(2)
Leasing of aeroplanes between a Bahraini operator and any entity
See ANTR OPS 1.165(c)(2)

1 Reserved

2 The BCAA may approve individually Bahraini operators provided that:

(a) The lessor is the operator holding an AOC issued by a State which is a signatory to the Convention on International Civil Aviation; and

(b) Unless otherwise agreed by the BCAA of the lessee, the lessee audits the operation of the lessor to confirm compliance with operating and aircrew training standards equivalent to ANTR OPS 1, maintenance standards equivalent to ANTR 145, and aircraft certification standards as prescribed in JARs or FARs; and

(c) The routes intended to be flown are contained within the authorised areas of operations specified in the AOC of the lessor; and

(d) (Reserved)

(e) For the duration of the lease, the flight and duty time limitations and rest requirements used by the lessor are not more permissive than apply in OPS

3 Lessors, when first approved by the BCAA, and any revalidations, remain valid for aperiod not exceeding 12 months.

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

Appendix to AC OPS 1.037 (a)(4)
Safety Management System – Flight Data Monitoring Programme

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.

Event Group	Description
Rejected take-Off	High Speed Rejected take-off
Take-off Pitch	Pitch rate high on take-off Pitch attitude high during take-off
Unstick Speeds	Unstick speed high Unstick speed low
Height Loss in Climb-out	Initial climb height loss 20 ft AGL to 400 ft AAL Initial climb height loss 400 ft to 1 500 ft AAL
Slow Climb-out	Excessive time to 1 000 ft AAL after take-off
Climb-out Speeds	Climb out speed high below 400 ft AAL Climb out speed high 400 ft AAL to 1 000 ft AAL Climb out speed low 35 ft AGL to 400 ft AAL Climb out speed low 400 ft AAL to 1 500 ft AAL
High Rate of Descent	High rate of descent below 2 000 ft AGL
Go-around	Go-around below 1 000 ft AAL Go-around above 1 000 ft AAL
Low Approach	Low on approach
Glideslope	Deviation under glideslope Deviation above glideslope (below 600 ft AGL)
Approach Power	Low power on approach
Approach Speeds	Approach speed high within 90 sec of touchdown Approach speed high below 500 ft AAL Approach speed high below 50 ft AGL Approach speed low within 2 minutes of touchdown
Landing Flap	Late land flap (not in position below 500 ft AAL) Reduced flap landing Flap load relief system operation
Landing Pitch	Pitch attitude high on landing Pitch attitude low on landing
Bank Angles	Excessive bank below 100 ft AGL Excessive bank 100 ft AGL to 500 ft AAL Excessive bank above 500 ft AGL Excessive bank near ground (below 20 ft AGL)
Normal Acceleration	High normal acceleration on ground High normal acceleration in flight flaps up (+/- increment) High normal acceleration in flight flaps down(+/- increment) High normal acceleration at landing
Abnormal Configuration	Take-off configuration warning Early configuration change after take-off (flap) Speed brake with flap Speedbrake on approach below 800 ft AAL Speedbrake not armed below 800 ft AAL
Ground Proximity Warning	GPWS operation - hard warning GPWS operation - soft warning GPWS operation - windshear warning GPWS operation - false warning
TCAS Warning	TCAS operation – Resolution Advisory
Margin to Stall/Buffet	Stickshake False stickshake Reduced lift margin except near ground Reduced lift margin at take-off Low buffet margin (above 20 000 ft)
Flight Manual Limitations	Vmo exceedence Mmo exceedence Flap placard speed exceedence Gear down speed exceedence Gear selection up/down speed exceedence Flap/ Slat altitude exceedence Maximum operating altitude exceedence

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AC/AMC/IEM C – OPERATOR CERTIFICATION & SUPERVISION

IEM OPS 1.175
The management organisation of an AOC/Authorisation holder
See ANTR OPS 1.175(g)-(o)

1 Function and Purpose

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

2 Responsibilities of Management

2.1 The responsibilities of management related to OPS Part 1 should include at least the following five main functions:

a. Determination of the operator’s flight safety policy;

b. Allocation of responsibilities and duties and issuing instructions to individuals, sufficient for implementation of company policy and the maintenance of safety standards;

c. Monitoring of flight safety standards;

d. Recording and analysis of any deviations from company standards and ensuring corrective action;

e. Evaluating the safety record of the company in order to avoid the development of undesirable trends.

IEM OPS 1.175(e)(2)
Principal place of business
See ANTR OPS 1.175(e)(2)

1 ANTR OPS 1.175(e)(2) requires the operator to have his principal place of business located in Bahrain.

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

AC OPS 1.175(k)
Nominated Postholders – Competence
See ANTR OPS 1.175(k)

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

2. Nominated postholders should have:

2.1 Practical experience and expertise in the application of aviation safety standards and safe operating practices;

2.2 Comprehensive knowledge of:

a. OPS and any associated requirements and procedures;

b. The AOC holder's Operations Specifications;

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

2.3 Familiarity with Quality Systems;

2.4 Appropriate management experience in a comparable organisation; and

2.5 Five years relevant work experience of which at least two years should be from the aeronautical industry in an appropriate position.

3. Flight Operations. The nominated postholder or his deputy should hold a valid Flight Crew Licence appropriate to the type of operation conducted under the AOC in accordance with the following:

3.1 If the AOC/Authorisation includes aeroplanes certificated for a minimum crew of 2 pilots - An Airline Transport Pilot's Licence issued or validated by the BCAA:

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

4. Maintenance System. The nominated postholder should possess the following:

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

4.2 Thorough familiarity with the organisation's Maintenance Management Exposition.

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

4.4 Knowledge of maintenance methods.

5. Crew Training. The nominated postholder or his deputy should be a current Type Rating Instructor on a type/class operated under the AOC/Authorisation.

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

6. Ground Operations. The nominated postholder should have a thorough knowledge of the AOC/Authorisation holder's ground operations concept.

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

AC OPS 1.175(l)
Combination of nominated postholder's responsibilities
See ANTR OPS 1.175(l)

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

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

3. The capacity of an individual to meet his responsibilities will primarily be dependent upon the scale of the operation. However, the complexity of the organisation or of the operation may prevent, or limit, combinations of posts which may be acceptable in other circumstances.

4. In most circumstances, the responsibilities of a nominated postholder will rest with a single individual. However, in the area of ground operations, it may be acceptable for these responsibilities to be split, provided that the responsibilities of each individual concerned are clearly defined.

5. The intent of ANTR OPS 1.175 is neither to prescribe any specific organisational hierarchy within the operator's organisation nor to prevent an Authority from requiring a certain hierarchy before it is satisfied that the management organisation is suitable.

AC OPS 1.175(l) & (m)
Employment of staff
See ANTR OPS 1.175(l) & (m*)*

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

IEM OPS 1.185(b)
Maintenance Management Exposition details
See ANTR OPS 1.185(b)

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

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

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AC/AMC/IEM D – OPERATIONAL PROCEDURES

AC OPS 1.195
Operational Control
See ANTR OPS 1.195

1 Operational control means the exercise by the operator, in the interest of safety, of responsibility for the initiation, continuation, termination or diversion of a flight. There may be a requirement for licensed flight dispatchers and a full flight watch system for EDTO operations.

2 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, termination or diversion of each flight.

AC OPS 1.205
Competence of Operations personnel
See ANTR OPS 1.205

If the operator employs Flight Operations Officers in conjunction with a method of Operational Control as defined in ANTR OPS 1.195, training for these personnel should be based on relevant parts of ICAO Doc 7192 D3. This training should be described in Subpart D of the Operations Manual.

AMC OPS 1.210(a)
Establishment of procedures
See ANTR OPS 1.210(a)

1 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.

2 The operator should specify procedures to be followed by cabin crew with respect to:

a. Arming and disarming of slides;

b. The operation of cabin lights, including emergency lighting;

c. The prevention and detection of cabin, oven and toilet fires;

d. Action to be taken when turbulence is encountered; and

e. Actions to be taken in the event of an emergency and/or an evacuation.

IEM OPS 1.210(b)
Establishment of procedures
See ANTR OPS 1.210(b)

When the operator establishes procedures and a checklist system for use by cabin crew with respect to the aeroplane cabin, at least the following items should be taken into account:

	ITEM	PRE-TAKE-OFF	IN-FLIGHT	PRE-LANDING	POST-LANDING
1.	Brief of cabin crew by the senior cabin crew member prior to commencement of a flight or series of flights.	X			
2.	Check of safety equipment in accordance with operator's policies and procedures.	X			
3.	Security checks as required by Subpart S (ANTR OPS 1.1250).	X			X
4.	Supervision of passenger embarkation and disembarkation (ANTR OPS 1.075; ANTR OPS 1.105; ANTR OPS 1.270; ANTR OPS 1.280; ANTR OPS 1.305).	X			X
5.	Securing of passenger cabin (e.g. seat belts, cabin cargo/baggage etc.(ANTR OPS 1.280; ANTR OPS 1.285; ANTR OPS 1.310).	X		X	
6.	Securing of galleys and stowage of equipment (ANTR OPS 1.325).	X		X	
7.	Arming of door slides.	X		X	
8.	Safety information to passengers (ANTR OPS 1.285).	X	X	X	X
9.	'Cabin secure' report to flight crew.	X	if required	X	
10.	Operation of cabin lights.	X	if required	X	
11.	Cabin crew at crew stations for take-off and landing.(ANTR OPS 1.310, ANTR OPS 1.210(c)/IEM OPS 1.210(c)).	X		X	X
12.	Surveillance of passenger cabin.	X	X	X	X
13.	Prevention and detection of fire in the cabin (including the combi-cargo area), crew rest areas, galleys and toilets and instructions for actions to be taken.	X	X	X	X
14.	Action to be taken when turbulence is encountered or in-flight incidents (pressurisation failure, medical emergency etc.). (See also ANTR OPS 1.320 and ANTR OPS 1.325).		X		
15.	Disarming of door slides.				X
16.	Reporting of any deficiency and/or unserviceability of equipment and/or any incident (See also ANTR OPS 1.420).	X	X	X	X

AC OPS 1.216
In-flight Operational Instructions
See ANTR OPS 1.216

When co-ordination with an appropriate Air Traffic Service unit has not been possible, in-flight operational instructions do not relieve a commander of responsibility for obtaining an appropriate clearance from an Air Traffic Service unit, if applicable, before making a change in flight plan.

IEM OPS 1.220
Authorisation of aerodromes
See ANTR OPS 1.220

1 When defining aerodromes for the type of aeroplane(s) and operation(s) concerned, the operator should take account of the following:

1.1 An adequate aerodrome is an aerodrome which the operator considers to be satisfactory, taking account of the applicable performance requirements and runway characteristics. In addition, it should be anticipated that, at the expected time of use, the aerodrome will be available and equipped with necessary ancillary services, such as ATS, sufficient lighting, communications, weather reporting, navaids and emergency services ***/ Rescue and Fire Fighting Services.***

AC OPS 1.241
Altimetry System Performance Requirements for Operations in RVSM Airspace
See ANTR OPS 1.241

1. In respect of groups of aeroplanes that are nominally of identical design and build with respect to all details that could influence the accuracy of height-keeping performance, the height-keeping performance capability shall be such that the total vertical error (TVE) for the group of aeroplanes shall have a mean no greater than 25 m (80 ft) in magnitude and shall have a standard deviation no greater than $28 – 0.013 z^2$ for $0 \le z \le 25$ when z is the magnitude of the mean TVE in metres, or $92 – 0.004 z^2$ for $0 \le z \le 80$ where z is in feet. In addition, the components of TVE shall have the following characteristics:

a. the mean altimetry system error (ASE) of the group shall not exceed 25 m (80 ft) in magnitude;

b. the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 m (245 ft); and

c. the differences between cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

2. In respect of aeroplanes for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belonging to a group of aeroplanes encompassed by paragraph 1, the height-keeping performance capability shall be such that the components of the TVE of the aeroplane have the following characteristics:

a. the ASE of the aeroplane shall not exceed 60 m (200 ft) in magnitude under all flight conditions; and

b. the differences between the cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.

AC OPS 1.243
Operations in areas with specified navigation performance requirements
See ANTR OPS 1.243

1. The equipment carriage requirements, operational and contingency procedures and operator approval requirements relating to areas, portions of airspace or on routes where navigation performance specifications have so far been specified can be found in the following documentation:

a. North Atlantic High-Level Airspace (NAT HLA) - ICAO document Doc 7030/4 Regional Supplementary Procedures (NAT Supps)

b. For RVSM in the North Atlantic and Europe (ECAC States) - Doc 7030/4 (NAT and EUR Supps)

c. For General Guidance on Performance Based Navigation Manual - ICAO Doc 9613

d. Guidance on specific approvals for PBN authorization required (AR) navigation specifications is contained in the Performance-based Navigation (PBN) Operational Approval Manual – ICAO Doc 9997.

e. For European RNAV (ECAC States) - Doc 7030/4 (EUR Supps)

f. Eurocontrol Standard Document 009-93 (RNAV Operations)

2. Operators should be aware that requirements relating to performance based navigation, including Area Navigation (RNAV) and Required Navigation Performance (RNP), are currently under rapid development. Pending the development, appropriate EASA and/or ICAO endorsed guidance and approval material, may be used in order to approve operators for operations in airspace that has specified navigation performance requirements.

IEM OPS 1.245(a)
Maximum distance from an adequate aerodrome for two-engined aeroplanes without EDTO Approval
See ANTR OPS 1.245

Notes:

1. MAPSC - Maximum Approved Passenger Seating Configuration
2. MTOM - Maximum Take-Off Mass

AMC OPS 1.245(a)(2)
Operation of non-EDTO compliant twin turbojet aeroplanes between 120 and 180 minutes from an adequate aerodrome
See ANTR OPS 1.245(a)(2)

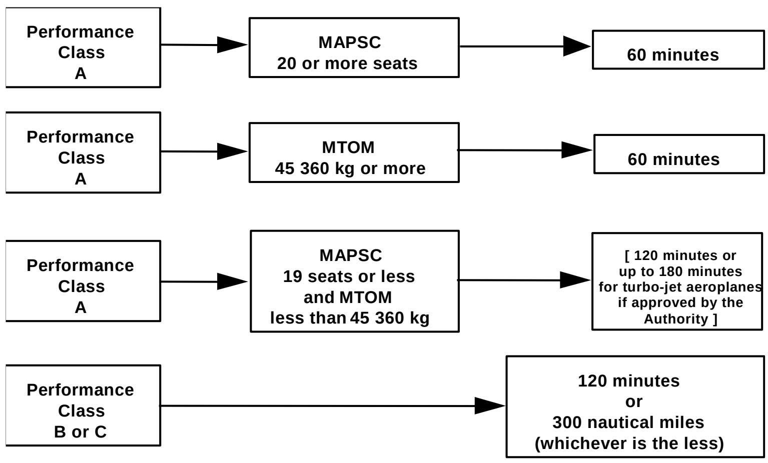
1. As prescribed in ANTR OPS 1.245(a)(2), the operator may not operate a twin turbo-jet powered aeroplane having a maximum approved passenger seating configuration of 19 or less and a MTOM less than 45360Kg beyond 120 minutes from an adequate aerodrome at the one engine inoperative cruise speed calculated in accordance with ANTR OPS 1.245(b) unless approved by the BCAA. This 120 minute threshold may be exceeded by no more than 60 minutes. In order for operations between 120 and 180 minutes to be approved, due account should be taken of the aeroplane's design and capabilities (as outlined below) and the operator's experience related to such operations. The operator should ensure that the following items are addressed. Where necessary, information should be included in the Operations Manual and the Operator's Maintenance Management Exposition.

Note: Mention of "the aeroplane's design" in paragraph 1 above does not imply any additional Type Design Approval requirements (beyond the applicable original Type Certification requirements) before the BCAA will permit operations beyond the 120 minute threshold.

2. Systems capability - Aeroplanes should be certificated to the respective Certification Specification / TCDS as accepted by BCAA for Large Transport Category Aeroplane as appropriate (or equivalent). With respect to the capability of the aeroplane systems, the objective is that the aeroplane is capable of a safe diversion from the maximum diversion distance with particular emphasis on operations with one engine inoperative or with degraded system capability. To this end, the operator should give consideration to the capability of the following systems to support such a diversion:

   a. Propulsion systems - The aeroplane power plant should meet the applicable requirements prescribed in CFR 14 PART 25 / CS 25 and CS E or equivalents, concerning engine type certification, installation and system operation. In addition to the performance standards established by the BCAA at the time of engine certification, the engines should comply with all subsequent mandatory safety standards specified by the BCAA, including those necessary to maintain an acceptable level of reliability. In addition, consideration should be given to the effects of extended duration single engine operation (e.g. the effects of higher power demands such as bleed and electrical).

   b. Airframe systems - With respect to electrical power, three or more reliable (as defined by the respective Certification Specification / TCDS as accepted by BCAA for Large Transport Category Aeroplane or equivalent) and independent electrical power sources should be available, each of which should be capable of providing power for all essential services (See Appendix 1). For single engine operations, the remaining power (electrical, hydraulic, pneumatic) should continue to be available at levels necessary to permit continued safe flight and landing, and to provide those services necessary for the overall safety of the passengers and crew. As a minimum, following the failure of any two of the three electrical power sources, the remaining source should be capable of providing power for all of the items necessary for the duration of any diversion. If one or more of the required electrical power sources are provided by an APU,



hydraulic system or Air Driven Generator/Ram Air Turbine (ADG/RAT), the following criteria should apply as appropriate:

i. To ensure hydraulic power (Hydraulic Motor Generator) reliability, it may be necessary to provide two or more independent energy sources.

ii. The ADG/RAT, if fitted, should not require engine dependent power for deployment.

iii. The APU should meet the criteria in sub-paragraph c below.

c. APU - The APU, if required for extended range operations, should be Certificated as an essential APU and should meet the applicable CFR 14 PART 25 / CS 25 provisions or equivalent.

d. Fuel supply system - Consideration should include the capability of the fuel supply system to provide sufficient fuel for the entire diversion taking account of aspects such as fuel boost and fuel transfer.

3. Powerplant Events and corrective action.

a. All powerplant events and operating hours should be reported by the operator to the Airframe and Engine manufacturers as well as to the Authority in the State of the operator.

b. These events should be evaluated by the operator in consultation with his Authority and with the engine and airframe manufacturers. The BCAA may consult with the type design authority to ensure that world wide data is evaluated.

c. Where statistical assessment alone may not be applicable e.g. where the fleet size or accumulated flight hours are small, individual powerplant events should be reviewed on a case by case basis.

d. The evaluation or statistical assessment, when available, may result in corrective action or the application of operational restrictions.

Note: Powerplant events could include engine shut downs, both on ground and inflight, (excluding normal training events) including flameout, occurrences where the intended thrust level was not achieved or where crew action was taken to reduce thrust below the normal level for whatever reason, and unscheduled removals.

4. <u>Maintenance</u>: The operator's maintenance requirements should address the following:

a. Release to service - A pre-departure check, additional to the pre-flight inspection required by ANTR M; M.A.201 should be reflected in the Operator's Maintenance Management Exposition. These checks should be conducted and certified by an organisation appropriately approved/accepted in accordance with ANTR-145 or by an appropriately trained flight crew member prior to an extended range flight to ensure that all maintenance actions are complete and all fluid levels are at prescribed levels for the flight duration.

b. Engine oil consumption programmes - Such programmes are intended to support engine condition trend monitoring (see below).

c. Engine condition trend monitoring programme - A programme for each powerplant that monitors engine performance parameters and trends of degradation that provides for maintenance actions to be undertaken prior to significant performance loss or mechanical failure.

d. Arrangements to ensure that all corrective actions required by the type design authority are implemented.

5. <u>Flight Crew Training</u>: Flight crew training for this type of operation should include, in addition to the requirements of ANTR OPS 1 Sub part N, particular emphasis on the following:

a. Fuel management - Verifying required fuel on board prior to departure and monitoring fuel on board en-route including calculation of fuel remaining. Procedures should provide for an independent cross-check of fuel quantity indicators (e.g. fuel flow used to calculate fuel burned compared to indicated fuel remaining). Confirmation that the fuel remaining is sufficient to satisfy the critical fuel reserves.

b. Procedures for single and multiple failures in flight that may give rise to go/no-go and diversion decisions - Policy and guidelines to aid the flight crew in the diversion decision making process and the need for constant awareness of the closest suitable alternate aerodrome in terms of time.

c. One-engine inoperative performance data - Drift down procedures and one-engine inoperative service ceiling data.

d. Weather reports and flight requirements - METAR and TAF reports and obtaining in flight weather updates on en-route alternate, destination and destination alternate aerodromes. Consideration should also be given to forecast winds (including the accuracy of the forecast compared to actual wind experienced during flight) and meteorological conditions along the expected flight path at the one-engine inoperative cruising altitude and throughout the approach and landing.

e. Pre-departure check - Flight crew members who are responsible for the pre-departure check of an aeroplane (see paragraph 3.a above), should be fully trained and competent to do so. The training programme required, which should be approved by the BCAA, should cover all relevant maintenance actions with particular emphasis on checking required fluid levels.

6 MEL - The MEL should take into account all items specified by the manufacturer relevant to operations in accordance with this AMC.

7. <u>Dispatch/Flight Planning Requirements</u>: The operator's dispatch requirements should address the following:

a. Fuel and oil supply - An aeroplane should not be dispatched on an extended range flight unless it carries sufficient fuel and oil to comply with the applicable operational requirements and any additional reserves determined in accordance with sub-paragraphs (a)(i) (ii) and (iii) below.

(i) <u>Critical fuel scenario</u> - 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 AMC OPS 1.255 1.6 a and b, as follows:

A. Fly from the critical point to an alternate aerodrome:

- At 10 000ft; or

- At 25 000ft or the single-engine ceiling, whichever is lower, provided that all occupants can be supplied with and use supplemental oxygen for the time required to fly from the critical point to an alternate aerodrome; or

- At the single-engine ceiling, provided that the aeroplane is type certificated to operate above Flight Level 450.

B. Descend and hold at 1 500 feet for 15 minutes in ISA conditions;

C. Descend to the applicable MDA/DH followed by a missed approach (taking into account the complete missed approach procedure); followed by

D. A normal approach and landing.

(ii) <u>Ice protection</u> - Additional fuel used when operating in icing conditions (e.g. operation of ice protection systems (engine/airframe as applicable)) and, when manufacturer's data is available, take account of ice accumulation on unprotected surfaces if icing conditions are likely to be encountered during a diversion;

(iii) <u>APU operation</u> - If an APU has to be used to provide additional electrical power, consideration should be given to the additional fuel required.

b. Communication facilities - The availability of communications facilities in order to allow reliable two-way voice communications between the aeroplane and the appropriate air traffic control unit at one-engine inoperative cruise altitudes.

c. Aircraft Technical Log review to ensure proper MEL procedures, deferred items, and required maintenance checks completed.

d. En-route alternate aerodrome(s) - Ensuring that en-route alternate aerodromes are available for the intended route, within 180 minutes based upon the one-engine inoperative cruise speed which is a speed within the certificated limits of the aeroplane, selected by the operator and approved by the regulatory authority, and confirmation that, based on the available meteorological information, the weather conditions at en-route alternate aerodromes are at or above the applicable minima for the period of time during which the aerodrome(s) may be used. (See also ANTR OPS 1.297).

Planning minima

Type of Approach	Planning Minima (RVR visibility required & ceiling if applicable)			
	Aerodrome with			
	at least 2 separate approach procedures based on 2 separate aids serving 2 separate runways (see IEM OPS 1.295 (c)(1)(ii))	at least 2 separate approach procedures based on 2 separate aids serving 1 runway	or	at least 1 approach procedure based on 1 aid serving 1 runway
Precision Approach Cat II, III (ILS, MLS)	Precision Approach Cat I Minima	Non-Precision Approach Minima		
Precision Approach Cat I (ILS, MLS)	Non-Precision Approach Minima	Circling minima or, if not available, non-precision approach minima plus 200 ft / 1 000 m		
Non-Precision Approach	The lower of non-precision approach minima plus 200 ft / 1 000 m or circling minima	The higher of circling minima or non-precision approach minima plus 200 ft / 1 000 m		
Circling Approach	Circling minima			

IEM OPS 1.246
Extended Diversion Time Operations
See ANTR OPS 1.246

1. Extended Diversion Time Operations - General

1.1 This guidance material is organized to address operations beyond the stated threshold times of ANTR OPS 1.245 to an en-route alternate aerodrome for all aeroplanes with turbine engines. All extended diversion time operations require BCAA approval.

It should be understood that the threshold time established in accordance with ANTR OPS 1.245 is not an operating limit. It is a flight time to an en-route alternate aerodrome, which is established by the BCAA as being the EDTO threshold beyond which particular consideration should be given to the aeroplane capability as well as the operator's relevant operational experience, before granting an EDTO approval.

1.2 Determination of the diversion time.

a. aeroplanes with two turbine engines

For determining whether a point on the route is beyond the diversion time to an en-route alternate, the operator should select an approved one-engine-inoperative (OEI) speed. The distance is calculated from the point of the diversion followed by cruise for 60 minutes, in ISA and still air conditions. For the purposes of computing distances, credit for drift-down may be taken.

b. aeroplanes with more than two turbine engines

For determining whether a point on the route is beyond the diversion time to an en-route alternate, the operator should select an approved all-engine-operative (AEO) speed. The distance is calculated from the point of the diversion followed by cruise for 120 minutes, in ISA and still air.

1.3 Training

Training programmes should ensure area, route and aerodrome qualifications are complied with such as, but not limited to, route qualification, flight preparation, concept of extended diversion time operations and criteria for diversions.

1.4 Flight dispatch and operational requirements

In applying the general flight dispatch requirements particular attention should be paid to the conditions which might prevail any time that the operation is beyond 60 minutes to an en-route alternate aerodrome, e.g. systems degradation, reduced flight altitude, etc. At least the following aspects should be considered:

a. identify en-route alternate airports;

b. ensure that prior to departure the flight crew is provided with the most up-to-date information on the identified en-route alternate aerodromes, including operational status and meteorological conditions and, in flight, make available means for the flight crew to obtain the most up-to-date meteorological information;

c. methods to enable two-way communications between the aeroplane and the operator’s operational control centre;

d. ensure that the operator has a means to monitor conditions along the planned route including the identified alternate airports and ensure that procedures are in place so that the flight crew are advised of any situation that may affect the safety of flight;

e. ensure that the intended route does not exceed the established aeroplane threshold time unless the operator is approved for EDTO operations;

f. pre-flight system serviceability including the status of items in the minimum equipment list;

g. communication and navigation facilities and capabilities;

h. fuel requirements; and

i. availability of relevant performance information for the identified en-route alternate aerodrome(s).

1.5 En-route alternate aerodromes

Aerodrome(s) to which an aircraft may proceed in the event that a diversion becomes necessary while en route, where the necessary services and facilities are available, where aircraft performance requirements can be met, and which are expected to be operational if required, need to be identified any time that the operation is beyond 60 minutes to an en-route alternate aerodrome.

Note: En-route alternate aerodromes may also be the take-off and/or destination aerodromes.

2. EDTO requirements – Two or more turbine engines

2.1 Basic concept

This section addresses provisions that apply in addition to those in Section 1 to operations by aeroplanes with two or more turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established under ANTR OPS 1.245 (extended diversion time operations).

2.2 EDTO significant systems

EDTO significant systems may be the aeroplane propulsion system and any other aeroplane systems whose failure or malfunctioning could adversely affect safety particular to an EDTO flight, or whose functioning is specifically important to continued safe flight and landing during an aeroplane EDTO diversion.

Many of the aeroplane systems which are essential for non-extended diversion time operations may need to be reconsidered to ensure that the redundancy level and/or reliability will be adequate to support the conduct of safe extended diversion time operations.

The maximum diversion time should not exceed the value of the EDTO significant system limitation(s), other than the cargo fire suppression system, for extended diversion time operations identified in the Aeroplane's Flight Manual directly or by reference, reduced with an operational safety margin, commonly 15 minutes, specified by the BCAA.

The maximum diversion time subject to cargo fire suppression time limitations are considered part of the most limiting EDTO significant time limitations.

The specific safety risk assessment to approve operations beyond the time limits of an EDTO significant time-limited system should be based on the safety risk management guidance contained in the operator's Safety Management Manual. Hazards should be identified and safety risks assessed according to predicted probability and the severity of the consequences based on the worst foreseeable situation. When addressing the following components of the specific safety risk assessment it should be understood that:

a. capabilities of the operator refer to the operator's quantifiable in-service experience, compliance record, aeroplane capability, and overall operational reliability that:

   i. is sufficient to support operations beyond the time limits of an EDTO significant time-limited system;

   ii. demonstrate the ability of the operator to monitor and respond to changes in a timely manner; and

   iii. there is an expectation that the operator's established processes, necessary for successful and reliable extended diversion time operations, can be successfully applied to such operations;

b. overall reliability of the aeroplane refers:

i. to quantifiable standards of reliability taking into account the number of engines, aircraft EDTO significant systems and any other factors that may affect operations beyond the time limits of a particular EDTO significant time limited system; and

ii. relevant data from the aeroplane manufacturer and data from the operator reliability program used as a basis to determine overall reliability of the aeroplane and its EDTO significant systems;

c. reliability of each time limited system refers to quantifiable standards of design, testing and monitoring that ensure the reliability of each particular EDTO significant time limited system;

d. relevant information from the aeroplane manufacturer refers to technical data and characteristics of the aeroplane and worldwide fleet operational data provided by the manufacturer and used as a basis to determine overall reliability of the aeroplane and its EDTO significant systems; and

e. specific mitigation measures refer to the safety risk management mitigation strategies, which have manufacturer concurrence, that ensure an equivalent level of safety is maintained. These specific mitigations shall be based on:

i. technical expertise (e.g. data, evidence) proving the operator’s eligibility for an approval of operations beyond the time limit of the relevant EDTO significant system; and

ii. an assessment of relevant hazards, their probability and severity of the consequences that may adversely impact the safety of the operation, of an aeroplane operated beyond the limit of a particular EDTO significant time limited system.

2.3 Maximum diversion time

It should be understood that the maximum diversion time to be approved should take into consideration the most limiting EDTO significant system time limitation, if any, indicated in the Aeroplane’s Flight Manual (directly or by reference) for a particular aeroplane type and the operator’s operational and EDTO experience, if any, with the aeroplane type, or if relevant with another aeroplane type or model.

3. EDTO requirements – Two turbine engines

3.1 Basic concept

This section addresses provisions that apply in addition to those in Section 1 to operations by aeroplanes with two turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established under ANTR OPS 1.245 (extended diversion time operations).

EDTO provisions for aeroplanes with two turbine engines do not differ from the previous provisions for extended range operations by aeroplanes with two turbine engines (ETOPS). Therefore, EDTO may be referred to as ETOPS in some documents.

3.2 Operational and diversion planning principles

When planning or conducting, extended diversion time operations, the operator and commander, should normally ensure that:

a. the minimum equipment list, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes or aeroplane performance, are appropriately considered;

b. in the event of an aeroplane engine shutdown, the aeroplane can proceed to and land at the nearest (in terms of the least flying time) en-route alternate aerodrome where a safe landing can be made; and

c. in the event of a single or multiple failure of an EDTO significant systems or systems (excluding engine failure), proceed to and land at the nearest available en-route alternate aerodrome where a safe landing can be made unless it has been determined that no substantial degradation of safety results from any decision made to continue the planned flight.

3.3 EDTO critical fuel

An aeroplane with two engines engaged in EDTO operations should carry enough fuel to fly to an en-route alternate aerodrome as described in ANTR OPS 1.255. The following should be considered, using the anticipated mass of the aeroplane, in determining the corresponding EDTO critical fuel:

a. fuel sufficient to fly to an en-route alternate aerodrome, considering at the most critical point of the route, failure of one engine or simultaneous engine failure and depressurization or depressurization alone, whichever is more limiting;

   i. the speed selected for the all-engine-operative diversion (i.e. depressurization alone) may be different from the approved one-engine-inoperative speed used to determine the EDTO threshold and maximum diversion distance.

   ii. the speed selected for the one-engine-inoperative diversions (i.e. engine failure alone and combined engine failure and depressurization) should be the approved one-engine-inoperative speed used to determine the EDTO threshold and maximum diversion distance.

b. fuel to account for icing;

c. fuel to account for errors in wind forecasting;

d. fuel to account for holding, an instrument approach and landing at the en-route alternate aerodrome;

e. fuel to account for deterioration in cruise fuel burn performance; and

f. fuel to account for APU use (if required).

3.4 Aerodrome Considerations

The following factors may be considered in determining if a landing at a given aerodrome is the more appropriate course of action:

a. aeroplane configuration, weight, systems status, and fuel remaining;

b. Meteorological conditions en-route at the diversion altitude, minimum altitudes en-route and fuel consumption to the en-route alternate aerodrome;

c. runways available, runway surface condition, meteorological conditions and terrain, in proximity of the en-route alternate aerodrome;

d. instrument approaches and approach/runway lighting available, rescue and fire fighting services (RFFS) at the en-route alternate aerodrome;

e. pilot's familiarity with that aerodrome and information about that aerodrome provided to the pilot by the operator; and

f. facilities for passenger and crew disembarkation and accommodation.

3.5 Maximum diversion time

In approving the maximum diversion time, the BCAA will take into consideration the EDTO certified capability of the aeroplane, the aeroplanes EDTO significant systems (e.g. limiting time limitation, if any, and relevant to that particular operation) for a particular aeroplane type and the operator's operational and EDTO experience with the aeroplane type, or if relevant, with another aeroplane type or model.

The operator's approved maximum diversion time should not exceed the EDTO certified capability of the aeroplane nor the most limiting EDTO significant system time limitation identified in the Aeroplane's Flight Manual reduced by an operational safety margin specified, commonly 15 minutes, by the BCAA.

3.6 EDTO significant systems

The reliability of the propulsion system for the aeroplane-engine combination being certified is such that the risk of double engine failures from independent causes is assessed and found acceptable to support the diversion time being approved.

For all operations beyond the EDTO threshold as determined by the BCAA, the operator should consider, at time of dispatch and as outlined below, the EDTO certified capability of the aeroplane and the most limiting

EDTO significant system time limitation, if any, indicated in the Aeroplane's Flight Manual (directly or by reference) and relevant to that particular operation.

The operator should check that from any point on the route, the maximum diversion time at the approved speed does not exceed the most limiting EDTO significant system time limitation, other than the cargo fire suppression system, reduced with an operational safety margin of 15 minutes.

The operator should check that from any point on the route, the maximum diversion time, at all engine operating cruise speed, considering ISA and still air conditions, does not exceed the cargo fire suppression system time limitation reduced with an operational safety margin of 15 minutes.

3.7 En-route alternate aerodromes

In addition to the en-route alternate aerodrome provisions described in Section 1 the following apply:

a. for route planning purposes, identified en-route alternate aerodromes need to be located at a distance within the maximum diversion time from the route and which could be used if necessary; and

b. in extended diversion time operations, before an aeroplane crosses its threshold time during flight, there should always be an en-route alternate aerodrome within the approved maximum diversion time whose conditions will be at or above the operator's established aerodrome operating minima for the operation during the estimated time of use.

If any conditions, such as meteorological conditions below landing minima, are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action should be determined such as selecting another en-route alternate aerodrome within the operator's approved maximum diversion time.

During flight preparation and throughout the flight the most up-to-date information should be provided to the flight crew on the identified en-route alternate aerodromes, including operational status and meteorological conditions.

In addition, operations conducted by aeroplanes with two turbine engines require that prior to departure and in flight, the meteorological conditions at identified en-route alternate aerodromes will be at or above the aerodrome operating minima required for the operation during the estimated time of use.

4. EDTO requirements – More ThanTwo turbine engines

4.1 Basic concept

This section addresses provisions that apply in addition to those in Sections 1 and 2 to operations by aeroplanes with more than two turbine engines where the diversion time to an en-route alternate aerodrome is greater than the threshold time established under ANTR OPS 1.245 (extended diversion time operations).

4.2 Operational and diversion planning principles

When planning or conducting, extended diversion time operations, the operator and commander, should normally ensure that:

a. the minimum equipment list, the communications and navigation facilities, fuel and oil supply, en-route alternate aerodromes or aeroplane performance, are appropriately considered;

b. if no more than one engine is shut down, the commander may elect to continue beyond the nearest en-route alternate aerodrome (in terms of time) if the commander determines that it is safe to do so. In making this decision, the commander should consider all relevant factors; and

c. in the event of a single or multiple failure of an EDTO significant system or systems (excluding engine failure), the aeroplane can proceed to and land at the nearest available en-route alternate aerodrome where a safe landing can be made unless it has been determined that no substantial degradation of safety results from any decision made to continue the planned flight.

4.3 EDTO critical fuel

An aeroplane with more than two engines engaged in EDTO operations should carry enough fuel to fly to an en-route alternate aerodrome as described in ANTR OPS 1.255. The following should be considered, using the anticipated mass of the aeroplane, in determining the corresponding EDTO critical fuel:

a. fuel sufficient to fly to an en-route alternate aerodrome, considering at the most critical point of the route, simultaneous engine failure and depressurization or depressurization alone, whichever is more limiting;

   i. the speed selected for the diversion (i.e. depressurization, combined or not with an engine failure) may be different from the approved one-engine-inoperative speed used to determine the EDTO threshold and maximum diversion distance.

b. fuel to account for icing;

c. fuel to account for errors in wind forecasting;

d. fuel to account for holding, an instrument approach and landing at the en-route alternate aerodrome;

e. fuel to account for deterioration in cruise fuel burn performance; and

f. fuel to account for APU use (if required).

4.4 Aerodrome Considerations

The following factors may be considered in determining if a landing at a given aerodrome is the more appropriate course of action:

a. aeroplane configuration, weight, systems status, and fuel remaining;

b. Meteorological conditions en-route at the diversion altitude, minimum altitudes en-route and fuel consumption to the en-route alternate aerodrome;

c. runways available, runway surface condition, meteorological conditions and terrain, in proximity of the en-route alternate aerodrome;

d. instrument approaches and approach/runway lighting available, rescue and fire fighting services (RFFS) at the en-route alternate aerodrome;

e. pilot’s familiarity with that aerodrome and information about that aerodrome provided to the pilot by the operator; and

f. facilities for passenger and crew disembarkation and accommodation.

4.5 Maximum diversion time

In approving the maximum diversion time, the BCAA will take into consideration the aeroplane, the aeroplanes EDTO significant systems (e.g. limiting time limitation, if any, and relevant to that particular operation) for a particular aeroplane type and the operator’s operational and EDTO experience with the aeroplane type, or if relevant, with another aeroplane type or model.

The operator’s approved maximum diversion time should not exceed the most limiting EDTO significant system time limitation identified in the Aeroplane’s Flight Manual reduced by an operational safety margin specified, commonly 15 minutes, by the BCAA.

4.6 EDTO significant systems

For all operations beyond the EDTO threshold as determined by the BCAA, the operator should consider, at time of dispatch and as outlined below, the most limiting EDTO significant system time limitation, if any, indicated in the Aeroplane’s Flight Manual (directly or by reference) and relevant to that particular operation.

The operator should check that from any point on the route, the maximum diversion time does not exceed the most limiting EDTO significant system time limitation, reduced by an operational safety margin of 15 minutes.

The maximum diversion time subject to cargo fire suppression time limitations are considered part of the most limiting EDTO significant time limitations.

When applying for EDTO, the operator should identify, and the BCAA should approve, the AEO speed(s), considering ISA and still-air conditions, that will be used to calculate the threshold and maximum diversion distances. The speed that will be used to calculate the maximum diversion distance may be different from the speed used to determine the 60-minute and EDTO thresholds.

4.7 En-route alternate aerodromes

In addition to the en-route alternate aerodrome provisions described in Section 1 the following apply:

a. for route planning purposes, identified en-route alternate aerodromes need to be located at a distance within the maximum diversion time from the route and which could be used if necessary; and

b. in extended diversion time operations, before an aeroplane crosses its threshold time during flight, there should always be an en-route alternate aerodrome within the approved maximum diversion time whose conditions will be at or above the operator's established aerodrome operating minima for the operation during the estimated time of use.

If any conditions, such as meteorological conditions below landing minima, are identified that would preclude a safe approach and landing at that aerodrome during the estimated time of use, an alternative course of action should be determined such as selecting another en-route alternate aerodrome within the operator's approved maximum diversion time.

Note: En-route alternate aerodromes may also be the take-off and/or destination aerodromes.

4.8 Airworthiness Certification Requirements for EDTO beyond the Threshold Time

There are no additional EDTO airworthiness certification requirements for aeroplanes with more than two engines.

IEM OPS 1.250
Establishment of Minimum Flight Altitudes
See ANTR OPS 1.250

1 The following are examples of some of the methods available for calculating minimum flight altitudes.

2 KSS Formula

2.1 Minimum obstacle clearance altitude (MOCA). MOCA is the sum of:

i. The maximum terrain or obstacle elevation whichever is highest; plus

ii. 1 000 ft for elevation up to and including 6 000 ft; or

iii 2 000 ft for elevation exceeding 6 000 ft rounded up to the next 100 ft.

2.1.1 The lowest MOCA to be indicated is 2 000 ft.

2.1.2 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).

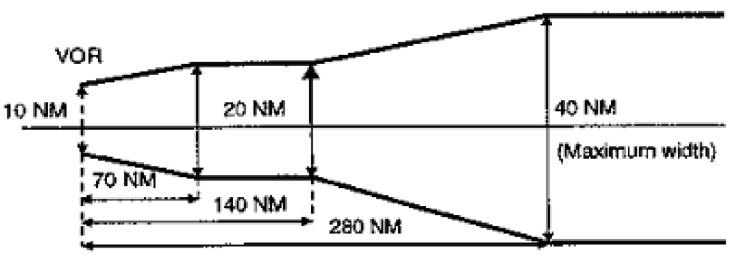


FIGURE 1

2.1.3 From an NDB, similarly, the corridor width is defined as a borderline starting 5 nm either side of the NDB diverging 7° until a width of 20 nm is reached 40 nm out, thence paralleling the centreline until 80 nm out, thence again diverging 7° until a maximum width of 60 nm is reached 245 nm out. Thereafter the width remains constant (see figure 2).

2.1.4 MOCA does not cover any overlapping of the corridor.

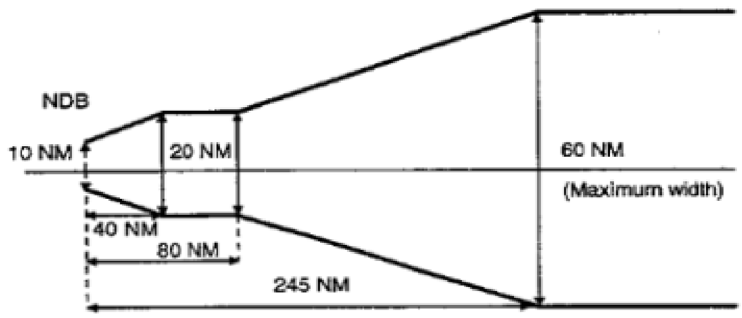


FIGURE 2

2.2 Minimum off-route altitude (MORA). MORA is calculated for an area bounded by every or every second LAT/LONG square on the Route Facility Chart (RFC)/Terminal Approach Chart (TAC) and is based on a terrain clearance as follows:

i. Terrain with elevation up to 6 000 ft (2 000 m) – 1 000 ft above the highest terrain and obstructions;

ii. Terrain with elevation above 6 000 ft (2 000 m) – 2 000 ft above the highest terrain and obstructions.

3 Jeppesen Formula (see figure 3)

3.1 MORA is a minimum flight altitude computed by Jeppesen from current ONC or WAC charts. Two types of MORAs are charted which are:

i. Route MORAs e.g. 9800a; and

ii. Grid MORAs e.g. 98.

3.2 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.

3.3 MORA values clear all terrain and man-made obstacles by 1 000 ft in areas where the highest terrain elevation or obstacles are up to 5 000 ft. A clearance of 2 000 ft is provided above all terrain or obstacles which are 5 001 ft and above.

3.4 A Grid MORA is an altitude computed by Jeppesen and the values are shown within each Grid formed by charted lines of latitude and longitude. Figures are shown in thousands and hundreds of feet (omitting the last two digits so as to avoid chart congestion). Values followed by ± are believed not to exceed the altitudes shown. The same clearance criteria as explained in paragraph 3.3 above apply.

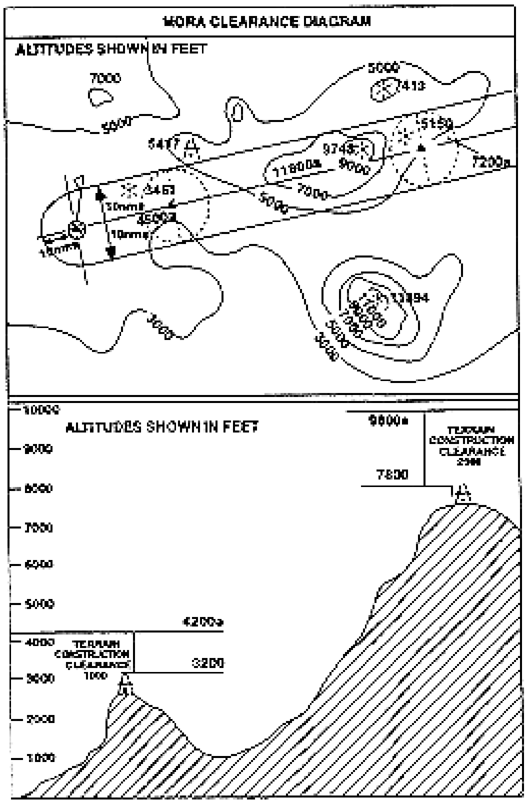


FIGURE 3

4 ATLAS Formula

4.1 Minimum safe En-route Altitude (MEA). Calculation of the MEA is based on the elevation of the highest point along the route segment concerned (extending from navigational aid to navigational aid) within a distance on either side of track as specified below:

i.	Segment length up to 100 nm	–	10 nm (See Note 1 below).
ii.	Segment length more than 100 nm	–	10% of the segment length up to a maximum of 60 nm See Note 2 below).

NOTE 1: This distance may be reduced to 5 nm within TMAs where, due to the number and type of available navigational aids, a high degree of navigational accuracy is warranted.

NOTE 2: In exceptional cases, where this calculation results in an operationally impracticable value, an additional special MEA may be calculated based on a distance of not less than 10 nm either side of track. Such special MEA will be shown together with an indication of the actual width of protected airspace.

4.2 The MEA is calculated by adding an increment to the elevation specified above as appropriate:

Elevation of highest point	Increment
Not above 5 000 ft	1 500 ft
Above 5 000 ft but not above 10 000 ft	2 000 ft
Above 10 000 ft	10% of elevation plus 1 000 ft

NOTE: For the last route segment ending over the initial approach fix, a reduction to 1 000 ft is permissible within TMAs where, due to the number and type of available navigation aids, a high degree of navigational accuracy is warranted.

The resulting value is adjusted to the nearest 100 ft.

4.3 Minimum safe Grid Altitude (MGA). Calculation of the MGA is based on the elevation of the highest point within the respective grid area.

The MGA is calculated by adding an increment to the elevation specified above as appropriate:

Elevation of highest point	Increment
Not above 5 000 ft	1 500 ft
Above 5 000 ft but not above 10 000 ft	2 000 ft
Above 10 000 ft	10% of elevation plus 1 000 ft

The resulting value is adjusted to the nearest 100 ft.

AC OPS 1.255
Contingency Fuel Statistical Method
See Appendix 1 to ANTR-OPS 1.255 (a)(3)(i)(D)

1. As an example, the following values of statistical coverage of the deviation from the planned to the actual trip fuel provides appropriate statistical coverage:

   a. 99% coverage plus 3% of the trip fuel, if the calculated flight time is less than two hours, or more than two hours and no suitable en-route alternate aerodrome is available;

   b. 99% coverage if the calculated flight time is more than two hours and a suitable en-route alternate aerodrome is available;

   c. 90% coverage if:

      i. the calculated flight time is more than two hours; and

      ii. a suitable en-route alternate aerodrome is available; and

      iii. at the destination aerodrome two (2) separate runways are available and usable, one of which is equipped with an ILS/MLS, and the weather conditions are in compliance with ANTR-OPS 1.295(c)(1)(ii); or the ILS/MLS is operational to Cat II/III operating minima and the weather conditions are at or above 500ft/2 500m.

2. The fuel consumption database used in conjunction with these values shall be based on fuel consumption monitoring for each route/aeroplane combination over a rolling two-year period.

IEM OPS 1.260
Carriage of persons with Reduced Mobility
See ANTR OPS 1.260

1 A person with reduced mobility (PRM) is understood to mean a person whose mobility is reduced due to physical incapacity (sensory or locomotory), an intellectual deficiency, age, illness or any other cause of disability when using transport and when the situation needs special attention and the adaptation to a person's need of the service made available to all passengers.

2 In normal circumstances PRMs should not be seated adjacent to an emergency exit.

3 In circumstances in which the number of PRMs forms a significant proportion of the total number of passengers carried on board:

   a. The number of PRMs should not exceed the number of able-bodied persons capable of assisting with an emergency evacuation; and

   b. The guidance given in paragraph 2 above should be followed to the maximum extent possible.

AMC OPS 1.270
Cargo carriage in the passenger cabin
See ANTR OPS 1.270

1. In establishing procedures for the carriage of cargo in the passenger cabin of an aeroplane, the operator should observe the following:

   a. That dangerous goods are not permitted (See also ANTR OPS 1.1210(a));

   b. That a mix of the passengers and live animals should not be permitted except for pets (weighing not more than 8 kg) and guide dogs;

c. That the weight of the cargo does not exceed the structural loading limit(s) of the cabin floor or seat(s);

d. That the number/type of restraint devices and their attachment points should be capable of restraining the cargo in accordance with the respective Certification Specification / TCDS as accepted by BCAA for Large Transport Category Aeroplane or equivalent;

e. That the location of the cargo should be such that, in the event of an emergency evacuation, it will not hinder egress nor impair the cabin crew's view.

AC OPS 1.280
Passenger Seating
See ANTR OPS 1.280
See IEM OPS 1.280

1 The operator should establish procedures to ensure that:

a. Those passengers who are allocated seats which permit direct access to emergency exits, appear to be reasonably fit, strong and able to assist the rapid evacuation of the aeroplane 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 which permit direct access to emergency exits. If the operator is unable to establish procedures which can be implemented at the time of passenger 'check-in', he should establish an alternative procedure acceptable to the BCAA that the correct seat allocation will, in due course, be made.

IEM OPS 1.280
Passenger Seating
See ANTR OPS 1.280

1 The following categories of passengers are among those who should not be allocated to, or directed to seats which permit direct access to emergency exits:

a. Passengers suffering from obvious physical, or mental, handicap 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 or prisoners in custody; and,

g. Passengers with animals.

Note: "Direct access" means a seat from which a passenger can proceed directly to the exit without entering an aisle or passing around an obstruction.

AC OPS 1.297(b)(2)
Planning Minima for Alternate Aerodromes
See ANTR OPS 1.297(b)(2)

'Non precision minima' in ANTR OPS 1.297, Table 1, means the next highest minimum that is available in the prevailing wind and serviceability conditions; Localiser Only approaches, if published, are considered to be 'non precision' in this context. It is recommended that operators wishing to publish Tables of planning minima choose values that are likely to be appropriate on the majority of occasions (e.g. regardless of wind direction). Unserviceabilities must, however, be fully taken into account.

AMC OPS 1.297
Application of aerodrome forecasts
See ANTR OPS 1.297

APPLICATION OF AERODROME FORECASTS (TAF & TREND) TO PRE-FLIGHT PLANNING (ICAO Annex 3 refers)

1. APPLICATION OF INITIAL PART OF TAF (For aerodrome planning minima see OPS 1.297)

a) **Applicable time period :** From the start of the TAF validity period up to the time of applicability of the first subsequent 'FM...*' or 'BECMG' or, if no 'FM' or BECMG' is given, up to the end of the validity period of the TAF.

b) **Application of forecast:** The prevailing weather conditions forecast in the initial part of the TAF should be fully applied with the exception of the **mean wind** and **gusts (and crosswind)** which should be applied in accordance with the policy in the column ' BECMG AT and FM' in the table below. This may however be overruled temporarily by a 'TEMPO' or 'PROB**' if applicable acc. to the table below.

2. APPLICATION OF FORECAST FOLLOWING CHANGE INDICATORS IN TAF AND TREND

TAF or TREND for AERODROME PLANNED AS:	FM (alone) and BECMG AT: Deterioration and Improvement	BECMG (alone), BECMG FM, BECMG TL, BECMG FM ...* TL, in case of: Deterioration	BECMG (alone), BECMG FM, BECMG TL, BECMG FM ...* TL, in case of: Improvement	TEMPO (alone), TEMPO FM, TEMPO TL, TEMPO FM ... TL, PROB30/40 (alone): Deterioration – Transient/Showery Conditions in connection with short-lived weather phenomena, e.g. thunderstorms, showers	TEMPO (alone), TEMPO FM, TEMPO TL, TEMPO FM ... TL, PROB30/40 (alone): Deterioration – Persistent Conditions in connection with e.g. haze, mist, fog, dust/sandstorm, continuous precipitation	TEMPO (alone), TEMPO FM, TEMPO TL, TEMPO FM ... TL, PROB30/40 (alone): Improvement In any case	PROB TEMPO: Deterioration and Improvement
DESTINATION at ETA ±1 HR **TAKE–OFF ALTERNATE** at ETA ± 1 HR **DEST. ALTERNATE** at ETA ± 1 HR **ENROUTE ALTERNATE** at ETA ± 1 HR (See . ' OPS AMC 1.255)	Applicable from the **start of the change.** **Mean wind:** Should be within required limits; **Gusts:** May be disregarded.	Applicable from the **time of start** of the change. **Mean wind:** Should be within required limits; **Gusts:** May be disre-garded.	Applicable from the **time of end** of the change. **Mean wind:** Should be within required limits; **Gusts:** May be disre-garded.	Not applicable **Mean wind and gusts** exceeding required limits may be **disregarded.**	Applicable **Mean wind:** Should be within required limits; **Gusts:** May be disregarded	Should be disregarded.	Deterioration may be disregarded; Improvement should be disregarded including mean wind and gusts.
ETOPS ENRT ALTN at earliest/latest ETA ± 1 HR	Applicable from the **time of start** of change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	Applicable from the **time of start** of change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	Applicable from the **time of end** of the change; **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied;.	**Applicable if below applicable landing minima** **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.	**Applicable if below applicable landing minima** **Mean wind:** Should be within required limits; **Gusts** exceeding crosswind limits should be fully applied.		

Note 1: "Required limits" are those contained in the Operations Manual.

Note 2: If promulgated aerodrome forecasts do not comply with the requirements of ICAO Annex 3, operators should ensure that guidance in the application of these reports is provided.

* The space following 'FM' should always include a time group e.g. 'FM1030'.

AMC OPS 1.300
Submission of ATS Flight plan
See ANTR OPS 1.300

1 Flights without ATS flight plan. When unable to submit or to close the ATS flight plan due to lack of ATS facilities or any other means of communications to ATS, the operator should establish procedures, instructions and a list of authorised persons to be responsible for alerting search and rescue services.

2 To ensure that each flight is located at all times, these instructions should:

a. Provide the authorised person with at least the information required to be included in a VFR Flight plan, and the location, date and estimated time for re-establishing communications;

b. If an aeroplane is overdue or missing, provide for notification to the appropriate ATS or Search and Rescue facility; and

c. Provide that the information will be retained at a designated place until the completion of the flight.

IEM OPS 1.307
Refuelling/Defueling with wide-cut fuel
See ANTR OPS 1.307

1. 'Wide cut fuel' (designated JET B, JP-4 or AVTAG) is an aviation turbine fuel that falls between gasoline and kerosene in the distillation range and consequently, compared to kerosene (JET A or JET A1), it has the properties of higher volatility (vapour pressure), lower flash point and lower freezing point.

2. Wherever possible, the operator should avoid the use of wide-cut fuel types. If a situation arises such that only wide-cut fuels are available for refuelling/defuelling, operators should be aware that mixtures of wide-cut fuels and kerosene turbine fuels can result in the air/fuel mixture in the tank being in the combustible range at ambient temperatures. The extra precautions set out below are advisable to avoid arcing in the tank due to electrostatic discharge. The risk of this type of arcing can be minimised by the use of a static dissipation additive in the fuel. When this additive is present in the proportions stated in the fuel specification, the normal fuelling precautions set out below are considered adequate.

3. Wide-cut fuel is considered to be "involved" when it is being supplied or when it is already present in aircraft fuel tanks.

4. When wide-cut fuel has been used, this should be recorded in the Technical Log. The next two uplifts of fuel should be treated as though they too involved the use of wide-cut fuel.

5. When refuelling/defuelling with turbine fuels not containing a static dissipator, and where wide -cut fuels are involved, a substantial reduction on fuelling flow rate is advisable. Reduced flow rate, as recommended by fuel suppliers and/or aeroplane manufacturers, has the following benefits:

a. It allows more time for any static charge build-up in the fuelling equipment to dissipate before the fuel enters the tank;

b. It reduces any charge which may build up due to splashing; and

c. Until the fuel inlet point is immersed, it reduces misting in the tank and consequently the extension of the flammable range of the fuel.

6. The flow rate reduction necessary is dependent upon the fuelling equipment in use and the type of filtration employed on the aeroplane fuelling distribution system. It is difficult, therefore, to quote precise flow rates. Reduction in flow rate is advisable whether pressure fuelling or over-wing fuelling is employed.

7. With over-wing fuelling, splashing should be avoided by making sure that the delivery nozzle extends as far as practicable into the tank. Caution should be exercised to avoid damaging bag tanks with the nozzle.

AC OPS 1.308
Push Back and Towing
See ANTR OPS 1.308

Towbarless towing should be based on the applicable SAE ARP (Aerospace Recommended Practices), i.e.4852B/4853B/5283/5284/5285 (as amended).

AC OPS 1.310(a)(3)
Controlled rest on flight deck
See ANTR OPS 1.310(a)(3)

Even though crew members should stay alert at all times during flight, unexpected fatigue can occur as a result of sleep disturbance and circadian disruption. To cover for this unexpected fatigue, and to regain a high level of alertness, a controlled rest procedure on the Flight Deck can be used. Moreover, the use of controlled rest has been shown to increase significantly levels of alertness during the later phases of flight, particularly after the top of descent, and is considered a good use of CRM principles. Controlled rest should be used in conjunction with other on board fatigue management countermeasures such as physical exercise, bright cockpit illumination at appropriate times, balanced eating and drinking, and intellectual activity. The maximum rest time has been chosen to limit deep sleep with consequent long recovery time (sleep inertia).

1 It is the responsibility of all crew members to be properly rested before flight (see ANTR OPS 1.085).

2 This AC is concerned with controlled rest taken by the minimum certificated flight crew. It is not concerned with resting by members of an augmented crew.

3 Controlled rest means a period of time 'off task' some of which may include actual sleep.

4 Controlled rest may be used at the discretion of the commander to manage both sudden unexpected fatigue and fatigue which is expected to become more severe during higher workload periods later in the flight. It cannot be planned before flight.

5 Controlled rest should only take place during a low workload part of the flight.

6 Controlled rest periods should be agreed according to individual needs and the accepted principles of CRM; where the involvement of the cabin crew is required, consideration should be given to their workload.

7 Only one crew member at a time should take rest, at his station; the harness should be used and the seat positioned to minimise unintentional interference with the controls.

8 The commander should ensure that the other flight crew member(s) is (are) adequately briefed to carry out the duties of the resting crew member. One pilot must be fully able to exercise control of the aeroplane at all times. Any system intervention which would normally require a cross check according to multi crew principles should be avoided until the resting crew member resumes his duties.

9 Controlled rest may be taken according the following conditions:

a) The rest period should be no longer than 45 minutes (in order to limit any actual sleep to approximately 30 minutes).

b) After this 45-minute period, there should be a recovery period of 20 minutes during which sole control of the aeroplane should not be entrusted to the pilot who has completed his rest.

c) In the case of 2-crew operations, means should be established to ensure that the non-resting flight crew member remains alert. This may include:

- Appropriate alarm systems

- Onboard systems to monitor crew activity

- Frequent Cabin Crew checks; In this case, the commander should inform the senior cabin crewmember of the intention of the flight crew member to take controlled rest, and of the time of the end of that rest; Frequent contact should be established between the flight deck and the cabin crew by means of the interphone, and cabin crew should check that the resting crew member is again alert at the end of the period. The frequency of the contacts should be specified in the Ops Manual.

10 A minimum 20 minute period should be allowed between rest periods to overcome the effects of sleep inertia and allow for adequate briefing.

11. If necessary, a flight crew member may take more than one rest period if time permits on longer sectors, subject to the restrictions above.

12 Controlled rest periods should terminate at least 30 minutes before top of descent.

IEM OPS 1.310(b)
Cabin crew seating positions
See ANTR OPS 1.310(b)

1 When determining cabin crew seating positions, the operator should ensure that they are:

i. Close to a floor level exit;

ii. Provided with a good view of the area(s) of the passenger cabin for which the cabin crew member is responsible; and

iii. Evenly distributed throughout the cabin,

in the above order of priority.

2 Paragraph 1 above should not be taken as implying that, in the event of there being more such cabin crew stations than required cabin crew, the number of cabin crew members should be increased.

AC OPS 1.345
Ice and other contaminants Procedures

1. General

a. Any deposit of frost, ice, snow or slush on the external surfaces of an aeroplane may drastically affect its flying qualities because of reduced aerodynamic lift, increased drag, modified stability and control characteristics. Furthermore, freezing deposits may cause moving parts, such as elevators, ailerons, flap actuating mechanism etc., to jam and create a potentially hazardous condition. Propeller/engine/APU/ systems performance may deteriorate due to the presence of frozen contaminants to blades, intakes and components. Also, engine operation may be seriously affected by the ingestion of snow or ice, thereby causing engine stall or compressor damage. In addition, ice/frost may form on certain external surfaces (e.g. wing upper and lower surfaces, etc.) due to the effects of cold fuel/structures, even in ambient temperatures well above 0° C.

b. The procedures established by the operator for de-icing and/or anti-icing in accordance with ANTR OPS 1.345 are intended to ensure that the aeroplane is clear of contamination so that degradation of aerodynamic characteristics or mechanical interference will not occur and, following anti-icing, to maintain the airframe in that condition during the appropriate holdover time. The de-icing and/or anti-icing procedures should therefore include requirements, including type-specific, taking into account manufacturer’s recommendations and cover:

(i) Contamination checks, including detection of clear ice and under-wing frost.

Note: limits on the thickness/area of contamination published in the AFM or other manufacturers’ documentation should be followed;

(ii) De-icing and/or anti-icing procedures including procedures to be followed if de-icing and/or anti-icing procedures are interrupted or unsuccessful;

(iii) Post treatment checks;

(iv) Pre take-off checks;

(v) Pre take-off contamination checks;

(vi) The recording of any incidents relating to de-icing and/or anti-icing; and

(vii) The responsibilities of all personnel involved in de-icing and/or anti-icing.

c. Under certain meteorological conditions de-icing and/or anti-icing procedures may be ineffective in providing sufficient protection for continued operations. Examples of these conditions are freezing rain, ice pellets and hail, heavy snow, high wind velocity, fast dropping OAT or any time when freezing precipitation with high water content is present. No Holdover Time Guidelines exist for these conditions.

d. Material for establishing operational procedures can be found, for example, in:

- ICAO Annex 3, Meteorological Service for International Air Navigation;
- ICAO Doc 9640-AN/940"Manual of aircraft ground de-icing/anti-icing operations";
- ISO 11075 (*) ISO Type I fluid;
- ISO 11076 (*) Aircraft de-icing/anti-icing methods with fluids;
- ISO 11077 (*) Self propelled de-icing/anti-icing vehicles-functional requirements;
- ISO 11078 (*) ISO Type II fluid;
- AEA "Recommendations for de-icing/anti-icing of aircraft on the ground";
- AEA "Training recommendations and background information for de-icing/anti-icing of aircraft on the ground";
- EUROCAE ED-104/SAE AS 5116 Minimum operational performance specification for ground ice detection systems;
- SAE ARP 4737 Aircraft de-icing/anti-icing methods;
- SAE AMS 1424 Type I fluids;
- SAE AMS 1428 Type II, III and IV fluids;
- SAE ARP 1971 Aircraft De-icing Vehicle, Self-Propelled, Large and Small Capacity;
- SAE ARD 50102 Forced air or forced air/fluid equipment for removal of frozen contaminants;
- SAE ARP 5149 Training Programme Guidelines for De-icing/Anti-icing of Aircraft on Ground.

(*) The revision cycle of ISO documents is infrequent and therefore the documents quoted may not reflect the latest industry standards.

2. Terminology

Terms used in the context of this AC have the following meanings. Explanations of other definitions may be found elsewhere in the documents listed in 1 d. In particular, meteorological definitions may be found in ICAO doc. 9640.

a. Anti-icing. The procedure that provides protection against the formation of frost or ice and accumulation of snow on treated surfaces of the aeroplane for a limited period of time (holdover time).

b. Anti-icing fluid. Anti-icing fluid includes but is not limited to the following:

(i) Type I fluid if heated to min 60° C at the nozzle;

(ii) Mixture of water and Type I fluid if heated to min 60°C at the nozzle;

(iii) Type II fluid;

(iv) Mixture of water and Type II fluid;

(v) Type III fluid;

(vi) Mixture of water and Type III fluid;

(vii) Type IV fluid;

(viii) Mixture of water and Type IV fluid.

NOTE: On uncontaminated aeroplane surfaces Type II, III and IV anti-icing fluids are normally applied unheated.

c. Clear ice. A coating of ice, generally clear and smooth, but with some air pockets. It forms on exposed objects, the temperature of which are at, below or slightly above the freezing temperature, by the freezing of super-cooled drizzle, droplets or raindrops.

d. Conditions conducive to aeroplane icing on the ground. Freezing fog, freezing precipitation, frost, rain or high humidity (on cold soaked wings), mixed rain and snow and snow.

e. Contamination. Contamination in this context is understood as all forms of frozen or semi-frozen moisture such as frost, snow, slush, or ice.

f. Contamination check. Check of aeroplane for contamination to establish the need for de-icing.

g. De-icing. The procedure by which frost, ice, snow or slush is removed from an aeroplane in order to provide uncontaminated surfaces.

h. De-icing fluid. Such fluid includes, but is not limited to, the following:

(i) Heated water;

(ii) Type I fluid;

(iii) Mixture of water and Type I fluid;

(iv) Type II fluid;

(v) Mixture of water and Type II fluid;

(vi) Type III fluid;

(vii) Mixture of water and Type III fluid;

(viii) Type IV fluid;

(ix) Mixture of water and Type IV fluid.

NOTE: De-icing fluid is normally applied heated to ensure maximum efficiency.

i. De-icing/anti-icing. This is the combination of de-icing and anti-icing performed in either one or two steps.

j. Ground Ice Detection System (GIDS). System used during aeroplane ground operations to inform the ground crew and/or the flight crew about the presence of frost, ice, snow or slush on the aeroplane surfaces.

k. Holdover time (HOT). The estimated period of time for which an anti-icing fluid is expected to prevent the formation of frost or ice and the accumulation of snow on the treated surfaces of an aeroplane on the ground in the prevailing ambient conditions.

l. Lowest Operational Use Temperature (LOUT). The lowest temperature at which a fluid has been tested and certified as acceptable in accordance with the appropriate aerodynamic acceptance test whilst still maintaining a freezing point buffer of not less than:

a. 10° C for a type I de-icing/anti-icing fluid,

b. 7° C for type II, III or IV de-/anti-icing fluids.

m. Post treatment check. An external check of the aeroplane after de-icing and/or anti-icing treatment accomplished from suitably elevated observation points (e.g. from the de-icing equipment itself or other elevated equipment) to ensure that the aeroplane is free from any frost, ice, snow, or slush.

n. Pre-take-off check. An assessment, normally performed from within the flight deck, to validate the applied holdover time.

o. Pre-take-off contamination check. A check of the treated surfaces for contamination, performed when the hold-over-time has been exceeded or if any doubt exists regarding the continued effectiveness of the applied anti-icing treatment. It is normally accomplished externally, just before the commencement of the take-off run.

3. Fluids

a. Type I fluid. Due to its properties, Type I fluid forms a thin, liquid-wetting film on surfaces to which it is applied which, under certain weather conditions, gives a very limited holdover time. With this type of fluid, increasing the concentration of fluid in the fluid/water mix does not provide any extension in holdover time.

b. Type II and type IV fluids contain 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 holdover time than Type I fluids in similar conditions. With this type of fluid, the holdover time can be extended by increasing the ratio of fluid in the fluid/water mix.

c. Type III fluid: a thickened fluid intended especially for use on aeroplanes with low rotation speeds.

d. Fluids used for de-icing and/or anti-icing should be acceptable to the operator and the aeroplane manufacturer. These fluids normally conform to specifications such as SAE AMS 1424, 1428 or equivalent. Use of non-conforming fluids is not recommended due to their characteristics not being known.

Note: The anti-icing and aerodynamic properties of thickened fluids may be seriously degraded by, for example, inappropriate storage, treatment, application, application equipment and age.

4. Communications

4.1 Before aeroplane treatment.

When the aeroplane is to be treated with the flight crew on board, the flight and ground crews should confirm the fluid to be used, the extent of treatment required, and any aeroplane type specific procedure(s) to be used. Any other information needed to apply the HOT tables should be exchanged.

4.2 Anti-icing code

a. The operator’s procedures should include an anti-icing code, which indicates the treatment the aeroplane has received. This code provides the flight crew with the minimum details necessary to estimate a holdover time (see para 5 below) and confirms that the aeroplane is free of contamination.

b. The procedures for releasing the aeroplane after the treatment should therefore provide the Commander with the anti-icing code.

c. Anti-icing Codes to be used (examples):

(i) ”Type I“ at (start time) – To be used if anti-icing treatment has been performed with a Type I fluid;

(ii) ”Type II/100“ at (start time) – To be used if anti-icing treatment has been performed with undiluted Type II fluid;

(iii) ”Type II/75“ at (start time) – To be used if anti-icing treatment has been performed with a mixture of 75% Type II fluid and 25% water;

(iv) ”Type IV/50“ at (start time) – To be used if anti-icing treatment has been performed with a mixture of 50% Type IV fluid and 50% water.

Note: When a two-step de-icing/anti-icing operation has been carried out, the Anti-Icing Code is determined by the second step fluid. Fluid brand names may be included, if desired.

4.3 After Treatment

Before reconfiguring or moving the aeroplane, the flight crew should receive a confirmation from the ground crew that all de-icing and/or anti-icing operations are complete and that all personnel and equipment are clear of the aeroplane.

5. Holdover protection

a. Holdover protection is achieved by a layer of anti-icing fluid remaining on and protecting aeroplane surfaces for a period of time. With a one-step de-icing/anti-icing procedure, the holdover time (HOT) begins at the commencement of de-icing/anti-icing. With a two-step procedure, the holdover time begins at the commencement of the second (anti-icing) step. The holdover protection runs out:

(i) At the commencement of take-off roll (due to aerodynamic shedding of fluid) or

(ii) When frozen deposits start to form or accumulate on treated aeroplane surfaces, thereby indicating the loss of effectiveness of the fluid.

b. The duration of holdover protection may vary subject to the influence of factors other than those specified in the holdover time (HOT) tables. Guidance should be provided by the operator to take account of such factors which may include:

(i) Atmospheric conditions, e.g. exact type and rate of precipitation, wind direction and velocity, relative humidity and solar radiation and

(ii) The aeroplane and its surroundings, such as aeroplane component inclination angle, contour and surface roughness, surface temperature, operation in close proximity to other aeroplanes (jet or propeller blast) and ground equipment and structures.

c. Holdover times are not meant to imply that flight is safe in the prevailing conditions if the specified holdover time has not been exceeded. Certain meteorological conditions, such as freezing drizzle or freezing rain, may be beyond the certification envelope of the aeroplane.

d. The operator should publish in the Operations Manual the holdover times in the form of a table or diagram to account for the various types of ground icing conditions and the different types and concentrations of fluids used. However, the times of protection shown in these tables are to be used as guidelines only and are normally used in conjunction with pre-take-off check.

e. References to usable HOT tables may be found in the ‘AEA recommendations for de-/anti-icing aircraft on the ground’.

6. Procedures to be used. Operator’s procedures should ensure that:

a. When aeroplane surfaces are contaminated by ice, frost, slush or snow, they are de-iced prior to take-off; according to the prevailing conditions. Removal of contaminants may be performed with mechanical tools, fluids (including hot water), infra-red heat or forced air, taking account of aeroplane type specific requirements.

b. Account is taken of the wing skin temperature versus OAT, as this may affect:

(i) The need to carry out aeroplane de-icing and/or anti-icing; and
(ii) The performance of the de-icing/anti-icing fluids.

c. When freezing precipitation occurs or there is a risk of freezing precipitation occurring, which would contaminate the surfaces at the time of take-off, aeroplane surfaces should be anti-iced. If both de-icing and anti-icing are required, the procedure may be performed in a one or two-step process depending upon weather conditions, available equipment, available fluids and the desired holdover time. One-step 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 aeroplane 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 to be sprayed over the aeroplane surfaces. The second step will be applied, before the first step fluid freezes, typically within three minutes and, if necessary, area by area.

d. When an aeroplane is anti-iced and a longer holdover time is needed/desired, the use of a less diluted Type II or Type IV fluid should be considered.

e. All restrictions relative to Outside Air Temperature (OAT) and fluid application (including, but not necessarily limited to temperature and pressure), published by the fluid manufacturer and/or aeroplane manufacturer, are followed. Procedures, limitations and recommendations to prevent the formation of fluid residues are followed.

f. During conditions conducive to aeroplane icing on the ground or after de-icing and/or anti-icing, an aeroplane is not dispatched for departure unless it has been given a contamination check or a post treatment check by a trained and qualified person. This check should cover all treated surfaces of the aeroplane and be performed from points offering sufficient accessibility to these parts. To ensure that there is no clear ice on suspect areas, it may be necessary to make a physical check (e.g. tactile).

g. The required entry is made in the Technical Log.

h. The Commander continually monitors the environmental situation after the performed treatment. Prior to take-off he performs a pre-take-off check, which is an assessment whether the applied HOT is still appropriate. This pre-take-off check includes, but is not limited to, factors such as precipitation, wind and OAT.

i. If any doubt exists as to whether a deposit may adversely affect the aeroplane's performance and/or controllability characteristics, the Commander should require a pre-take-off contamination check to be performed in order to verify that the aeroplane's surfaces are free of contamination. Special methods and/or equipment may be necessary to perform this check, especially at night time or in extremely adverse weather conditions. If this check cannot be performed just prior take-off, re-treatment should be applied.

j. When re-treatment is necessary, any residue of the previous treatment should be removed and a completely new de-icing/anti-icing treatment applied.

k. When a Ground Ice Detection System (GIDS) is used to perform an aeroplane surfaces check prior to and/or after a treatment, the use of GIDS by suitably trained personnel should be a part of the procedure.

7. Special operational considerations

a. When using thickened de-icing/anti-icing fluids, the operator should consider a two-step de-icing/anti-icing procedure, the first step preferably with hot water and/or non thickened fluids.

b. The use of de-icing/anti-icing fluids has to be in accordance with the aeroplane manufacturer's documentation. This is particular true for thickened fluids to assure sufficient flow-off during take-off.

c. The operator should comply with any type-specific operational requirement(s) such as an aeroplane mass decrease and/or a take-off speed increase associated with a fluid application.

d. The operator should take into account any flight handling procedures (stick force, rotation speed and rate, take-off speed, aeroplane attitude etc.) laid down by the aeroplane manufacturer when associated with a fluid application.

e. The limitations or handling procedures resulting from c and/or d above should be part of the flight crew pre take-off briefing.

8. Special maintenance considerations

a. General

The operator should take proper account of the possible side-effects of fluid use. Such effects may include, but are not necessarily limited to, dried and/or re-hydrated residues, corrosion and the removal of lubricants.

b. Special considerations due to residues of dried fluids.

The operator should establish procedures to prevent or detect and remove residues of dried fluid. If necessary the operator should establish appropriate inspection intervals based on the recommendations of the airframe manufacturers and/or own experience:

(i) Dried fluid residues.

Dried fluid residue could occur when surfaces has been treated but the aircraft has not subsequently been flown and not been subject to precipitation. The fluid may then have dried on the surfaces;

(ii) Re-hydrated fluid residues.

Repetitive application of thickened de-icing/anti-icing fluids may lead to the subsequent formation/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: around flight control hinges, pulleys, grommets, on cables and in gaps;

(iii) Operators are strongly recommended to request information about the fluid dry-out and rehydration characteristics from the fluid manufacturers and to select products with optimised characteristics;

(iv) Additional information should be obtained from fluid manufacturers for handling, storage, application and testing of their products.

9. Training

a. The operator should establish appropriate initial and recurrent de-icing and/or anti-icing training programmes (including communication training) for flight crew and those of his ground crew who are involved in de-icing and/or anti-icing.

b. These de-icing and/or anti-icing training programmes should include additional training if any of the following will be introduced:

(i) A new method, procedure and/or technique;

(ii) A new type of fluid and/or equipment; and

(iii) A new type(s) of aeroplane.

10. Subcontracting (see AMC OPS 1.035 sections 4 and 5)

The operator should ensure that the subcontractor complies with the operator’s quality and training/qualification requirements together with the special requirements in respect of:

a. De-icing and/or anti-icing methods and procedures;

b. Fluids to be used, including precautions for storage and preparation for use;

c. Specific aeroplane requirements (e.g. no-spray areas, propeller/engine de-icing, APU operation etc.);

d. Checking and communications procedures.

AC OPS 1.346
Flight in expected or actual icing conditions
See ANTR OPS 1.346

1 The procedures to be established by the operator should take account of the design, the equipment or the configuration of the aeroplane and also of the training which is needed. For these reasons, different aeroplane types operated by the same company may require the development of different procedures. In every case, the relevant limitations are those which are defined in the Aeroplane Flight Manual (AFM) and other documents produced by the manufacturer.

2 For the required entries in the Operations Manual, the procedural principles which apply to flight in icing conditions are referred to under Appendix 1 to ANTR OPS 1.1045, A 8.3.8 and should be cross-referenced, where necessary, to supplementary, type-specific data under B 4.1.1.

3 *Technical content of the Procedures.* The operator should ensure that the procedures take account of the following:

a. ANTR OPS 1.675;

b. The equipment and instruments which must be serviceable for flight in icing conditions;

c. The limitations on flight in icing conditions for each phase of flight. These limitations may be imposed by the aeroplane's de-icing or anti-icing equipment or the necessary performance corrections which have to be made;

d. The criteria the Flight Crew should use to assess the effect of icing on the performance and/or controllability of the aeroplane;

e. The means by which the Flight Crew detects, by visual cues or the use of the aeroplane's ice detection system, that the flight is entering icing conditions; and

f. The action to be taken by the Flight Crew in a deteriorating situation (which may develop rapidly) resulting in an adverse affect on the performance and/or controllability of the aeroplane, due to either:

i. the failure of the aeroplane's anti-icing or de-icing equipment to control a build-up of ice, and/or

ii. ice build-up on unprotected areas.

4. *Training for despatch and flight in expected or actual icing conditions.* The content of the Operations Manual, Part D, should reflect the training, both conversion and recurrent, which Flight Crew, Cabin Crew and all other relevant operational personnel will require in order to comply with the procedures for despatch and flight in icing conditions.

4.1 For the Flight Crew, the training should include:

a. Instruction in how to recognise, from weather reports or forecasts which are available before flight commences or during flight, the risks of encountering icing conditions along the planned route and on how to modify, as necessary, the departure and in-flight routes or profiles;

b. Instruction in the operational and performance limitations or margins;

c. The use of in-flight ice detection, anti-icing and de-icing systems in both normal and abnormal operation; and

d. Instruction in the differing intensities and forms of ice accretion and the consequent action which should be taken.

4.2 For the Cabin Crew, the training should include;

a. Awareness of the conditions likely to produce surface contamination; and

b. The need to inform the Flight Crew of significant ice accretion.

AC OPS 1.390(a)(1)
Assessment of Cosmic Radiation
See ANTR OPS 1.390(a)(1)

1 In order to show compliance with ANTR OPS 1.390(a), the operator should assess the likely exposure for crew members so that he can determine whether or not action to comply with ANTR OPS 1.390(a)(2), (3), (4) and (5) will be necessary.

a. Assessment of exposure level can be made by the method described below, or other method acceptable to the BCAA:

Table 1 - Hours exposure for effective dose of 1 millisievert (mSv)

Altitude (feet)	Kilometre equivalent	Hours at latitude 60º N	Hours at equator
27 000	8·23	630	1330
30 000	9·14	440	980
33 000	10·06	320	750
36 000	10·97	250	600
39 000	11·89	200	490
42 000	12·80	160	420
45 000	13·72	140	380
48 000	14·63	120	350

Note: This table, published for illustration purposes, is based on the JAR I-3 computer program; and may be superseded by updated versions, as approved by the BCAA.

The uncertainty on these estimates is about ± 20%.A conservative conversion factor of 0.8 has been used to convert ambient dose equivalent to effective dose.

b. Doses from cosmic radiation vary greatly with altitude and also with latitude and with the phase of the solar cycle. Table 1 gives an estimate of the number of flying hours at various altitudes in which a dose of 1 mSv would be accumulated for flights at 60º N and at the equator. Cosmic radiation dose rates change reasonably slowly with time at altitudes used by conventional jet aircraft (i.e. up to about 15 km / 49 000 ft).

c. Table 1 can be used to identify circumstances in which it is unlikely that an annual dosage level of 1 mSv would be exceeded. If flights are limited to heights of less than 8 km (27 000 ft), it is unlikely that annual doses will exceed 1 mSv. No further controls are necessary for crew members whose annual dose can be shown to be less than 1 mSv.

AC OPS 1.390(a)(2)
Working Schedules and Record Keeping
See ANTR OPS 1.390(a)(2)

Where in-flight exposure of crew members to cosmic radiation is likely to exceed 1 mSv per year the operator should arrange working schedules, where practicable, to keep exposure below 6 mSv per year. For the purpose of this regulation crew members who are likely to be exposed to more than 6 mSv per year are considered highly exposed and individual records of exposure to cosmic radiation should be kept for each crew member concerned.

AC OPS 1.390(a)(3)
Explanatory Information
See ANTR OPS 1.390(a)(*3)*

Operators should explain the risks of occupational exposure to cosmic radiation to their crew members. Female crew members should know of the need to control doses during pregnancy, and the operator consequently notified so that the necessary dose control measures can be introduced.

AC OPS 1.398
Use of Airborne Collision Avoidance System (ACAS)
See ANTR OPS 1.398

The ACAS operational procedures and training programmes established by the operator should take into account the advice contained in the below guidance material:

a. ICAO Annex 10 Volume 4;

b. ICAO Doc 8168 PANS OPS Volume 3;

c. ICAO Doc 4444 PANS ATM; and

d. ICAO Doc 9863 Airborne Collision Avoidance System (ACAS) Manual.

IEM OPS 1.400
Approach and Landing Conditions
See ANTR OPS 1.400

The in-flight determination of the landing distance should be based on the latest available report, preferably not more than 30 minutes before the expected landing time.

Appendix 1 to AMC OPS 1.245(a)(2)
Power supply to essential services

1. Any one of the three electrical power sources referred to in sub-paragraph 2.b of AMC OPS 1.245(a)(2) should be capable of providing power for essential services which should normally include:

   a. Sufficient instruments for the flight crew providing, as a minimum, attitude, heading, airspeed and altitude information;

   b. Appropriate pitot heating;

   c. Adequate navigation capability;

   d. Adequate radio communication and intercommunication capability;

   e. Adequate flight deck and instrument lighting and emergency lighting;

   f Adequate flight controls;

   g. Adequate engine controls and restart capability with critical type fuel (from the stand-point of flame-out and restart capability) and with the aeroplane initially at the maximum relight altitude;

   h. Adequate engine instrumentation;

   i. Adequate fuel supply system capability including such fuel boost and fuel transfer functions that may be necessary for extended duration single or dual engine operation;

   j. Such warnings, cautions and indications as are required for continued safe flight and landing;

   k. Fire protection (engines and APU);

   l. Adequate ice protection including windshield de-icing; and

   m. Adequate control of the flight deck and cabin environment including heating and pressurisation.

2. The equipment (including avionics) necessary for extended diversion times should have the ability to operate acceptably following failures in the cooling system or electrical power systems.

AC/AMC/IEM E — ALL WEATHER OPERATIONS

AC OPS 1.430 Continuous Descent Final Approach (CDFA)
(See Appendix 1 to ANTR OPS 1.430)

1. Introduction

1.1. 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 stabilized approach criteria on a continuous descent with a constant, predetermined vertical path is seen as a major improvement in safety during the conduct of such approaches. Operators should ensure that the following techniques are adopted as widely as possible, for all approaches.

1.2. The elimination of level flight segments at Minimum Descent Altitude (MDA) close to the ground during approaches, and the avoidance of major changes in attitude and power / thrust close to the runway which can destabilise approaches, are seen as ways to reduce operational risks significantly.

1.4. The term Continuous Descent Final Approach (CDFA) has been selected to cover a technique for instrument approach operations using non-precision approach (NPA) operation.

1.5. The advantages of CDFA are:

a. The technique enhances safe approach operations by the utilisation of standard operating practices;

b. 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;

c. The aeroplane attitude may enable better acquisition of visual cues;

d. The technique may reduce pilot workload;

e. The Approach profile is fuel efficient;

f. The Approach profile affords reduced noise levels;

g. The technique affords procedural integration with 3D approach operations; and

h. When used and the approach is flown in a stabilised manner, CDFA is the safest approach technique for all instrument approach operations using NPA procedures

2. Stabilised Approach (SAp).

a. The control of the descent path is not the only consideration when using the CDFA technique. Control of the aeroplane’s configuration and energy is also vital to the safe conduct of an approach.

b. The control of the flight path, described above as one of the requirements for conducting an SAp, should not be confused with the path requirements for using the CDFA technique. The pre-determined path requirements for conducting SAp are established by the operator and published in the Operations Manual (OM) Part B;

c. The slope requirements for applying the appropriate descent path for applying the CDFA technique is CDFA technique are established by:

i. The published ‘nominal’ slope information when the approach has a nominal vertical profile; and

ii. The designated final-approach segment minimum of 3 NM, and maximum, when using timing techniques, of 8 NM.

d. Straight-in approach operations using CDFA do not have a level segment of flight at MDA/H. This enhances safety by mandating a prompt missed approach procedure manoeuvre at DA/H.

e. An approach using the CDFA technique will always be flown as an SAp, since this is a requirement for applying CDFA; however, an SAp does not have to be flown using the CDFA technique, for example a visual approach.

3. Circling approach operations using the CDFA technique

Circling approach operations using the CDFA technique require a continuous descent from an altitude/height at or above the FAF altitude/height until MDA/H or visual flight manoeuvre altitude/height. This does not preclude level flight at or above the MDA/H. This level flight may be at MDA/H while following the IAP or after visual reference has been established as the aircraft is aligned with the final approach track. The conditions for descent from level flight are described in Para V to Appendix 1 to ANTR OPS 1.430.

3. Training

3.1 Operational Procedures and Instructions and Training

a. The operator should establish procedures and instructions for flying approaches using the CDFA technique and flight crew not to exercise the procedure until such training completed. These procedures should be included in the OM and should include the duties of the flight crew during the conduct of such operations.

b. Refer Paragraph XII.3 of Appendix 1 to ANTR OPS 1.430

IEM OPS 1.430
Documents containing information related to All Weather Operations
See ANTR OPS 1, Subpart E

1 The purpose of this IEM is to provide operators with a list of documents related to AWO.

a. ICAO Annex 2 / Rules of the Air;

b. ICAO Annex 6 / Operation of Aircraft, Part I;

c. ICAO Annex 10 / Telecommunications Vol 1;

d. ICAO Annex 14 / Aerodromes Vol 1;

e. ICAO Doc 8186 / PANS - OPS Aircraft Operations;

f. ICAO Doc 9365 / AWO Manual;

g. ICAO Doc 9476 / SMGCS Manual (Surface Movement Guidance And Control Systems);

h. ICAO Doc 9157 / Aerodrome Design Manual;

i. ICAO Doc 9328 / Manual for RVR Assessment;

j. ECAC Doc 17, Issue 3 (partly incorporated in ANTR-OPS); and

k. CS-AWO (Airworthiness Certification).

l. EASA – Air Ops Easy Access Rules

m. EASA- Part – SERA

IEM to Appendix 1 to ANTR OPS 1.430
Aerodrome Operating Minima
See Appendix 1 to ANTR OPS 1.430

The minima stated in this Appendix are based upon the experience of commonly used approach aids. This is not meant to preclude the use of other guidance systems such as Head Up Display (HUD) and Enhanced Visual Systems (EVS) but the applicable minima for such systems will need to be developed as the need arises.

IEM to Appendix 1 to ANTR OPS 1.430, paragraph III
Establishment of minimum RVR-Category II/III Operations

1 General

1.1 When establishing minimum RVR for Category II and III Operations, operators should pay attention to the following information which originates in ECAC Doc 17 3rd Edition, Subpart A. It is retained as background information and, to some extent, for historical purposes although there may be some conflict with current practices.

1.2 Since the inception of instrument approach operations various methods have been devised for the calculation of aerodrome operating minima in terms of decision height and runway visual range. It is a comparatively straightforward matter to establish the decision height for an operation but establishing the minimum RVR to be associated with that decision height so as to provide a high probability that the required visual reference will be available at that decision height has been more of a problem.

1.3 The methods adopted by various States to resolve the DH/RVR relationship in respect of Category II and Category III operations have varied considerably. In one instance there has been a simple approach which entailed the application of empirical data based on actual operating experience in a particular environment. This has given satisfactory results for application within the environment for which it was developed. In another instance a more sophisticated method was employed which utilised a fairly complex computer programme to take account of a wide range of variables. However, in the latter case, it has been found that with the improvement in the performance of visual aids, and the increased use of automatic equipment in the many different types of new aircraft, most of the variables cancel each other out and a simple tabulation can be constructed which is applicable to a wide range of aircraft. The basic principles which are observed in establishing the values in such a table are that the scale of visual reference required by a pilot at and below decision height depends on the task that he has to carry out, and that the degree to which his vision is obscured depends on the obscuring medium, the general rule in fog being that it becomes more dense with increase in height. Research using flight simulators coupled with flight trials has shown the following:

a. Most pilots require visual contact to be established about 3 seconds above decision height though it has been observed that this reduces to about 1 second when a fail-operational automatic landing system is being used;

b. To establish lateral position and cross-track velocity most pilots need to see not less than a 3 light segment of the centre line of the approach lights, or runway centre line, or runway edge lights;

c. For roll guidance most pilots need to see a lateral element of the ground pattern, i.e. an approach lighting cross bar, the landing threshold, or a barrette of the touchdown zone lighting; and

d. To make an accurate adjustment to the flight path in the vertical plane, such as a flare, using purely visual cues, most pilots need to see a point on the ground which has a low or zero rate of apparent movement relative to the aircraft.

e. With regard to fog structure, data gathered in the United Kingdom over a twenty-year period have shown that in deep stable fog there is a 90% probability that the slant visual range from eye heights higher than 15ft above the ground will be less that the horizontal visibility at ground level, i.e. RVR. There are at present no data available to show what the relationship is between the Slant Visual Range and RVR in other low visibility conditions such as blowing snow, dust or heavy rain, but there is some evidence in pilot reports that the lack of contrast between visual aids and the background in such conditions can produce a relationship similar to that observed in fog.

2 Category II Operations

2.1 The selection of the dimensions of the required visual segments which are used for Category II operations is based on the following visual requirements:

a. A visual segment of not less than 90 metres will need to be in view at and below decision height for pilot to be able to monitor an automatic system;

b. A visual segment of not less than 120 metres will need to be in view for a pilot to be able to maintain the roll attitude manually at and below decision height; and

c. For a manual landing using only external visual cues, a visual segment of 225 metres will be required at the height at which flare initiation starts in order to provide the pilot with sight of a point of low relative movement on the ground.

3 Category III fail passive operations

3.1 Category III operations utilising fail-passive automatic landing equipment were introduced in the late 1960's and it is desirable that the principles governing the establishment of the minimum RVR for such operations be dealt with in some detail.

3.2 During an automatic landing the pilot needs to monitor the performance of the aircraft system, not in order to detect a failure which is better done by the monitoring devices built into the system, but so as to know precisely the flight situation. In the final stages he should establish visual contact and, by the time he reaches decision height, he should have checked the aircraft position relative to the approach or runway centre-line lights. For this he will need sight of horizontal elements (for roll reference) and part of the touchdown area. He should check for lateral position and cross-track velocity and, if not within the pre-stated lateral limits, he should carry out a go-around. He should also check longitudinal progress and sight of the landing threshold is useful for this purpose, as is sight of the touchdown zone lights.

3.3 In the event of a failure of the automatic flight guidance system below decision height, there are two possible courses of action; the first is a procedure which allows the pilot to complete the landing manually if there is adequate visual reference for him to do so, or to initiate a go-around if there is not; the second is to make a go-around mandatory if there is a system disconnect regardless of the pilot's assessment of the visual reference available.

a. If the first option is selected then the overriding requirement in the determination of a minimum RVR is for sufficient visual cues to be available at and below decision height for the pilot to be able to carry out a manual landing. Data presented in Doc 17 showed that a minimum value of 300 metres would give a high probability that the cues needed by the pilot to assess the aircraft in pitch and roll will be available and this should be the minimum RVR for this procedure.

b. The second option, to require a go-around to be carried out should the automatic flight-guidance system fail below decision height, will permit a lower minimum RVR because the visual reference requirement will be less if there is no need to provide for the possibility of a manual landing. However, this option is only acceptable if it can be shown that the probability of a system failure below decision height is acceptably low. It should be recognised that the inclination of a pilot who experiences such a failure would be to continue the landing manually but the results of flight trials in actual conditions and of simulator experiments show that pilots do not always recognise that the visual cues are inadequate in such situations and present recorded data reveal that pilots' landing performance reduces progressively as the RVR is reduced below 300 metres. It should further be recognised that there is some risk in carrying out a manual go-around from below 50ft in very low visibility and it should therefore be accepted that if an RVR lower than 300 metres is to be authorised, the flight deck procedure should not normally allow the pilot to continue the landing manually in such conditions and the aeroplane system should be sufficiently reliable for the go-around rate to be low.

3.4 These criteria may be relaxed in the case of an aircraft with a fail-passive automatic landing system which is supplemented by a head-up display which does not qualify as a fail-operational system but which gives guidance which will enable the pilot to complete a landing in the event of a failure of the automatic landing system. In this case it is not necessary to make a go-around mandatory in the event of a failure of the automatic landing system when the RVR is less than 300 metres.

4 Category III fail operational operations - with a Decision Height

4.1 For Category III operations utilising a fail-operational landing system with a Decision Height, a pilot should be able to see at least 1 centre line light.

4.2 For Category III operations utilising a fail-operational hybrid landing system with a Decision Height, a pilot should have a visual reference containing a segment of at least 3 consecutive lights of the runway centre line lights.

5 Category III fail operational operations - with No Decision Height

5.1 For Category III operations with No Decision Height the pilot is not required to see the runway prior to touchdown. The permitted RVR is dependent on the level of aeroplane equipment.

5.2 A CAT III runway may be assumed to support operations with no Decision Height unless specifically restricted as published in the AIP or NOTAM.

IEM to Appendix 1 to ANTR OPS 1.430, Paragraph VII, - Table 10
Crew actions in case of autopilot failure at or below decision height in fail-passive Category III operations.

For operations to actual RVR values less than 300m, a go-around is assumed in the event of an autopilot failure at or below DH.

This means that a go-around is the normal action. However, the wording recognises that there may be circumstances where the safest action is to continue the landing. Such circumstances include the height at which the failure occurs, the actual visual references, and other malfunctions. This would typically apply to the late stages of the flare.

In conclusion it is not forbidden to continue the approach and complete the landing when the commander or the pilot to whom the conduct of the flight has been delegated, determines that this is the safest course of action.

Operational instructions should reflect the information given in this IEM and the operators policy.

AC OPS to Appendix 1 to ANTR OPS 1.430 / 1.440 / 1.450 / 1.455
Enhanced Vision Systems

EVSs —ENHANCED VISION SYSTEMS

(a) Introduction to EVSs

EVSs use sensing technology to improve a pilot's ability to detect objects and topographical features ahead of the aircraft. Different types of sensing technology are used on different aircraft installations. Sensing technologies used include forward-looking infrared, millimetre wave radiometry, millimetre wave radar or low-light level intensification; additional technologies may be developed in the future. The image from sensors may be displayed to the pilot in a number of different ways including 'head-up' and 'head-down' displays.

(b) EVSs and EFVSs

An EFVS is an EVS that is integrated with a flight guidance system, which presents the image from sensors to the pilot on a head-up display (HUD) or equivalent display. If EFVS equipment is certified according to the applicable airworthiness requirements and an operator holds the necessary specific approval, then an EFVS may be used for EFVS operations. An EFVS operation is an operation with an operational credit which allows operating in visibility conditions lower than those in which operations without the use of EFVS are permitted.

(c) Functions of EVSs

Depending on the capabilities of the particular system, EVSs may be useful during operations at night or in reduced visibility for the following:

(1) improving visibility of airport features and other traffic during ground operations;

(2) displaying terrain and obstructions in flight;

(3) displaying weather in flight;

(4) improving visibility of the runway environment during approach operations; and

(5) improving visibility of obstructions on a runway (e.g. aircraft, vehicles or animals) during take-off and approach operations.

(d) Limitations of EVSs

EVSs are a useful tool for enhancing situational awareness; however, each EVS installation has its own specific limitations. These may include:

(1) Performance variations depend on conditions including ambient temperature and lighting and weather phenomena. A system may provide very different image qualities in the same visibility depending on the particular phenomena causing restricted visibility, e.g. haze, rain, fog, snow, dust, etc.

(2) An EVS may not be able to detect certain types of artificial lighting. Light emitting diode (LED) lights have a much lower infrared signature than incandescent lights and therefore may not be detected by some types of EVSs. LED lighting is used for runway, taxiway and approach lighting at many airports.

(3) Monochrome display. EVSs will generally not be able to detect and display the colour of airport lighting. This means that colour coding used on airport lighting will not be visible to the pilot using an EVS.

(4) Many EVS installations do not have redundancy, so a single failure may lead to loss of EVS image.

(5) The location of the sensor on the airframe may mean that in certain conditions it could be susceptible to ice accretion or obscuration from impact damage from objects such as insects or birds.

(6) Where an EVS image is presented on a HUD or an equivalent display, the image needs to be consistent with the pilot's external view through the display. Particular installations may have limitations on the conditions under which this consistent image can be generated (e.g. crosswind conditions during approach).

(7) Imaging sensor performance can be variable and unpredictable. Pilots should not assume that a flightpath is free of hazards because none are visible in an EVS image.

(e) Considerations for the use of EVSs

EVSs may be used in all phases of flight and have significant potential to enhance the pilot's situational awareness. No specific approval is required for the use of an EVS; however, the operator is responsible for ensuring that the flight crew members have received training on the equipment installed on their aircraft in accordance with ANTR OPS 1. In addition, the operator is responsible for evaluating the risks associated with system limitations and for implementing suitable mitigation measures in accordance with ANTR OPS 1.037 before using the EVS.

The use of EVSs does not permit the use of different operating minima, and EVS images cannot replace natural vision for the required visual reference in any phase of flight including take-off, approach or landing.

An EVS that is not an EFVS cannot be used for EFVS operations and therefore does not obtain an operational credit.

IEM OPS 1.450
Low Visibility Operations - Training & Qualifications
See Appendix 1 to ANTR OPS 1.450

a. FLIGHT CREW TRAINING

(1) The number of approaches referred to in Paragraph VI, VII, VIII & X of Appendix 1 to ANTR 1.450 represents the minimum number of approaches that the flight crew members should conduct during initial and recurrent training and checking. More approaches or other training exercises may be required in order to ensure that flight crew members achieve the required proficiency.

(2) Where flight crew members are to be authorised to conduct more than one kind of LVOs including operations with operational credits for which the technology and operating procedures are similar, there is no requirement to increase the number of approaches in initial training if the training programme ensures that the flight crew members are competent for all operations for which they will be authorised. Where flight crew members are to be authorised to conduct more than one kind of LVOs including operations with operational credits using different technology or operating procedures, then the required minimum number of approaches should be completed for each different technology or operating procedure.

(3) Where flight crew members are authorised to conduct more than one kind of LVOs including operations with operational credits for which the technology and operating procedures are similar, then there is no requirement to increase the number of approaches flown during recurrent checking. However, where flight crew members are authorised to conduct more than one kind of LVOs including operations with operational credits using different technology or operating procedures, then the required number of approaches should be completed for each different technology or operating procedure.

(4) Flight crew members are required to complete initial FSTD training and maintain recency for each operating capacity for which they will be authorised (e.g. as pilot flying and/or pilot monitoring). A pilot who will be authorised to operate in either capacity will need to complete the minimum number of approaches in each capacity.

(5) Approaches conducted in a suitably qualified FSTD and/or during a proficiency check or demonstration of competence may be counted towards the recent experience requirements. If a flight crew member has not complied with the recent experience requirements of Paragraph I.a & I.b of Appendix 1 to ANTR OPS 1.450 , the required approaches may be conducted during recurrent training, an operator proficiency check or a periodic check of competence either in an aircraft or on an FSTD.

(6) Table 1 presents a summary of initial training requirements for LVOs and operations with operational credits.

(7) Table 2 presents a summary of recent experience and recurrent training/checking requirements for LVOs and operations with operational credits.

Table 1

Summary of initial training requirements for LVOs and operations with operational credits

Table 1

Approval	Airborne Equipment	Previous Experience	Reference	Practical FSTD trainings	LIFUS (If Required)
CAT II	Auto coupled to below DH with manual landing	none	Para VI. (a)(2)(v) of Appendix 1 to ANTR OPS 1.450	As required but not less than 6 approaches	3 landings or 1 landing¹
		Previously qualified with the same operator, similar operations³	Para VI. (b)(2)(ii) of Appendix 1 to ANTR OPS 1.450	2 approaches	none
		Previously qualified with a different EU operator, same type and variant	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	2 approaches	none
		Previously qualified with a different EU operator, similar operations³	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	2 approaches	3 landings or 1 landing
SA CAT I CAT II SA CAT II CAT III	Autoland	none	Para VI. (a)(4)(ii) of Appendix 1 to ANTR OPS 1.450	As required but not less than 6 approaches	2 landings or 1 landing¹ or no landings²
		Previously qualified with the same operator, similar operations³	Para VI. (b)(3)(ii) of Appendix 1 to ANTR OPS 1.450	2 approaches	None
		Previously qualified with a different EU operator, same type and variant	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	2 approaches	none
		Previously qualified with a different EU operator, similar operations³	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	2 approaches	2 landings or 1 landing¹ or no landings²
CAT II SA CAT II CAT III	HUDLS/ manual landing	none	Para VI. (a)(2)(v) of Appendix 1 to ANTR OPS 1.450	As required but not less than 8 approaches	4 landings or 2 landings¹
		Previously qualified with the same operator, similar operations³	Para VI. (b)(3)(i) of Appendix 1 to ANTR OPS 1.450	4 approaches	None
		Previously qualified with a different EU operator, same type and variant	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	4 approaches	none
		Previously qualified with a different EU operator, similar operations³	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	4 approaches	4 landings or 2 landings¹

SA CAT I CAT II SA CAT II CAT III	HUDLS/ automatic landing	none	Para VI. (a)(4) of Appendix 1 to ANTR OPS 1.450	As required but not less than 8 approaches	2 landings or 1 landing[1] or no landings[2]
		Previously qualified with the same operator, similar operations[3]	Para VI. (b)(3) of Appendix 1 to ANTR OPS 1.450	4 approaches	None
		Previously qualified with a different EU operator, same type and variant	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	4 approaches	None
		Previously qualified with a different EU operator, similar operations[3]	Para VI. (c)(2) of Appendix 1 to ANTR OPS 1.450	4 approaches	2 landings or 1 landing[1] or no landings[2]
EVS - Approach	EFVS with HUD/ HUDLS	none	Para VII. (a)(2) of Appendix 1 to ANTR OPS 1.450	As required but not less than 8 approaches	3 landings
		Previously qualified with the same operator, similar operations[3]	Para VII. (b)(3) of Appendix 1 to ANTR OPS 1.450	2 approaches	None
		Previously qualified with a different EU operator, same type and variant	Para VII. (c)(2) of Appendix 1 to ANTR OPS 1.450	2 approaches	none
		Previously qualified with a different EU operator, similar operations[3]	Para VII. (c)(2) of Appendix 1 to ANTR OPS 1.450	2 approaches	3 landings
EFVS-L	EFVS with HUD/ HUDLS	none	Para VII. (a)(2) of Appendix 1 to ANTR OPS 1.450	As required but not less than 8 approaches	4 landings
		Previously qualified with the same operator, similar operations[3]	Para VII. (b)(3) of Appendix 1 to ANTR OPS 1.450	4 approaches	None
		Previously qualified with a different EU operator, same type and variant	Para VII. (c)(2) of Appendix 1 to ANTR OPS 1.450	4 approaches	none
		Previously qualified with a different EU operator, similar operations[3]	Para VII. (c)(2) of Appendix 1 to ANTR OPS 1.450	4 approaches	4 landings

Notes:

1: Fewer landings during LIFUS are required if a level ‘D’ FSTD is used for conversion training.

2: No landings are required if a candidate has completed the zero flight-time (ZFT) type rating.

3: ‘Similar operations’ implies that the level of technology, operating procedures, handling characteristics and HUD/HUDLS or equivalent display systems are the same or similar.
4: ‘operational suitability data established in accordance with ANTR OPS 1 / ANTR FCL 1 may define credits’

Table 2 Summary of recent experience and recurrent training/checking requirements for LVOs and operations with operational credits

LVO / Operational Credit	Airborne Equipment	Recent Experience [1,2]	Reference	Recurrent Training / Checking	Reference
LVTO	-	-	-	1 rejected take-off and 1 LVTO at minimum RVR[1]	Para VIII. (a)(1), (a)(2) of Appendix 1 to ANTR OPS 1.450
CAT II	Auto coupled below DH with manual landing	2 or more approaches[4]	Para III. (a) & (b) of Appendix 1 to ANTR OPS 1.450	1 approach to land; 1 approach to go-around	Para VIII. (a)(2) & (a)(3) of Appendix 1 to ANTR OPS 1.450
SA CAT I CAT II SA CAT II CAT III	Autoland				
CAT II/III SA CAT I SA CAT II	HUDLS/ manual landing	2 or 4 approaches	Para III. (c) of Appendix 1 to ANTR OPS 1.450	2 approaches including a landing	Para VIII. (b) of Appendix 1 to ANTR OPS 1.450
CAT II/III SA CAT I SA CAT II	HUDLS/ automatic landing				
Approach using EFVS	(HUD/ HUDLS)	2 approaches[4]	Para II of Appendix 1 to ANTR OPS 1.450	2 approaches[3]	Para X of Appendix 1 to ANTR OPS 1.450

Notes:
1: LVTO only required if the minimum approved RVR is less than 150 m.
2: If a flight crew member is authorised to operate as pilot flying and pilot monitoring, then the flight crew member should complete the required number of approaches in each operating capacity.
3: One approach to be flown without natural vision, to the height below which an approach should not be continued if natural visual reference is not acquired.
4: ‘operational suitability data established in accordance with ANTR OPS 1 / ANTR FCL 1 may define credits’

b. RECURRENT TRAINING AND CHECKING FOR EFVS OPERATIONS

In order to provide the opportunity to practise decision-making in the event of system failures and failure to acquire natural visual reference, the recurrent training and checking for EFVS / EVS operations is recommended to periodically include different combinations of equipment failures, go-around due to loss of visual reference and landings.

c. INITIAL TRAINING AND CHECKING FOR SA CAT I, CAT II, SA CAT II AND CAT III APPROACH OPERATIONS

The ground training referred to in points (1)(i)(a) and (d) of Para II.b of Appendix 1 to ANTR OPS 1.450may include:

(1) airborne and ground equipment:

(i) technical requirements;

(ii) operational requirements;

(iii) operational reliability;

(iv) fail-operational;

(v) fail-passive;

(vi) equipment reliability;

(vii) operating procedures;

(viii) preparatory measures;

(ix) operational downgrading; and

(x) communications; and

(2) procedures and limitations:

(i) operating procedures; and

(ii) crew coordination.

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AC/AMC/IEM F - PERFORMANCE GENERAL

AMC OPS 1.475(b)
Landing - Reverse Thrust Credit
See ANTR OPS 1.475(b)

Landing distance data included in the AFM (or POH etc.) with credit for reverse thrust can only be considered to be approved for the purpose of showing compliance with the applicable requirements if it contains a specific statement from the appropriate airworthiness authority that it complies with a recognised airworthiness code (e.g. FAR 23/25, JAR 23/25, BCAR Section 'D'/'K').

IEM OPS 1.475(b)
Factoring of Automatic Landing Distance Performance Data (Performance Class A Aeroplanes only)
See ANTR OPS 1.475(b)

1 In those cases where the landing requires the use of an automatic landing system, and the distance published in the Aeroplane Flight Manual (AFM) includes safety margins equivalent to those contained in ANTR OPS 1.515(a)(1) and ANTR OPS 1.520, the landing mass of the aeroplane should be the lesser of:

a. The landing mass determined in accordance with ANTR OPS 1.515(a)(1) or ANTR OPS 1.520 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.

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AC/AMC/IEM G – PERFORMANCE CLASS A

IEM OPS 1.485(b)
General – Wet and Contaminated Runway data
See ANTR OPS 1.485(b)

If the performance data has been determined on the basis of 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.

IEM OPS 1.490(c)(3)
Take-off – Runway surface condition
See ANTR OPS 1.490(c)(3)

1 Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aeroplane during take-off, since the actual conditions may not completely match the assumptions on which the performance information is based. In the case of a contaminated runway, the first option for the commander is to wait until the runway is cleared. If this is impracticable, he may consider a take-off, provided that he has applied the applicable performance adjustments, and any further safety measures he considers justified under the prevailing conditions.

2 An adequate overall level of safety will only be maintained if operations in accordance with the respective Certification Specification / TCDS as accepted by BCAA for Large Transport Category Aeroplane are limited to rare occasions. Where the frequency of such operations on contaminated runways is not limited to rare occasions, operators should provide additional measures ensuring an equivalent level of safety. Such measures could include special crew training, additional distance factoring and more restrictive wind limitations.

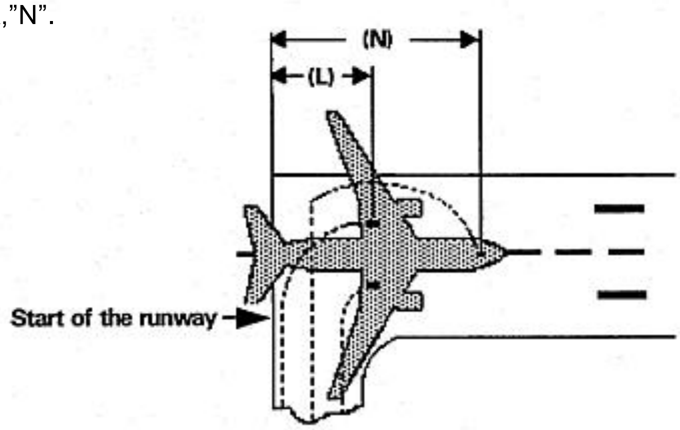
IEM OPS 1.490(c)(6)
Loss of runway length due to alignment
See ANTR OPS 1.490(c)(6)

1 Introduction

1.1 The length of the runway which is declared for the calculation of TODA, ASDA and TORA, does not account for line-up of the aeroplane in the direction of take-off on the runway in use. This alignment distance depends on the aeroplane geometry and access possibility to the runway in use. Accountability is usually required for a 90° taxiway entry to the runway and 180° turnaround on the runway. There are two distances to be considered:

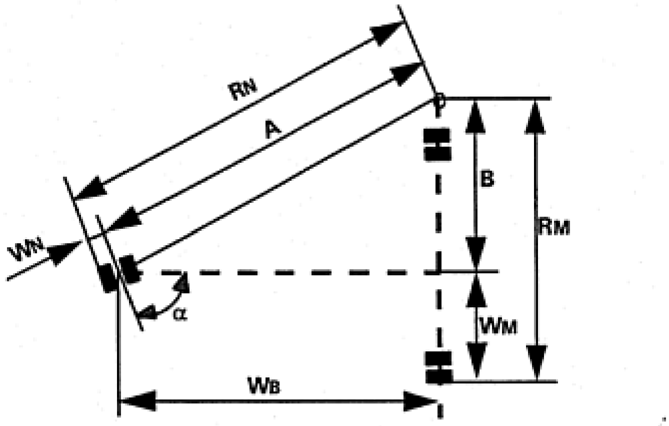
a. The minimum distance of the mainwheels from the start of the runway for determining TODA and TORA,”L”; and

b. The minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA,”N”.



Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in paragraph 2 may be use to determine the alignment distance.

2. Alignment Distance Calculation



The distances mentioned in (a) and (b) of paragraph 1 above are:

	90° ENTRY	180° TURNAROUND
L=	$R_M + X$	$R_N + Y$
N=	$R_M + X + W_B$	$R_N + Y + W_B$

where: $$R_N = A + W_N = \frac{WB}{\cos(90°-\alpha)} + W_N$$

and $$R_M = B + W_M = W_B \tan(90°-\alpha) + W_M$$

X = Safety distance of outer main wheel during turn to the edge of the runway

Y = Safety distance of outer nose wheel during turn to the edge of the runway

NOTE: Minimum edge safety distances for X and Y are specified in FAA AC 150/5300-13 and ICAO Annex 14 paragraph 3.8.3

R_N = Radius of turn of outer nose wheel

R_M = Radius of turn of outer main wheel

W_N = Distance from aeroplane centre-line to outer nose wheel

W_M = Distance from aeroplane centre-line to outer main wheel

W_B = Wheel base

α = Steering angle

IEM OPS 1.495(a)
Take-off obstacle clearance
See ANTR OPS 1.495(a)

1 In accordance with the definitions used in preparing the take-off distance and take-off flight path Data provided in the Aeroplane Flight Manual:

a. The net take-off flight path is considered to begin at a height of 35 ft above the runway or clearway at the end of the take-off distance determined for the aeroplane in accordance with sub-paragraph (b) below.

b. The take-off distance is the longest of the following distances:

i. 115% of the distance with all engines operating from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway; or

ii. The distance from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed (V_1) 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 (V_1) for a wet or contaminated runway.

ANTR OPS 1.495(a) specifies that the net take-off flight path, determined from the data provided in the Aeroplane Flight Manual in accordance with sub-paragraphs 1(a) and 1(b) above, must clear all relevant obstacles by a vertical distance of 35 ft. When taking off on a wet or contaminated runway and an engine failure occurs at the point corresponding to the decision speed (V_1) for a wet or contaminated runway, this implies that the aeroplane can initially be as much as 20 ft below the net take-off flight path in accordance with sub-paragraph 1 above and, therefore, may clear close-in obstacles by only 15 ft. When taking off on wet or contaminated runways, the operator should exercise special care with respect to obstacle assessment, especially if a take-off is obstacle limited and the obstacle density is high.

AMC OPS 1.495(c)(4)
Take-off obstacle clearance
See ANTR OPS 1.495(c)

1 The Aeroplane Flight Manual generally provides a climb gradient decrement for a 15° bank turn. For bank angles of less than 15°, a proportionate amount should be applied, unless the manufacturer or Aeroplane Flight Manual has provided other data.

2 Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturer, acceptable adjustments to assure adequate stall margins and gradient corrections are provided by the following:

BANK	SPEED	GRADIENT CORRECTION
15°	V_2	1 x Aeroplane Flight Manual 15° Gradient Loss
20°	V_2 + 5 kt	2 x Aeroplane Flight Manual 15° Gradient Loss
25°	V_2 + 10 kt	3 x Aeroplane Flight Manual 15° Gradient Loss

AMC OPS 1.495(d)(1) & (e)(1)
Required Navigational Accuracy
See ANTR OPS 1.495(d)(1) & (e)(1)

1 Flight-deck systems. The obstacle accountability semi-widths of 300 m (see ANTR OPS 1.495(d)(1)) and 600 m (see ANTR OPS 1.495(e)(1)) may be used if the navigation system under one-engine-inoperative conditions provides a two standard deviation (2 s) accuracy of 150 m and 300 m respectively.

2 Visual Course Guidance

2.1 The obstacle accountability semi-widths of 300 m (see ANTR OPS 1.495(d)(1)) and 600 m (see ANTR OPS 1.495(e)(1)) may be used where navigational accuracy is ensured at all relevant points on the flight path by use of external references. These references may be considered visible from the flight deck if they are situated more than 45° either side of the intended track and with a depression of not greater than 20° from the horizontal.

2.2 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:

a. 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;

b. The procedure should be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;

c. A written and/or pictorial description of the procedure should be provided for crew use;

d. The limiting environmental conditions (such as wind, the lowest cloud base, ceiling, visibility, day/night, ambient lighting, obstruction lighting) should be specified.

IEM OPS 1.495(f)
Engine failure procedures
See ANTR OPS 1.495(f)

If compliance with ANTR OPS 1.495(f) is based on an engine failure route that differs from the all engine departure route or SID normal departure, a "deviation point" can be identified where the engine failure route deviates from the normal departure route. Adequate obstacle clearance along the normal departure with failure of the critical engine at the deviation point will normally be available. However, in certain situations the obstacle clearance along the normal departure route may be marginal and should be checked to ensure that, in case of an engine failure after the deviation point, a flight can safely proceed along the normal departure.

AMC OPS 1.500
En-Route – One Engine Inoperative
See ANTR OPS 1.500

1 The high terrain or obstacle analysis required for showing compliance with ANTR OPS 1.500 may be carried out in one of two ways, as explained in the following three paragraphs.

2 A detailed analysis of the route should be made using contour maps of the high terrain and plotting the highest points within the prescribed corridor's width along the route. The next step is to determine whether it is possible to maintain level flight with one engine inoperative 1000 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 2000 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.

3 Alternatively, the published minimum flight altitudes (Minimum En route Altitude, MEA, or Minimum Off Route Altitude, MORA) may be used for determining whether one engine inoperative level flight is feasible at the minimum flight altitude or if it is necessary to use the published minimum flight altitudes as the basis for the driftdown construction (see Figure 1). This procedure avoids a detailed high terrain contour analysis but may be more penalising than taking the actual terrain profile into account as in paragraph 2.

4 In order to comply with ANTR OPS 1.500(c), one means of compliance is the use of MORA and, with ANTR OPS 1.500(d), MEA provided that the aeroplane meets the navigational equipment standard assumed in the definition of MEA.

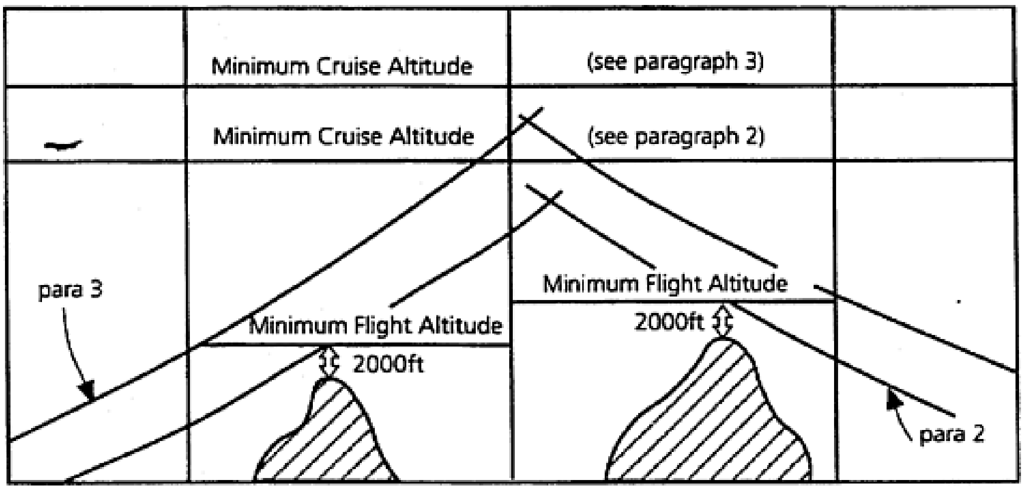


FIGURE 1

Note: MEA or MORA normally provide the required 2000 ft obstacle clearance for driftdown. However, at and below 6000 ft altitude, MEA and MORA cannot be used directly as only 1000 ft. clearance is ensured.

IEM OPS 1.510(b) and (c)
Landing – Destination and Alternate Aerodromes
See ANTR OPS 1.510(b) and (c)

The required missed approach gradient may not be achieved by all aeroplanes when operating at or near maximum certificated landing mass and in engine-out conditions. Operators of such aeroplanes should consider mass, altitude and temperature limitations and wind for the missed approach. As an alternative method, an increase in the decision altitude/height or minimum descent altitude/height and/or a contingency procedure (see ANTR OPS 1.495(f)) providing a safe route and avoiding obstacles, can be approved.

AMC OPS 1.510 & 1.515
Landing – Destination and Alternate Aerodromes
Landing – Dry Runways
See ANTR OPS 1.510 & 1.515

In showing compliance with ANTR OPS 1.510 and ANTR OPS 1.515, the operator should use either pressure altitude or geometric altitude for his operation and this should be reflected in the Operations Manual.

IEM OPS 1.515(c)
Landing – Dry runway
See ANTR OPS 1.515(c)

1 ANTR OPS 1.515(c) establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

2 Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 60%or 70% (as applicable) of the landing distance available on the most favourable (normally the longest)runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome, cannot be exceeded.

3 Secondly, consideration should be given to anticipated conditions and circumstances. The expected wind, or ATC and noise abatement procedures, may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under paragraph 2 above, in which case, to show compliance with ANTR OPS 1.515(a), despatch should be based on this lesser mass.

4 The expected wind referred to in paragraph 3 is the wind expected to exist at the time of arrival.

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AMC/IEM H — PERFORMANCE CLASS B

IEM OPS 1.526
S/E Operations at Night and/or in IMC

1. Purpose and scope

The purpose of this IEM is to give additional guidance on the airworthiness and operational requirements described in ANTR OPS 525(c), which have been designed to meet the overall level of safety intended for approved operations by single-engine turbine-powered aeroplanes at night and/or in IMC.

2. Turbine engine reliability

2.1 The power loss rate required should be established as likely to be met based on data from commercial operations supplemented by available data from private operations in similar theatres of operation. A minimum amount of service experience is needed on which to base the judgment, and this should include at least 20 000 hours on the actual aeroplane/engine combination unless additional testing has been carried out or experience on sufficiently similar variants of the engine is available.

2.2 In assessing turbine engine reliability, evidence should be derived from a world fleet database covering as large a sample as possible of operations considered to be representative, compiled by the manufacturers and reviewed with the States of Design and of the Operator. Since flight hour reporting is not mandatory for many types of operators, appropriate statistical estimates may be used to develop the engine reliability data. Data for individual operators approved for these operations including trend monitoring and event reports should also be monitored and reviewed by the State of the Operator to ensure that there is no indication that the operator's experience is unsatisfactory.

2.2.1 Engine trend monitoring should include the following:

(a) an oil consumption monitoring programme based on manufacturers' recommendations; and

(b) an engine condition monitoring programme describing the parameters to be monitored, the method of data collection and the corrective action process; this should be based on the manufacturer's recommendations. The monitoring is intended to detect turbine engine deterioration at an early stage to allow for corrective action before safe operation is affected.

2.2.2 A reliability programme should be established covering the engine and associated systems. The engine programme should include engine hours flown in the period and the in-flight shutdown rate for all causes and the unscheduled engine removal rate, both on a 12-month moving average basis. The event reporting process should cover all items relevant to the ability to operate safely at night and/or in IMC. The data should be available for use by the operator, the Type Certificate Holder and the Authority so as to establish that the intended reliability levels are being achieved. Any sustained adverse trend should result in an immediate evaluation by the operator in consultation with the BCAA and manufacturer with a view to determining actions to restore the intended safety level. The operator should develop a parts control programme with support from the manufacturer that ensures that the proper parts and configuration are maintained for single-engine turbine-powered aeroplanes approved to conduct these operations.

The programme includes verification that parts placed on an approved single-engine turbine-powered aeroplane during parts borrowing or pooling arrangements, as well as those parts used after repair or overhaul, maintain the necessary configuration of that aeroplane for operations approved in accordance with ANTR OPS 525(c).

2.3 Power loss rate should be determined as a moving average over a specified period (e.g. a 12-month moving average if the sample is large). Power loss rate, rather than in-flight shut-down rate, has been used as it is considered to be more appropriate for a single-engine aeroplane. If a failure occurs on a multi-engine aeroplane that causes a major, but not total, loss of power on one engine, it is likely that the engine will be shut down as positive engine-out performance is still available, whereas on a single-engine aeroplane it may well be decided to make use of the residual power to stretch the glide distance.

2.4 The actual period selected should reflect the global utilization and the relevance of the experience included (e.g. early data may not be relevant due to subsequent mandatory modifications which affected the power loss rate). After the introduction of a new engine variant and whilst global utilization is relatively low, the total available experience may have to be used to try to achieve a statistically meaningful average.

3. Operations manual

The operations manual should include all necessary information relevant to operations by single-engine turbine-powered aeroplanes at night and/or in IMC. This should include all of the additional equipment, procedures and training required for such operations, route and/or area of operation and aerodrome information (including and operating minima).

4. Operator certification or validation

The certification or validation process specified by the will ensure the adequacy of the operator's procedures for normal, abnormal and emergency operations, including actions following engine, systems or equipment failures. In addition to the normal requirements for operator certification or validation, the following items should be addressed in relation to operations by single-engine turbine-powered aeroplanes:

(a) proof of the achieved engine reliability of the aeroplane engine combination;

(b) specific and appropriate training and checking procedures including those to cover engine failure/ malfunction on the ground, after take-off and en-route and descend to a forced landing from the normal cruising altitude;

(c) a maintenance programme which is extended to address the equipment and systems;

(d) an MEL modified to address the equipment and systems necessary for operations at night and/or in IMC;

(e) planning and operating minima appropriate to the operations at night and/or in IMC;

(f) departure and arrival procedures and any route limitations;

(g) pilot qualifications and experience; and

(h) the operations manual, including limitations, emergency procedures, approved routes or areas of operation, the MEL and normal procedures related to the equipment.

5. Operational and maintenance programme requirements

5.1 Approval to undertake operations by single-engine turbine-powered aeroplanes at night and/or in IMC specified in an air operator certificate or equivalent document should include the particular airframe/engine combinations, including the current type design standard for such operations, the specific aeroplanes approved, and the areas or routes of such operations.

5.2 The operator's continuing Airworthiness management exposition should include a statement of certification of the additional equipment required, and of the maintenance and reliability programme for such equipment, including the engine.

6. Route limitations over water

6.1 Operators of single-engine turbine-powered aeroplanes carrying out operations at night and/or in IMC should make an assessment of route limitations over water. The distance that the aeroplane may be operated from a land mass suitable for a safe forced landing should be determined. This equates to the glide distance from the cruise altitude to the safe forced landing area following engine failure, assuming still air conditions. States may add to this an additional distance taking into account the likely prevailing conditions and type of operation. This should take into account the likely sea conditions, the survival equipment carried, the achieved engine reliability and the search and rescue services available.

6.2 Any additional distance allowed beyond the glide distance should not exceed a distance equivalent to 15 minutes at the aeroplane's normal cruise speed.

IEM OPS 1.526(i)
S/E operations - Forced Landing Areas

Operation over routes and in weather conditions that permit a safe forced landing in the event of an engine failure, is not required for aeroplanes approved in accordance with ANTR OPS 1.526. The availability of forced landing areas at all points along a route is not specified for these aeroplanes because of the very high engine reliability, additional systems and operational equipment, procedures and training requirements.

AMC OPS 1.530(c)(4)
Take-Off Performance Correction Factors
See ANTR OPS 1.530(c)(4)

Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturers, the variables affecting the take-off performance and the associated factors that should be applied to the Aeroplane Flight Manual data are shown in the table below. They should be applied in addition to the operational factors as prescribed in ANTR OPS 1.530(b).

SURFACE TYPE	CONDITION	FACTOR
	Dry	1·20
	Wet	1·30
Paved	Wet	1·00

Notes: 1. *The soil is firm when there are wheel impressions but no rutting.*

2. *When taking off on grass with a single engined aeroplane, care should be taken to assess the rate of acceleration and consequent distance increase.*

3. *When making a rejected take-off on very short grass which is wet, and with a firm subsoil, the surface may be slippery, in which case the distances may increase significantly.*

IEM OPS 1.530(c)(4)
Take-Off Performance Correction Factors
See ANTR OPS 1.530(c)(4)

Due to the inherent risks, operations from contaminated runways are inadvisable, and should be avoided whenever possible. Therefore, it is advisable to delay the take-off until the runway is cleared. Where this is impracticable, the commander should also consider the excess runway length available including the criticality of the overrun area.

AMC OPS 1.530(c)(5)
Runway Slope
See ANTR OPS 1.530(c)(5)

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturers, the take-off distance should be increased by 5% for each 1% of upslope except that correction factors for runways with slopes in excess of 2% require the acceptance of the BCAA.

IEM OPS 1.535
Obstacle Clearance in Limited Visibility
See ANTR OPS 1.535

1 The intent of the complementary requirements ANTR OPS 1.535 and Appendix 1 to ANTR OPS 1.430 sub-paragraph (a)(3)(ii) is to enhance safe operation with Performance Class B aeroplanes in conditions of limited visibility. Unlike the Performance Class A Airworthiness requirements, those for Performance Class B do not necessarily provide for engine failure in all phases of flight. It is accepted that performance accountability for engine failure need not be considered until a height of 300 ft is reached.

2 The weather minima given in Appendix 1 to ANTR OPS 1.430 sub-paragraph (a)(3)(ii) up to and including 300 ft imply that if a take-off is undertaken with minima below 300 ft a one engine inoperative flight path must be plotted starting on the all-engine take-off flight path at the assumed engine failure height. This path must meet the vertical and lateral obstacle clearance specified in ANTR OPS 1.535. Should engine failure occur below this height, the associated visibility is taken as being the minimum which would enable the pilot to make, if necessary, a forced landing broadly in the direction of the take-off. At or below 300 ft, a circle and land procedure is extremely inadvisable. Appendix 1 to ANTR OPS 1.430 sub-paragraph (a)(3)(ii) specifies that, if the assumed engine failure height is more than 300 ft, the visibility must be at least 1500 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.

AMC OPS 1.535(a)
Take-off Flight Path Construction
See ANTR OPS 1.535(a)

1 Introduction. For demonstrating that an aeroplane clears all obstacles vertically, a flight path should be constructed consisting of an all-engine segment to the assumed engine failure height, followed by an engine-out segment. Where the Aeroplane Flight Manual does not contain the appropriate data, the approximation given in paragraph 2 below may be used for the all-engine segment for an assumed engine failure height of 200 ft, 300 ft, or higher.

2 Flight Path Construction

2.1 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:

$$Y_{300} = \frac{0 \cdot 57(\ _{ER}\ )}{1 + (V_{ER}{}^{2} - V_2{}^{2})/5647}$$

NOTE: The factor of 0.77 as required by ANTR OPS 1.535(a)(4) is already included where:

Y300 = Average all-engines gradient from 50 ft to 300 ft

YERC = Scheduled all engines en-route gross climb gradient

VERC = En-route climb speed, all engines knots TAS

V2 = Take-off speed at 50 ft, knots TAS

(See IEM OPS 1.535(a), Figure 1a for graphical presentation)

2.2 All-Engines Segment (50 ft to 200 ft). (May be used as an alternative to 2.1 where weather minima permits) The average all-engine gradient for the all-engine flight path segment starting at an altitude of 50 ft at the end of the take-off distance ending at or passing through the 200 ft point is given by the following formula:

$$Y_{200} = \frac{0 \cdot 51(Y_{ERC})}{1 + (V_{ERC}{}^{2} - V_2{}^{2})/3388}$$

NOTE: The factor of 0.77 as required by ANTR OPS 1.535(a)(4) is already included where:

Y200 = Average all-engines gradient from 50 ft to 200 ft

YERC = Scheduled all engines en-route gross climb gradient

VERC = En-route climb speed, all engines, knots TAS

V2 = Take-off speed at 50 ft, knots TAS

(See IEM OPS 1.535(a), Figure 1b for graphical presentation)

2.3 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.

2.4 The One Engine Inoperative Flight Path. The one engine inoperative flight path is given by the one engine inoperative gradient chart contained in the AFM.

3 Worked examples of the method given above are contained in IEM OPS 1.535(a).

IEM OPS 1.535(a)
Take-off flight path construction
See ANTR OPS 1.535(a)

1 This IEM provides examples to illustrate the method of take-off flight path construction given in AMC OPS 1.535(a). The examples shown below are based on an aeroplane for which the Aeroplane Flight Manual shows, at a given mass, altitude, temperature and wind component the following performance data:

Factored take-off distance	–	1000 m
Take-off speed, V2	–	90 kt
En-route climb speed, VERC	–	120 kt
En-route all-engine climb gradient, YERC	–	0·200
En-route one engine inoperative climb gradient, YERC-1		0·032

a. Assumed Engine Failure Height 300 ft. The average all-engine gradient from 50 ft to 300 ft may be read from Figure 1a (page 2–H–8) or calculated with the following formula:

$$Y_{300} = \frac{0 \cdot 57(\ _{ER}\ )}{1 + (V_{ER}{}^{2} - V_2^2)/5647}$$

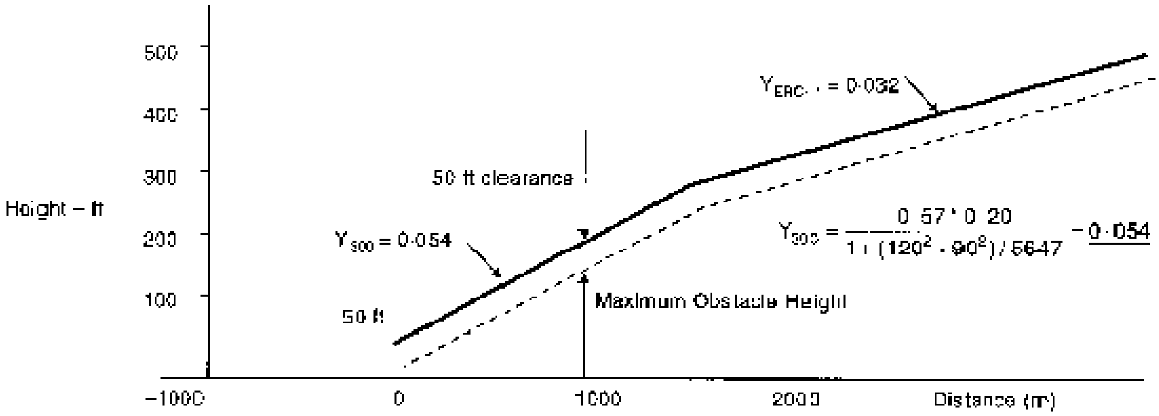
NOTE: The factor of 0.77 as required by ANTR OPS 1.535(a)(4) is already included where:

Y300 = Average all-engines gradient from 50 ft to 300 ft

YERC = Scheduled all engines en-route gross climb gradient

VERC = En-route climb speed, all engines knots TAS

V2 = Take-off speed at 50 ft, knots TAS



b. Assumed engine failure height 200 ft. The average all-engine gradient from 50 ft to 200 ft may be read from Figure 1b (page 2–H–9) or calculated with the following formula:

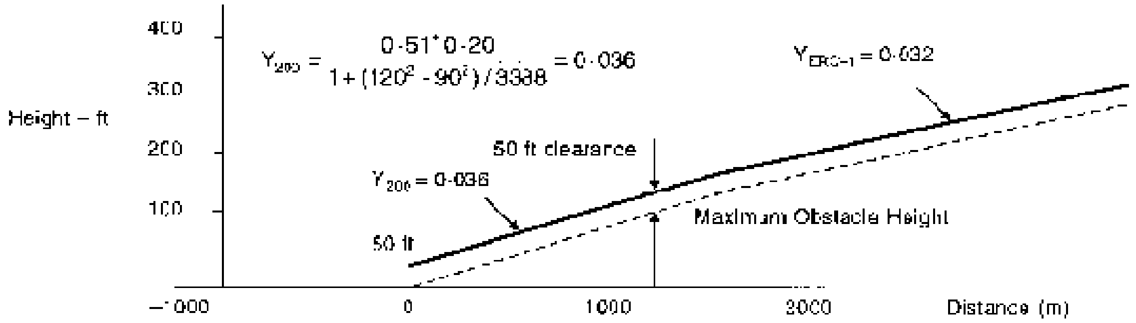
$$Y_{200} = \frac{0 \cdot 51(Y_{ERC})}{1 + (V_{ERC}^{2} - V_2^{2})/3388}$$

NOTE: The factor of 0.77 as required by ANTR OPS 1.535(a)(4) is already included where:

Y200 = Average all-engines gradient from 50 ft to 200 ft

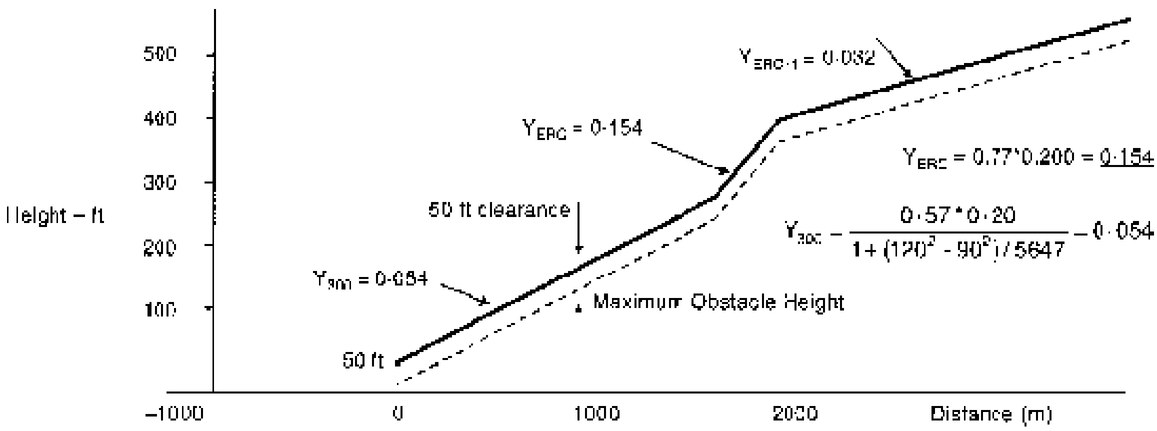
YERC = Scheduled all engines en-route gross gradient
VERC = En-route climb speed, all engines, knots TAS

V2 = Take-off speed at 50 ft, knots TAS



c. Assumed engine failure height less than 200 ft. Construction of a take-off flight path is only possible if the AFM contains the required flight path data.

d. Assumed engine failure height more than 300 ft. The construction of a take-off flight path for an assumed engine failure height of 400 ft is illustrated below.



IEM OPS 1.540
En-Route
See ANTR OPS 1.540

1 The altitude at which the rate of climb equals 300 ft per minute is not a restriction on the maximum cruising altitude at which the aeroplane can fly in practice, it is merely the maximum altitude from which the driftdown procedure can be planned to start.

2 Aeroplanes may be planned to clear en-route obstacles assuming a driftdown procedure, having first increased the scheduled en-route one engine inoperative descent data by 0·5% gradient.

IEM OPS 1.542
En-route – Single-engined Aeroplanes
See ANTR OPS 1.542

1 In the event of an engine failure, single-engine aeroplanes have to rely on gliding to a point suitable for a safe forced landing. Such a procedure is clearly incompatible with flight above a cloud layer which extends below the relevant minimum safe altitude.

2 Operators should first increase the scheduled engine-inoperative gliding performance data by 0·5% gradient when verifying the en-route clearance of obstacles and the ability to reach a suitable place for a forced landing.

3 The altitude at which the rate of climb equals 300 ft per minute is not a restriction on the maximum cruising altitude at which the aeroplane can fly in practice, it is merely the maximum altitude from which the engine-inoperative procedure can be planned to start.

AMC OPS 1.542(a)
En-Route - Single-engine aeroplanes
See ANTR OPS 1.542(a)

ANTR OPS 1.542(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 successful forced landing can be made. Unless otherwise specified by the BCAA, this point should be 1000ft above the intended landing area.

AMC OPS 1.545 & 1.550
Landing Destination and Alternate Aerodromes
Landing - Dry runway
See ANTR OPS 1.545 & 1.550

In showing compliance with ANTR OPS 1.545 & ANTR OPS 1.550, the operator should use either pressure altitude or geometric altitude for his operation and this should be reflected in the Operations Manual.

AMC OPS 1.550(b)(3)
Landing Distance Correction Factors
See ANTR OPS 1.550(b)(3)

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturers, the variable affecting the landing performance and the associated factor that should be applied to the Aeroplane Flight Manual data is shown in the table below. It should be applied in addition to the operational factors as prescribed in ANTR OPS 1.550(a).

SURFACE TYPE	FACTOR
Grass (on firm soil up to 20 cm long)	1·15

NOTE: The soil is firm when there are wheel impressions but no rutting

AMC OPS 1.550(b)(4)
Runway Slope
See ANTR OPS 1.550(b)(4)

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturer, the landing distances required should be increased by 5% for each 1% of downslope except that correction factors for runways with slopes in excess of 2% need the acceptance of the BCAA.

IEM OPS 1.550(c)
Landing – Dry Runway
See ANTR OPS 1.550(c)

1 ANTR OPS 1.550(c) establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

2 Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 70% of the landing distance available on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome, cannot be exceeded.

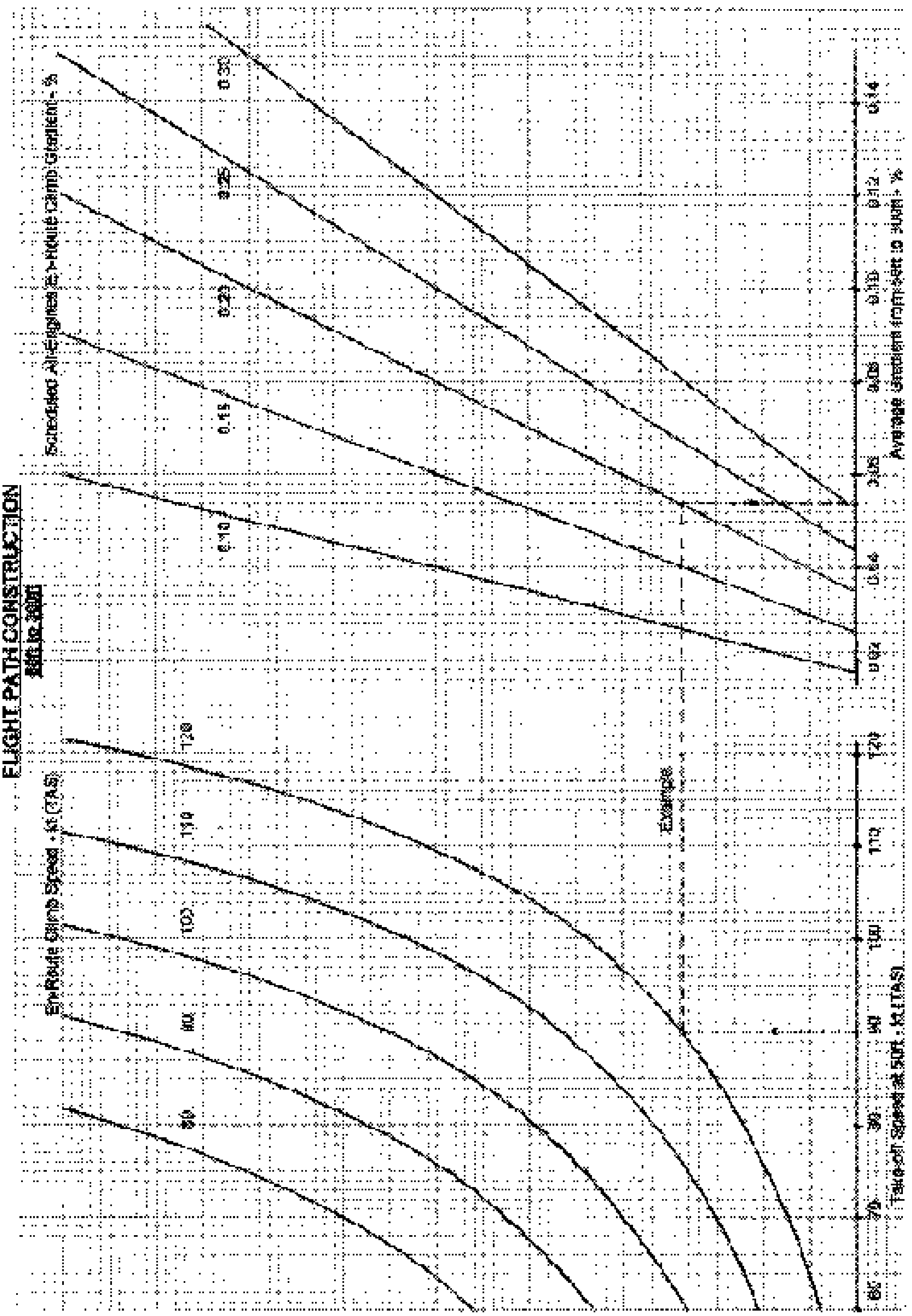
3 Secondly, consideration should be given to anticipated conditions and circumstances. The expected wind, or ATC and noise abatement procedures, may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under paragraph 2 above, in which case, to show compliance with ANTR OPS 1.550(a), despatch should be based on this lesser mass.

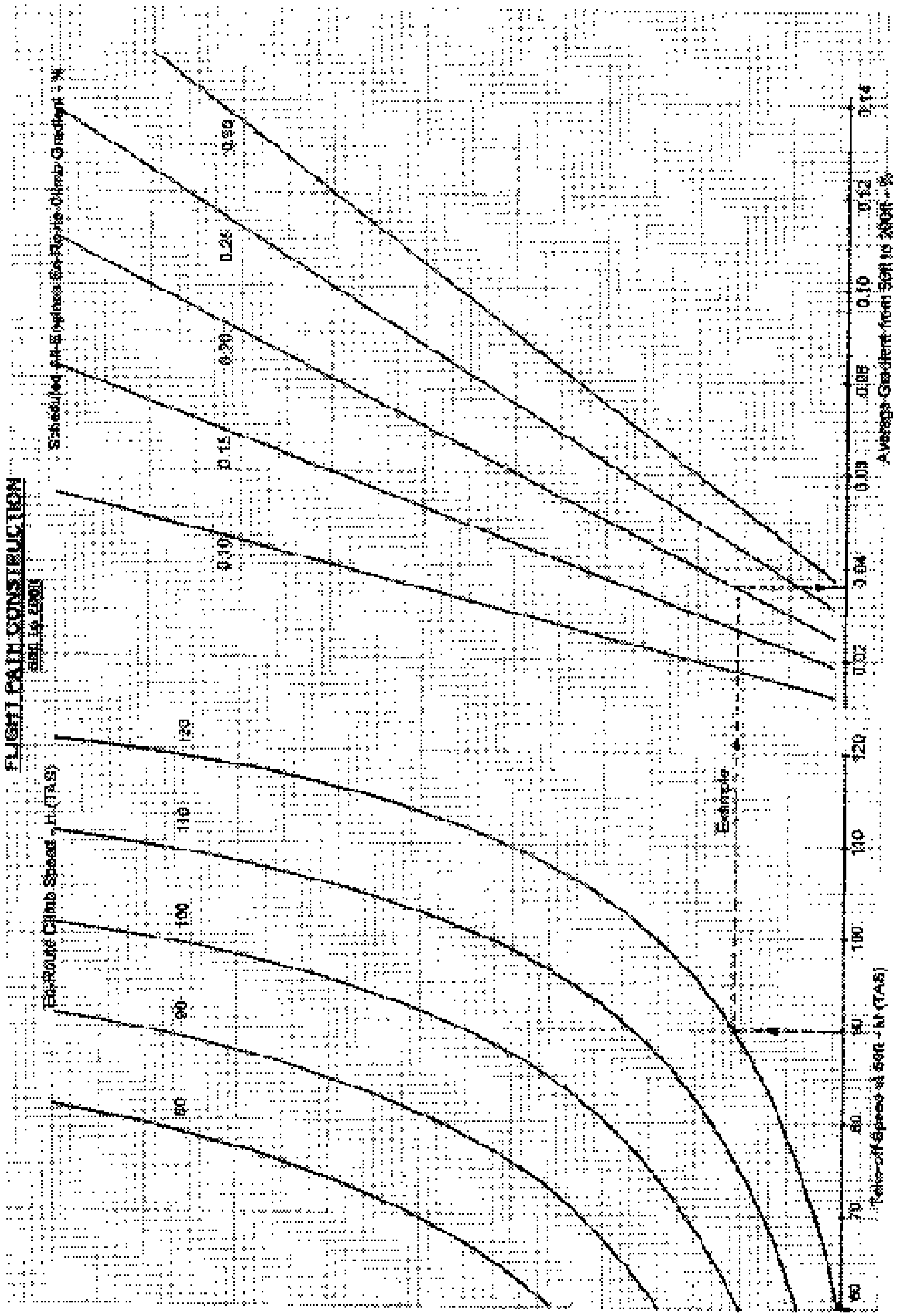
4 The expected wind referred to in paragraph 3 is the wind expected to exist at the time of arrival.

IEM OPS 1.555(a)
Landing on Wet Grass Runways
See ANTR OPS 1.555(a)

1 When landing on very short grass which is wet, and with a firm subsoil, the surface may be slippery, in which case the distances may increase by as much as 60% (1.60 factor).

2 As it may not be possible for a pilot to determine accurately the degree of wetness of the grass, particularly when airborne, in cases of doubt, the use of the wet factor (1.15) is recommended.


FLIGHT PATH CONSTRUCTION
En-Route Climb Speed - kt (TAS)
Scheduled All-Engines En-Route Climb Gradient - %
Example
Take-off Speed at 50ft - kt (TAS)
Average Gradient from 50ft to 300ft - %


FLIGHT PATH CONSTRUCTION
Example

AMC/IEM I — PERFORMANCE CLASS C

IEM OPS 1.565(d)(3)
Take-off
See ANTR OPS 1.565(d)(3)

Operation on runways contaminated with water, slush, snow or ice implies uncertainties with regard to runway friction and contaminant drag and therefore to the achievable performance and control of the aeroplane during take-off, since the actual conditions may not completely match the assumptions on which the performance information is based. An adequate overall level of safety can, therefore, only be maintained if such operations are limited to rare occasions. In case of a contaminated runway the first option for the commander is to wait until the runway is cleared. If this is impracticable, he may consider a take-off, provided that he has applied the applicable performance adjustments, and any further safety measures he considers justified under the prevailing conditions.

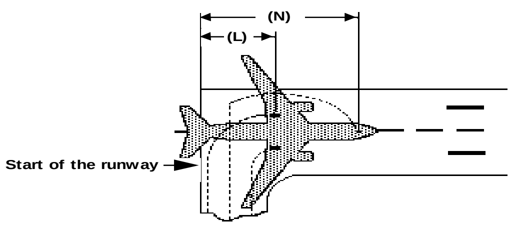
IEM OPS 1.565(d)(6)
Loss of runway length due to alignment
See ANTR OPS 1.565(d)(6)

1 Introduction

1.1 The length of the runway which is declared for the calculation of TODA, ASDA and TORA, does not account for line-up of the aeroplane in the direction of take-off on the runway in use. This alignment distance depends on the aeroplane geometry and access possibility to the runway in use. Accountability is usually required for a 90° taxiway entry to the runway and 180° turnaround on the runway. There are two distances to be considered:

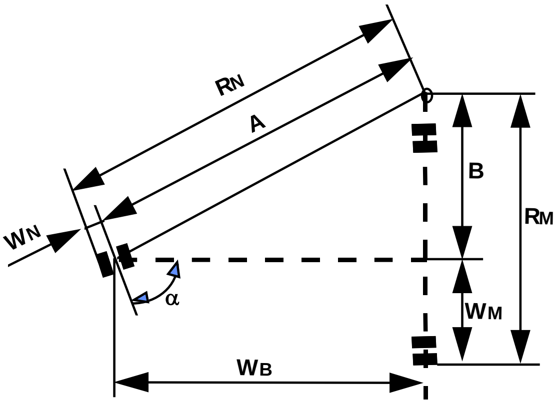
a. The minimum distance of the mainwheels from the start of the runway for determining TODA and TORA, “L”; and

b. The minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA, “N”.



Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in paragraph 2 may be use to determine the alignment distance.

2. Alignment Distance Calculation



The distances mentioned in (a) and (b) of paragraph 1 above are:

	90° ENTRY	180° TURNAROUND
L =	$R_M + X$	$R_N + Y$
N =	$R_M + X + W_B$	$R_N + Y + W_B$

where:

$$R_N = A + W_N = \frac{W_B}{\cos(90°-\alpha)} + W_N$$

and

$$R_M = B + W_M = W_B \tan(90°-\alpha) + W_M$$

X = Safety distance of outer main wheel during turn to the edge of the runway

Y = Safety distance of outer nose wheel during turn to the edge of the runway

NOTE: Minimum edge safety distances for X and Y are specified in FAA AC 150/5300-13 and ICAO Annex 14 paragraph 3.8.3

R_N = Radius of turn of outer nose wheel

R_M = Radius of turn of outer main wheel

W_N = Distance from aeroplane centre-line to outer nose wheel

W_M = Distance from aeroplane centre-line to outer main wheel

W_B = Wheel base

a = Steering angle

AMC OPS 1.565(d)(4)
Runway Slope
See ANTR OPS 1.565(d)(4)

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturers, the take-off distance should be increased by 5% for each 1% of upslope except that correction factors for runways with slopes in excess of 2% need the acceptance of the BCAA.

AMC OPS 1.570(d)
Take-off Flight Path
See ANTR OPS 1.570(d)

1 The Aeroplane Flight Manual generally provides a climb gradient decrement for a 15° bank turn. Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturer, acceptable adjustments to assure adequate stall margins and gradient corrections are provided by the following:

BANK	SPEED	GRADIENT CORRECTION
15°	V_2	1 x Aeroplane Flight Manual 15° Gradient Loss
20°	V_2 + 5 kt	2 x Aeroplane Flight Manual 15° Gradient Loss
25°	V_2 + 10 kt	3 x Aeroplane Flight Manual 15° Gradient Loss

2 For bank angles of less than 15°, a proportionate amount may be applied, unless the manufacturer or Aeroplane Flight Manual has provided other data.

AMC OPS 1.570(e)(1) & (f)(1)
Required navigational accuracy
See ANTR OPS 1.570(e)(1) & (f)(1)

1 Flight-deck systems. The obstacle accountability semi-widths of 300 m (see ANTR OPS 1.570(e)(1)) and 600 m (see ANTR OPS 1.570(f)(1)) may be used if the navigation system under one-engine-inoperative conditions provides a two standard deviation (2 s) accuracy of 150 m and 300 m respectively.

2 Visual Course Guidance

2.1 The obstacle accountability semi-widths of 300 m (see ANTR OPS 1.570(e)(1)) and 600 m (see ANTR OPS 1.570(f)(1)) may be used where navigational accuracy is ensured at all relevant points on the flight path by use of external references. These references may be considered visible from the flight deck if they are situated more than 45° either side of the intended track and with a depression of not greater than 20° from the horizontal.

2.2 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:

a. 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;

b. The procedure should be within the capabilities of the aeroplane with respect to forward speed, bank angle and wind effects;

c. A written and/or pictorial description of the procedure should be provided for crew use;

d. The limiting environmental conditions (such as wind, the lowest cloud base, ceiling, visibility, day/night, ambient lighting, obstruction lighting) should be specified.

AMC OPS 1.580
En-Route – One Engine Inoperative
See ANTR OPS 1.580

The high terrain or obstacle analysis required for showing compliance with ANTR OPS 1.580 can be carried out by making a detailed analysis of the route using contour maps of the high terrain, and plotting the highest points within the prescribed corridor width along the route. The next step is to determine whether it is possible to maintain level flight with one engine inoperative 1000 ft above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a drift-down procedure must be evaluated, based on engine failure at the most critical point, and must show obstacle clearance during the drift-down by at least 2000 ft. The minimum cruise altitude is determined from the drift-down path, taking into account allowances for decision making, and the reduction in the scheduled rate of climb (See Figure 1).

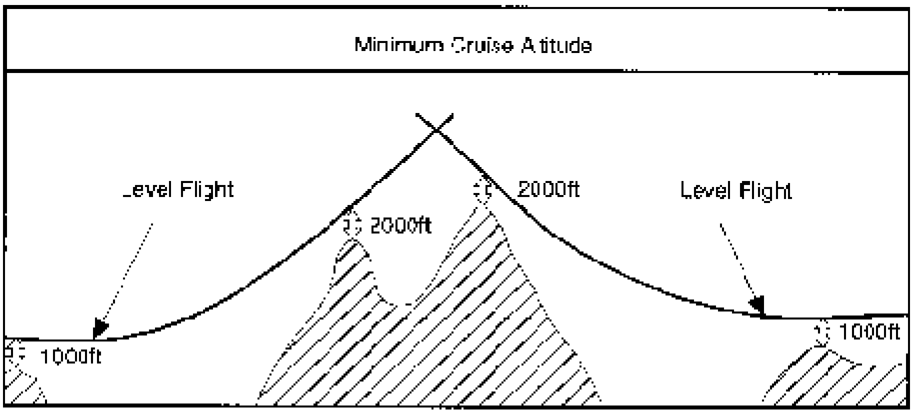


FIGURE 1

AMC OPS 1.590 & 1.595
Landing – Destination and Alternate Aerodromes
Landing – Dry Runways
See ANTR OPS 1.590 & 1.595

In showing compliance with ANTR OPS 1.590 and ANTR OPS 1.595, the operator should use either pressure altitude or geometric altitude for his operation and this should be reflected in the Operations Manual.

AMC OPS 1.595(b)(3)
Landing Distance Correction Factors
See ANTR OPS 1.595(b)(3)

Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturers, the variables affecting the landing performance and the associated factors to be applied to the Aeroplane Flight Manual data are shown in the table below. It should be applied in addition to the factor specified in ANTR OPS 1.595(a).

SURFACE TYPE	FACTOR
Grass (on firm soil up to 13 cm long)	1·20

NOTE: The soil is firm when there are wheel impressions but no rutting.

AMC OPS 1.595(b)(4)
Runway Slope
See ANTR OPS 1.595(b)(4)

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturer, the landing distances required should be increased by 5% for each 1% of downslope.

IEM OPS 1.595(c)
Landing Runway
See ANTR OPS 1.595(c)

1 ANTR OPS 1.595(c) establishes two considerations in determining the maximum permissible landing mass at the destination and alternate aerodromes.

2 Firstly, the aeroplane mass will be such that on arrival the aeroplane can be landed within 70% of the landing distance available on the most favourable (normally the longest) runway in still air. Regardless of the wind conditions, the maximum landing mass for an aerodrome/aeroplane configuration at a particular aerodrome, cannot be exceeded.

3 Secondly, consideration should be given to anticipated conditions and circumstances. The expected wind, or ATC and noise abatement procedures, may indicate the use of a different runway. These factors may result in a lower landing mass than that permitted under paragraph 2 above, in which case, to show compliance with ANTR OPS 1.595(a), despatch should be based on this lesser mass.

4 The expected wind referred to in paragraph 3 is the wind expected to exist at the time of arrival.

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AC/AMC/IEM J - MASS & BALANCE

IEM OPS 1.605(e)
Fuel density
See ANTR OPS 1.605(e)

1 If the actual fuel density is not known, the operator may use the standard fuel density values specified in the Operations Manual for determining the mass of the fuel load. Such standard values should be based on current fuel density measurements for the airports or areas concerned. Typical fuel density values are:

a. Gasoline (piston engine fuel) – 0·71

b. Jet fuel JP 1 – 0·79

c. Jet fuel JP 4 – 0·76

d. Oil – 0·88

AC OPS 1.605
Mass values
See ANTR OPS 1.605

In accordance with ICAO Annex 5 and the International System of Units (SI), the actual and limiting masses of aeroplanes, the payload and its constituent elements, the fuel load etc, are expressed in ANTR OPS 1 in units of mass (kg). However, in most approved Flight Manuals and other operational documentation, these quantities are published as weights in accordance with the common language. In the SI system, a weight is a force rather than a mass. Since the use of the term 'weight' does not cause any problem in the day-to-day handling of aeroplanes, its continued use in operational applications and publications is acceptable.

AMC to Appendix 1 to ANTR OPS 1.605
Accuracy of weighing equipment
See Appendix 1 to ANTR OPS 1.605, paragraph (a)(4)(iii)

1 The mass of the aeroplane as used in establishing the dry operating mass and the centre of gravity must be established accurately. Since a certain model of weighing equipment is used for initial and periodic weighing of aeroplanes of widely different mass classes, one single accuracy criterion for weighing equipment cannot be given. However, the weighing accuracy is considered satisfactory if the following accuracy criteria are met by the individual scales/cells of the weighing equipment used:

a. For a scale/cell load below 2 000 kg – an accuracy of ± 1%;

b. For a scale/cell load from 2 000 kg to 20 000 kg – an accuracy of ± 20 kg; and

c. For a scale/cell load above 20 000 kg – an accuracy of ± 0·1 %.

IEM to Appendix 1 to ANTR OPS 1.605
Centre of gravity limits
See Appendix 1 to ANTR OPS 1.605, sub-paragraph (d)

1 In the Certificate Limitations section of the Aeroplane Flight Manual, forward and aft centre of gravity (CG) limits are specified. These limits ensure that the certification stability and control criteria are met throughout the whole flight and allow the proper trim setting for take-off. The operator should ensure that these limits are observed by defining operational procedures or a CG envelope which compensates for deviations and errors as listed below:

1.1 Deviations of actual CG at empty or operating mass from published values due, for example, to weighing errors, unaccounted modifications and/or equipment variations.

1.2 Deviations in fuel distribution in tanks from the applicable schedule.

1.3 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.

1.4 Deviations in actual passenger seating from the seating distribution assumed when preparing the mass and balance documentation. (See Note)

1.5 Deviations of the actual CG of cargo and passenger load within individual cargo compartments or cabin sections from the normally assumed mid position.

1.6 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).

1.7 Deviations caused by in-flight movement of cabin crew, pantry equipment and passengers.

Note: Large CG errors may occur when 'free seating' (freedom of passengers to select any seat when entering the aeroplane) is permitted. Although in most cases reasonably even longitudinal passenger seating can be expected, there is a risk of an extreme forward or aft seat selection causing very large and unacceptable CG errors (assuming that the balance calculation is done on the basis of an assumed even distribution). The largest errors may occur at a load factor of approximately 50% if all passengers are seated in either the forward or aft half of the cabin. Statistical analysis indicates that the risk of such extreme seating adversely affecting the CG is greatest on small aeroplanes.

AMC OPS 1.620(a)
Passenger mass established by use of a verbal statement
See ANTR OPS 1.620(a)

1 When asking each passenger on aeroplanes with less than 10 passenger seats for his/her mass (weight), specific constants should be added to account for hand baggage and clothing. These constants should be determined by the operator on the basis of studies relevant to his particular routes, etc. and should not be less than:

a. For clothing - 4 kg; and

b. For hand baggage - 6 kg.

2 Personnel boarding passengers on this basis should assess the passenger's stated mass and the mass of passengers' clothing and hand baggage to check that they are reasonable. Such personnel should have received instruction on assessing these mass values. Where necessary, the stated mass and the specific constants should be increased so as to avoid gross inaccuracies.

IEM OPS 1.620(d)(2)
Holiday Charter
See ANTR OPS 1.620(d)(2)

A "charter flight solely intended as an element of a holiday travel package" is a flight where the entire passenger capacity is hired by one or more Charterer(s) for the carriage of passengers who are travelling, all or in part by air, on a round- or circle-trip basis for holiday purposes. Categories of passengers such as company personnel, tour operators' staff, representatives of the press, Authority officials etc. can be included within the 5% alleviation without negating the use of holiday charter mass values.

IEM OPS 1.620(g)
Statistical evaluation of passenger and baggage mass data
See ANTR OPS 1.620(g)

1 Sample size (see also Appendix 1 to ANTR OPS 1.620(g)).

1.1 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.

1.2 As a consequence, for the parameters of mass distribution, i.e. mean and standard deviation, three cases have to be distinguished:

a. μ, σ = the true values of the average passenger mass and standard deviation, which are unknown and which are to be estimated by weighing passenger samples.

b. μ’, □’ = 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.

c. $\bar{x}$, s= the estimates for the current true values of m and s, calculated from the sample.

The sample size can then be calculated using the following formula:

$$n \geq \frac{(1\cdot 96 * \sigma' * 100)^2}{(e'_r * \mu')^2}$$

where:

n = number of passengers to be weighed (sample size)

e'_r = allowed relative confidence range (accuracy) for the estimate of μ by $\bar{x}$ (see also equation in paragraph 3).

NOTE: The allowed relative confidence range specifies the accuracy to be achieved when estimating the true mean. For example, if it is proposed to estimate the true mean to within ± 1%, then e'_r will be 1 in the above formula.

1·96 = value from the Gaussian distribution for 95% significance level of the resulting confidence interval.

2 Calculation of average mass and standard deviation. If the sample of passengers weighed is drawn at random, then the arithmetic mean of the sample ($\bar{x}$) is an unbiased estimate of the true average mass (μ) of the population.

2.1 Arithmetic mean of sample

$$\bar{x} \pm \frac{1\cdot 96 * s}{\sqrt{n}}$$

where:

x_j = mass values of individual passengers (sampling units).

2.2 Standard deviation

$$s = \sqrt{\frac{\sum_{j=1}^{n}(x_j - \bar{x})^2}{n-1}}$$

where:

$x_j -$ = deviation of the individual value from the sample mean.

3. Checking the accuracy of the sample mean. The accuracy (confidence range) which can be ascribed to the sample mean as an indicator of the true mean is a function of the standard deviation of the sample which has to be checked after the sample has been evaluated. This is done using the formula:

$$e_r = \frac{1\cdot 96 * s * 100}{\sqrt{n} * \bar{x}} (\%)$$

whereby e_r should not exceed 1% for an all adult average mass and not exceed 2% for an average male and/or female mass. The result of this calculation gives the relative accuracy of the estimate of μ at the 95% significance level. This means that with 95% probability, the true average mass μ lies within the interval:

4. Example of determination of the required sample size and average passenger mass

$$\bar{x} = \frac{\sum_{j=1}^{n} x_j}{n}$$

4.1 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.

4.2 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 has to be weighed so that the required values can be calculated. The latter has been assumed for the example.

Step 1: estimated average passenger mass

n	x_j (kg)
1	79·9
2	68·1
3	77·9
4	74·5
5	54·1
6	$\bar{x}$ 62·2
7	89·3
8	108·7
.	.
85	63·2
86	75·4
	6 071·6

$$\mu' = \bar{x} = \frac{\sum x_j}{n} = \frac{6071 \cdot 6}{86}$$

$= 70 \cdot 6$ kg

Step 2: estimated standard deviation

n	x_j	$(x_j - x)$	$(xj - x)^2$
1	79·9	+9·3	86·49
2	68·1	–2·5	6·25
3	77·9	+7·3	53·29
4	74·5	+3·9	15·21
5	54·1	–16·5	272·25
6	62·2	–8·4	70·56
7	89·3	+18·7	349·69
8	108·7	+38·1	1 451·61
.	.	.	.
85	63·2	–7·4	54·76
86	75·4	–4·8	23·04
$\sum_{j=1}^{86}$	6 071·6		34 683·40

$$\sigma' = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}$$

$$\sigma' = 20 \cdot 20 \text{ kg}$$

$$\sigma' = \sqrt{\frac{34\,683 \cdot 40}{86-1}}$$

Step 3: required sample size.

The required number of passengers to be weighed should be such that the confidence range, e'_r, does not exceed 1% as specified in paragraph 3.

$$n \geq \frac{(1 \cdot 96 * \sigma' * 100)^2}{(e'_r * \mu')^2}$$

$$n \geq \frac{(1 \cdot 96 * 20 \cdot 20 * 100)^2}{(1 * 70 \cdot 6)^2}$$

$$n \geq 3145$$

The result shows that at least 3 145 passengers have to be weighed to achieve the required accuracy. If e□$_r$ is chosen as 2% the result would be n ≥ 786.

Step 4: after having established the required sample size a plan for weighing the passengers is to be worked out, as specified in Appendix 1 to ANTR OPS 1.620(g).

4.3 Determination of the passenger average mass

Step 1: Having collected the required number of passenger mass values, the average passenger mass can be calculated. For the purpose of this example it has been assumed that 3 180 passengers were weighed. The sum of the individual masses amounts to 231 186·2 kg.

$$n = 3180$$

$$\sum_{j=1}^{3180} X_j = 231186 \cdot 2 \quad kg$$

$$\bar{x} = \frac{\sum x_j}{n} = \frac{231186 \cdot 2}{3180} \quad kg$$

$$\bar{x} = 72 \cdot 7 \quad kg$$

Step 2: calculation of the standard deviation.

For calculating the standard deviation the method shown in paragraph 4.2 step 2 should be applied.

$$\sum (x_j - \bar{x})^2 = 745\,145 \cdot 20$$

$$s = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}$$

$$s = \sqrt{\frac{745\,145 \cdot 20}{3180 - 1}}$$

$$s = 15 \cdot 31 \text{ kg}$$

Step 3: calculation of the accuracy of the sample mean.

$$e_r = \frac{1 \cdot 96 * s * 100}{\sqrt{n} * \bar{x}} \%$$

$$e_r = \frac{1 \cdot 96 * 15 \cdot 31 * 100}{\sqrt{3180} * 72 \cdot 7} \%$$

$$e_r = 0 \cdot 73\%$$

Step 4: calculation of the confidence range of the sample mean.

$$\bar{x} \pm \frac{1 \cdot 96 * s}{\sqrt{n}}$$

$$\bar{x} \pm \frac{1 \cdot 96 * 15 \cdot 31}{\sqrt{3180}} \quad kg$$

$$72 \cdot 7 \pm 0 \cdot 5 \text{ kg}$$

The result of this calculation shows that there is a 95% probability of the actual mean for all passengers lying within the range 72·2 kg to 73·2 kg.

IEM OPS 1.620(h) & (i)
Adjustment of standard masses
See ANTR OPS 1.620(h) & (i)

1. When standard mass values are used, ANTR OPS 1.620 (h) and 1.620(i) require the operator to identify and adjust the passenger and checked baggage masses in cases where significant numbers of passengers or quantities of baggage are suspected of exceeding the standard values. This requirement implies that the Operations Manual should contain appropriate directives to ensure that:

   a. Check-in, operations and cabin staff and loading personnel report or take appropriate action when a flight is identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to exceed the standard passenger mass, and/or groups of passengers carrying exceptionally heavy baggage (e.g. military personnel or sports teams); and

   b. On small aeroplanes, where the risks of overload and/or CG errors are the greatest, commanders pay special attention to the load and its distribution and make proper adjustments.

AMC to Appendix 1 to ANTR OPS 1.620(g)
Guidance on passenger weighing surveys
See Appendix 1 to ANTR OPS 1.620(g), sub-paragraph (c)(4)

1 Operators seeking approval to use standard passenger masses differing from those prescribed in ANTR OPS 1.620, Tables 1 and 2, on similar routes or networks may pool their weighing surveys provided that:

   a. The BCAA has given prior approval for a joint survey;

   b. The survey procedures and the subsequent statistical analysis meet the criteria of Appendix 1 to ANTR OPS 1.620(g); and

   c. In addition to the joint weighing survey results, results from individual operators participating in the joint survey should be separately indicated in order to validate the joint survey results.

IEM to Appendix 1 to ANTR OPS 1.620(g)
Guidance on passenger weighing surveys
See Appendix 1 to ANTR OPS 1.620(g)

1 This IEM summarises several elements of passenger weighing surveys and provides explanatory and interpretative information.

2 Information to the BCAA. The operator should advise the BCAA about the intent of the passenger weighing survey, explain the survey plan in general terms and obtain prior approval to proceed (ANTR OPS 1.620(g) refers).

3 Detailed survey plan

3.1 The operator should establish and submit for approval to the BCAA 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 (ANTR OPS 1.620(g)).

3.2 A representative survey plan means a weighing plan specified in terms of weighing locations, dates and flight numbers giving a reasonable reflection of the operator’s timetable and/or area of operation (See Appendix 1 to ANTR OPS 1.620(g), sub-paragraph (a)(1)).

3.3 The minimum number of passengers to be weighed is the highest of the following (See Appendix 1 to ANTR OPS 1.620(g) sub-paragraph (a)):

   a. The number that follows from the general requirement that the sample should be representative of the total operation to which the results will be applied; this will often prove to be the overriding requirement; or

   b. The number that follows from the statistical requirement specifying the accuracy of the resulting mean values which should be at least 2% for male and female standard masses and 1% for all adult standard masses, where applicable. The required sample size can be estimated on the basis of a pilot sample (at least 100 passengers) or from previous surveys. If analysis of the results of the survey indicates that the requirements on the accuracy of the mean values for male or female standard masses or all adult standard masses, as applicable, are not met, an additional number of representative passengers should be weighed in order to satisfy the statistical requirements.

3.4 To avoid unrealistically small samples a minimum sample size of 2 000 passengers (males + females) is also required, except for small aeroplanes where in view of the burden of the large number of flights to be weighed to cover 2 000 passengers, a lesser number is considered acceptable.

4 Execution of weighing programme

4.1 At the beginning of the weighing programme it is important to note, and to account for, the data requirements of the weighing survey report (See paragraph 7 below).

4.2 As far as is practicable, the weighing programme should be conducted in accordance with the specified survey plan.

4.3 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.

5 Analysis of results of weighing survey

5.1 The data of the weighing survey should be analysed as explained in IEM OPS 1.620(g). To obtain an insight to variations per flight, per route etc. this analysis should be carried out in several stages, i.e. by flight, by route, by area, inbound/outbound, etc. Significant deviations from the weighing survey plan should be explained as well as their possible effect(s) on the results.

6 Results of the weighing survey

6.1 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 ANTR OPS 1.620 Tables 1 and 2. As stated in Appendix 1 to ANTR OPS 1.620(g), sub-paragraph (c), these averages, rounded to the nearest whole number may, in principle, be applied as standard mass values for males and females on aeroplanes with 20 and more passenger seats. Because of variations in actual passenger masses, the total passenger load also varies and statistical analysis indicates that the risk of a significant overload becomes unacceptable for aeroplanes with less than 20 seats. This is the reason for passenger mass increments on small aeroplanes.

6.2 The average masses of males and females differ by some 15 kg or more and because of uncertainties in the male/female ratio the variation of the total passenger load is greater if all adult standard masses are used than when using separate male and female standard masses. Statistical analysis indicates that the use of all adult standard mass values should be limited to aeroplanes with 30 passenger seats or more.

6.3 As indicated in Appendix 1 to ANTR OPS 1.620(g), standard mass values for all adults must be based on the averages for males and females found in the sample, taking into account a reference male/female ratio of 80/20 for all flights except holiday charters where a ratio of 50/50 applies. 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.

7 Weighing survey report

7.1 The weighing survey report, reflecting the content of paragraphs 1–6 above, should be prepared in a standard format as follows:

WEIGHING SURVEY REPORT

1 Introduction

– Objective and brief description of the weighing survey

2 Weighing survey plan

– Discussion of the selected flight number, airports, dates, etc.

– Determination of the minimum number of passengers to be weighed.

– Survey plan.

3 Analysis and discussion of weighing survey results

– Significant deviations from survey plan (if any).

– Variations in means and standard deviations in the network.

– Discussion of the (summary of) results.

4 Summary of results and conclusions

– Main results and conclusions.

– Proposed deviations from published standard mass values.

Attachment 1

Applicable summer and/or winter timetables or flight programmes.

Attachment 2

Weighing results per flight (showing individual passenger masses and sex); means and standard deviations per flight, per route, per area and for the total network.

IEM to Appendix 1 to ANTR OPS 1.625
Mass and balance documentation
See Appendix 1 to ANTR OPS 1.625

For Performance Class B aeroplanes, the CG position need not be mentioned on the mass and balance documentation if, for example, the load distribution is in accordance with a precalculated balance table or if it can be shown that for the planned operations a correct balance can be ensured, whatever the real load is.

AC/AMC/IEM K – INSTRUMENTS AND EQUIPMENT

IEM OPS 1.630
Instruments and Equipment - Approval and Installation
See ANTR OPS 1.630

1 For Instruments and Equipment required by ANTR OPS 1 Subpart K, “Approved” means that compliance with the applicable TSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a TSO does not exist, the applicable airworthiness standards apply unless otherwise prescribed in ANTR OPS 1 or ANTR M.

2 “Installed” means that the installation of Instruments and Equipment has been demonstrated to comply with the applicable airworthiness requirements of the respective Certification Specification / TCDS as accepted by BCAA for the respective Category Aeroplane or the relevant code used for Type Certification, and any applicable requirement prescribed in ANTR OPS 1.

3 Instruments and Equipment approved in accordance with design requirements and performance specifications other than TSOs, before the applicability dates prescribed in ANTR OPS 1.001(b), are acceptable for use or installation on aeroplanes operated for the purpose of commercial air transportation provided that any relevant OPS requirement is complied with.

4 When a new version of a TSO (or of a specification other than a TSO) is issued, Instruments and Equipment approved in accordance with earlier requirements may be used or installed on aeroplanes operated for the purpose of commercial air transportation provided that such Instruments and Equipment are operational, unless removal from service or withdrawal is required by means of an amendment to ANTR OPS 1 or ANTR M.

AMC OPS 1.650/1.652
Flight and Navigational Instruments and Associated Equipment
See ANTR OPS 1.650/1.652

1 Individual requirements of these paragraphs 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 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. by the instruments and associated equipment as specified in this Subpart.

2 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.

IEM OPS 1.650/1.652
Flight and Navigational Instruments and Associated Equipment
See ANTR OPS 1.650/1.652

Flight and navigational instruments and associated equipment

SERIAL		FLIGHTS UNDER VFR		FLIGHTS UNDER IFROR AT NIGHT	
INSTRUMENT		SINGLE-PILOT	TWO PILOTS REQUIRED	SINGLE-PILOT	TWO PILOTS REQUIRED
1	Magnetic direction	1	1	1	1
2	Time	1	1	1	1
3	Pressure altitude	1	2	2 Note (5)	2 Note (5)
4	Indicated airspeed	1	2	1	2
5	Vertical speed	1	2	1	2
6	Turn and slip or turn coordinator	1 Note (1)	2 Note (1) & Note (2)	1 Note (4)	2 Note (4)
7	Attitude	1 Note (1)	2 Note (1) & Note (2)	1	2
8	Stabilised direction	1 Note (1)	2 Note (1) & Note (2)	1	2
9	Outside air temperature	1	1	1	1
10	Mach number indicator	See Note (3)			
11	Airspeed icing protection	1 Note (6)	2 Note (6)	1	2
12	Airspeed icing protection failure indicating			1 Note (7)	2 Note (7)
13	Static pressure source			2	2
14	Standby attitude indicator			1 Note (8)	1 Note (8)
15	Chart holder			1 Note (6)	1 Note (6)

Note 1: *For local flights (A to A, 50 NM radius, not more than 60 minutes' duration), the instruments at serial (f) 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 CFR 14 PART 25 / EASA 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 9. 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 5 700 kg and an MOPSC greater than 9.*

Note 8: *Applicable only to aeroplanes with an MCTOM of more than 5 700 kg, or with an MOPSC of more than 9.*

AMC OPS 1.650(i) & 1.652(i)
Flight and Navigational Instruments and Associated Equipment
See ANTR OPS 1.650(i) & 1.652(i)

A means of displaying outside air temperature may be an air temperature indicator that provides indications that are convertible to outside air temperature.

IEM OPS 1.650(p)/1.652(s)
Headset, boom microphone and associated equipment
See ANTR OPS 1.650(p)/1.652(s)

A headset, as required by ANTR OPS 1.650(p) and ANTR OPS 1.652(s), consists of a communication device which includes an earphone(s) to receive and a microphone to transmit audio signals to the aeroplane's communication system. To comply with the minimum performance requirements, the earphone(s) and microphone should match with the communication system's characteristics and the flight deck environment. The headset should be adequately adjustable to fit the pilot's head. Headset boom microphones should be of the noise cancelling type.

AMC OPS 1.652(d) & (k)(2)
Flight and Navigational Instruments and Associated Equipment
See ANTR OPS 1.652(d) & (k)(2)

A combined pitot heater warning indicator is acceptable provided that a means exists to identify the failed heater in systems with two or more sensors.

IEM OPS 1.668
Airborne Collision Avoidance System
See ANTR OPS 1.668

The minimum performance level for ACAS II is contained in ICAO Annex 10, Volume IV, Chapter 4.

AC OPS 1.680(a)(2)
Quarterly Radiation Sampling
See ANTR OPS 1.680(a)(2)

1. Compliance with ANTR OPS 1.680(a)(2) may be shown by conducting quarterly radiation sampling during aeroplane operation using the following criteria:
   a. The sampling should be carried out in conjunction with a Radiological Agency or similar organisation acceptable to the BCAA;
   b. Sixteen route sectors which include flight above 49 000 ft should be sampled every quarter (three months). Where less than sixteen route sectors which include flight above 49 000 ft are achieved each quarter, then all sectors above 49 000 ft should be sampled.;
   c. The cosmic radiation recorded should include both the neutron and non-neutron components of the radiation field.
2. The results of the sampling, including a cumulative summary quarter on quarter, should be reported to the BCAA under arrangements acceptable to the BCAA.

AMC OPS 1.690(b)(6)
Crew member interphone system
See ANTR OPS 1.690(b)(6)

1 The means of determining whether or not an interphone call is a normal or an emergency call may be one or a combination of the following:
   i. Lights of different colours;
   ii. Codes defined by the operator (e.g. Different number of rings for normal and emergency calls);
   iii. Any other indicating signal acceptable to the BCAA.

IEM OPS 1.690(b)(7)
Crew member interphone system
See ANTR OPS 1.690(b)(7)

At least one interphone system station for use by ground personnel should be, where practicable, so located that the personnel using the system may avoid detection from within the aeroplane.

IEM OPS 1.700/1.705/1.710/1.715
Summary of the Flight Recorder carriage requirement

Through the years, the applicability date and the carriage of flight recorders to be installed, as defined by the SARPs, were complex. The tables below summarize the current flight recorders carriage requirements.

1. FDR/AIR/ADRS/AIRS installation

<table>
<tr><th rowspan="3">Date</th><th colspan="9">Maximum Certified Take Off Mass</th></tr>
<tr><th colspan="3">Over 27,000 Kg</th><th colspan="3">Over 5,700 Kg</th><th colspan="3">5,700 Kg and below</th></tr>
<tr><th>All aeroplanes new type certificate</th><th>All aeroplanes first certificate of airworthiness</th><th>All turbine aeroplanes first certificate of</th><th>All Aeroplanes new type certificate</th><th>All aeroplanes first certificate of airworthiness</th><th>All turbine aeroplanes first certificate of airworthiness</th><th>All Aeroplanes new type certificate</th><th>All aeroplanes first certificate of airworthiness</th><th>All turbine aeroplanes first certificate of</th></tr>
<tr><td></td><td rowspan="5"></td><td rowspan="2"></td><td>ANTR OPS 1.705(a)(6)
ANTR OPS 1.705(a)(9)</td><td rowspan="5"></td><td rowspan="2"></td><td>ANTR OPS 1.705(a)(6)</td><td rowspan="5"></td><td rowspan="5"></td><td rowspan="3"></td></tr>
<tr><td>1987</td><td>ANTR OPS 1.705(a)(8)</td><td>ANTR OPS 1.705(a)(7)</td></tr>
<tr><td>1989</td><td rowspan="2">ANTR OPS 1.705(a)(3)</td><td rowspan="3"></td><td rowspan="2">ANTR OPS 1.705(a)(4)</td><td rowspan="4"></td></tr>
<tr><td>1990</td><td rowspan="2">ANTR OPS 1.705(a)(5)</td></tr>
<tr><td>2005</td><td rowspan="2">ANTR OPS 1.705(a)(10)</td><td rowspan="2">ANTR OPS 1.705(a)(10)</td></tr>
<tr><td>2016</td><td>Table A8-1 (Some parameters are sampled at an increased frequency)</td><td></td><td>Table at Appendix 1 to ANTR OPS 1.705 (Some parameters are sampled at an increased frequency)</td><td>ANTR OPS 1.705(a)(1)</td><td>ANTR OPS 1.705(a)(2)</td><td></td></tr>
<tr><td>2023</td><td>ANTR OPS 1.705(a)(11)</td><td>ANTR OPS 1.705(a)(12)</td><td></td><td>ANTR OPS 1.705(a)(11)</td><td>ANTR OPS 1.705(a)(12)</td><td></td><td></td><td></td><td></td></tr>
</table>

2. CVR/CARS installation

<table>
<tr><th rowspan="3">Date</th><th colspan="6">Maximum Certified Take Off Mass</th></tr>
<tr><th colspan="2">Over 27,000 Kg</th><th colspan="2">Over 5,700 Kg</th><th colspan="2">Over 2,250 Kg</th></tr>
<tr><th>All aeroplanes</th><th>All turbine aeroplanes first certificate of airworthiness</th><th>All aeroplanes first certificate of airworthiness</th><th>All turbine aeroplanes first certificate of airworthiness</th><th>All turbine aeroplanes more than 1 pilot new type certificate</th><th>All turbine aeroplanes more than 1 pilot first certificate of airworthiness</th></tr>
<tr><td></td><td rowspan="3"></td><td rowspan="5">ANTR OPS 1.710(a)(4)</td><td></td><td>ANTR OPS 1.710(a)(5)</td><td rowspan="3"></td><td rowspan="3"></td></tr>
<tr><td>1987</td><td rowspan="4">ANTR OPS 1.710(a)(3)</td><td rowspan="3"></td></tr>
<tr><td>2003</td></tr>
<tr><td>2016</td><td>ANTR OPS 1.710(c)(1)</td><td rowspan="2">ANTR OPS 1.710(a)(1)</td><td rowspan="2">ANTR OPS 1.710(a)(2)</td></tr>
<tr><td>2021</td><td>ANTR OPS 1.710(c)(2)</td><td></td></tr>
</table>

3. Combination Recorder Installation

Date	Maximum Certified Take Off Mass			
	Over 27,000 Kg	Over 5,700 Kg		Less Than 5,700 Kg
	All aeroplanes new type certificate requiring CVR and FDR	All aeroplanes new type certificate requiring CVR and FDR	All aeroplanes requiring CVR and FDR	All multi-engined turbinepowered aeroplanes requiring FDR and/or CVR
2016 →	ANTR OPS 1.700(g)(2)	ANTR OPS 1.700(g)(1)	ANTR OPS 1.700(g)(3)	ANTR OPS 1.700(g)(4)

4. Flight crew-machine interface recordings

Date	Maximum Certified Take Off Mass	
	Over 27,000 Kg	Over 5,700 Kg
	All aeroplanes new type certificate	All aeroplanes first certificate of airworthiness
2023 →	ANTR OPS 1.705(e)(1)	ANTR OPS 1.705(e)(2)

5. Data link communications (DLC) recording installation clarification

Rows	Date individual certificate of airworthiness was first issued	Date aircraft type certificate issued or modification for DLC equipment first approved	Date of activation for use of DLC equipment	DLC recording required	SARP Reference
1	On or after 1 January 2016	On or after 1 January 2016	On or after 1 January 2016	Yes	ANTR OPS 1.715(a)(1)
2	On or after 1 January 2016	Before 1 January 2016	On or after 1 January 2016	Yes	ANTR OPS 1.715(a)(1)
3	Before 1 January 2016	On or after 1 January 2016	On or after 1 January 2016	Yes	ANTR OPS 1.715(a)(2)
4	Before 1 January 2016	Before 1 January 2016	Before 1 January 2016	No	ANTR OPS 1.715(a)(2)
5	Before 1 January 2016	Before 1 January 2016	On or after 1 January 2016	No1	ANTR OPS 1.715(a)(2) & ANTR OPS 1.715(a)(3)

Explanatory Notes for the Table 5:

1. TABLE HEADINGS

1.1 *Date individual certificate of airworthiness* was first issued is self-explanatory.

1.2 *Date aircraft type certificate issued or modification for DLC equipment first approved* is the date that allows the installation of DLC equipment on the aircraft and refers to the airworthiness approval of the installation of aircraft components such as the structural and wiring provisions with which the DLC equipment needs to be compliant. These airworthiness approvals are usually in a form of a type certificate, a supplemental type certificate or an amended type certificate.

1.2.1 It is not uncommon for original customers of an aircraft that have airworthiness approvals related to DLC capability, to choose not to install the DLC equipment or choose not to have it activated even if the aircraft is prepared for it.

1.3 *Date of activation for use of DLC equipment* refers to the date that a DLC application referred to in Appendix 1 to ANTR OPS 1.715(a)(2) was first activated for use.

1.3.1 Datalink communication (DLC) equipment as used in these provisions, refer to the physical unit(s) (e.g. box(es)) that was approved to a minimum performance standard issued by a certification authority (e.g. TSO or ETSO).

1.3.2 The activation of DLC functions refer to approved software activation of DLC functions or software updates.

1.4 *DLC recording required* refers to the requirement to record DLC message in accordance with provisions ANTR OPS 1.715(a)(1), ANTR OPS 1.715(a)(2) and ANTR OPS 1.715(a)(3).

2. GENERAL

2.1 It is the date on which the CVR capabilities of the aircraft were approved that determines the DLC recording requirement. The date in which the DLC equipment was approved to a minimum performance standard is not relevant for CVR recording requirement purposes.

2.2 For the DLC equipment to be compliant with an airworthiness approval, it needs to be able to use, without modification, the installed aircraft components that are necessary to provide the DLC function such as the:

a) datalink router (e.g. hosted in the communications management unit);

b) radios (e.g. VHF, HF datalink, Satcom) and related antennas.

2.3 Approved software updates to installed equipment or software activation of functions normally do not alter the DLC equipment compliance with the rest of the aircraft systems. 26

3. EXAMPLES

3.1 For rows 1 and 2:

– The recording requirement is driven by ANTR OPS 1.715(a)(1) which is based on when the individual certificate of airworthiness was first issued. Any subsequent airworthiness modifications related to DLC capability do not exempt the aircraft from the requirement to record DLC messages.

3.2 For rows 3 to 5 — General:

– The recording requirement is driven by ANTR OPS 1.715(a)(2) and is based on whether or not the aircraft has an airworthiness approval for DLC capabilities and the date of its issue.

– Since there was no requirement to record DLC messages prior to 1 January 2016, airworthiness approvals related to DLC capability issued before that date did not necessarily include this function.

3.3 For row 3:

– The recording requirement applies regardless of when the certificate of airworthiness was issued, because an airworthiness approval related to DLC capability was issued on or after 1 January 2016. The date of installation of the equipment would typically be after the airworthiness approval.

3.4 For row 4:

– The recording requirement does not apply because the aircraft's certificate of airworthiness and an airworthiness approval related to DLC capability was issued before 1 January 2016. The date of installation of DLC equipment is not a factor for DLC message recording requirements as long as the equipment is compliant with that airworthiness approval.

3.5 For row 5:

– The recording requirement does not apply because the aircraft's certificate of airworthiness and an airworthiness approval related to DLC capability was issued before 1 January 2016. The date of installation of DLC equipment is not a factor for DLC message recording requirements as long as the equipment is compliant with that airworthiness approval.

– Notwithstanding the above, if the activation for use of the DLC equipment is on or after 1 January 2016, DLC messages should be recorded in accordance with Recommendation ANTR OPS 1.715(a)(3).

AC OPS 1.730(a)(3)
Seats, seat safety belts, harnesses and child restraint devices
(See ANTR OPS 1.730(a)(3))

1. General

A child restraint device (CRD) is considered to be acceptable if:

a) It is a ‘supplementary loop belt’ manufactured with the same techniques and the same materials of the approved safety belts; or

b) It complies with paragraph 2.

2. Acceptable CRDs

Provided the CRD can be installed properly on the respective aircraft seat, the following CRDs are considered “acceptable”:

2.1 Types of CRDs

a) CRDs approved for use in aircraft only by the EASA or FAA or Transport Canada (on the basis of a national technical standard) or through the respective STCs / Certificates and marked accordingly.

b) Child seats approved for use in motor vehicles on the basis of the technical standard specified in point (i) below. The child seat must be also approved for use in aircraft on the basis of the technical standard specified in either point (ii) or point (iii):

(i) UN Standard ECE R44-04 (or 03), or ECE R129 bearing the respective ‘ECE R’ label; and
(ii) German ‘Qualification Procedure for Child Restraint Systems for Use in Aircraft’ (TÜV/958-01/2001) bearing the label ‘For Use in Aircraft’; or
(iii) Other technical standard acceptable to the BCAA. The child seat should hold a qualification sign that it can be used in aircraft.

c) CRDs approved for use in motor vehicles and aircraft according to Canadian CMVSS 213/213.1bearing the respective ;lable; or

d) CRDs approved for use in motor vehicles and aircraft according to US FMVSS No 213 and US approved CRDs and bearing one or two labels displaying the following labels in red lettering:
1) “THIS CHILD RESTRAINT SYSTEM CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS“ and

2) in red letters “THIS RESTRAINT IS CERTIFIED FOR USE IN MOTOR VEHICLES AND AIRCRAFT“.

e) Child seats approved for use in motor vehicles and aircraft according to Australia/New Zealand’s technical standard AS/NZS 1754:2013 bearing the green part on the label displaying ‘For Use in Aircraft’; and

2.2 CRDs manufactured and tested according to other technical standards equivalent to those listed in 2.1 (a) to (e) inclusive, which are acceptable to the authority. The device must be marked with an associated qualification sign, which shows the name of the qualification organisation and a specific identification number, related to the associated qualification project.

2.3 The qualifying organization shall be a competent and independent organization that is acceptable to the authority.

3. Location

3.1 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 it is positioned. Rearward facing CRDs can only be installed on forward facing passenger seats. A CRD may not be installed within the radius of action of an airbag, unless it is obvious that the airbag is de-activated or it can be demonstrated that there is no negative impact from the airbag.

3.2 An infant / child in a restraint device should be located in the vicinity of a floor level exit as feasible.

3.3 An infant / child in a restraint device should be seated in accordance with ANTR OPS 1.280 and IEM OPS 1.280, “Passenger Seating“ so as to not hinder evacuation for any passenger.

3.4 An infant / child in a restraint device 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 is not recommended. Other locations may be acceptable provided the access of neighbour passengers to the nearest aisle is not obstructed by the CRD.

3.5 In general, only one CRD per row segment is recommended. More than one CRD per row segment is allowed if the infant / children are from the same family or travelling group provided the infant / children are accompanied by a responsible person sitting next to them.

3.6 A Row Segment is the fraction of a row separated by two aisles or by one aisle and the aircraft fuselage.

4. Installation

4.1 CRDs shall only be installed on a suitable aircraft seat with the type of connecting device they are approved or qualified for. E.g., CRDs to be connected by a three point harness only (most rearward facing baby CRDs currently available) shall not be attached to an aircraft seat with a lap belt only, a CRD designed to be attached to a vehicle seat by means of rigid bar lower anchorages (ISO-FIX or US equivalent) only, shall only be used on aircraft seats that are equipped with such connecting devices and shall not be attached by the aircraft seat lap belt. The method of connecting must be clearly shown in the manufacturer’s instructions to be provided with each CRD.

4.2 All safety and installation instructions must be followed carefully by the responsible person accompanying the infant / child. Cabin crew should prohibit the use of a CRD not installed on the passenger seat according to the manufacturer's instructions or not approved for use in aircraft.

4.3 If a forward facing child seat 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.

4.4 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.

4.5 Forward facing restraint devices with an integral harness must not be installed such that the adult safety belt is secured over the infant.

5. Operation

5.1 Each CRD shall remain secured to a passenger seat during all phases of flight, unless it is properly stowed when not in use.

5.2 Where a child seat is adjustable in recline it must be in an upright position for all occasions when passenger restraint devices are required to be used according to ANTR OPS 1.320(b)(1).

IEM OPS 1.740
Placards
(See ANTR OPS 1.740)

The markings required must:

- a be painted, or affixed by other equally permanent means;
- b be red in colour, and in any case where the colour of the adjacent back-ground is such as to render red markings not readily visible,
- c be outlined in white or some other contrasting colour in such a manner as to render them readily visible;
- d be kept at all times clean and un-obscured.
- e if they are symbolic signs, then the exit universal symbols standard, acceptable to EASA and FAA, are considered acceptable for respective State of Design aircraft.

AMC OPS 1.745
First-Aid Kits
See ANTR OPS 1.745

The following should be included in the First-Aid Kits:

— List of contents

Bandage: adhesive strips
Bandage: gauze 7.5 cm x 4.5 m
Bandage: triangular; safety pins
Dressing: burn 10 cm x 10 cm
Dressing: compress, sterile 7.5 cm x 12 cm
Dressing: gauze, sterile 10.4 cm x 10.4 cm
Antiseptic swabs (10/Pack)
Adhesive wound closures
Tape: Adhesive 2.5 cm (roll)
Steri-strips (or equivalent adhesive strip)
Hand Cleanser or cleansing towelettes
Pad with shield, or tape for eye
Mouth-to-mouth resuscitation mask with one-way valve
Scissors: 10 cm (if allowed by national regulation)
Tape: Adhesive, surgical 1.2 cm x 4.6 m
Thermometer (non-mercury)
Mild to moderate analgesic
Antiemetic
Tweezers: splinter
Nasal decongestant
First-Aid handbook – current edition
*Antacid
Antihistamine-non-injectable
*Anti-diarrhoeal medication e.g. Loperamide +
Disposable Gloves (multiple pairs)
Incident record form

A list of contents in at least 2 languages (English and one other). This should include information on the effects and side effects of drugs carried.

NOTE: An eye irrigator whilst not required to be carried in the first -aid kit should, where possible, be available for use on the ground.

*For aeroplanes with more than 9 passenger seats installed.

AMC OPS 1.750
Universal Precaution Kit Content

The Universal Precaution Kit should contain as a minimum the following:

(a) Dry powder that can convert small liquid spill into a sterile granulated gel

(b) Germicidal disinfectant for surface cleaning

(c) Skin wipes

(d) Face/eye mask (separate or combined)

(e) Gloves (disposable)

(f) Protective apron

(g) Large absorbent towel

(h) Pick-up scoop with scraper

(i) Bio-hazard disposal waste bag

(j) Instructions

AMC OPS 1.755
Medical Kit
See ANTR OPS 1.755

The following should be included in the medical kit carried in the aeroplane:

Equipment

— List of contents
— Stethoscope
— Sphygmomanometer (electronic preferred)
— Airways, oropharyngeal (three sizes)
— Syringes (appropriate range of sizes)
— Needles (appropriate range of sizes)
— Intravenous catheters (appropriate range of sizes)
— Antiseptic wipes
— Gloves (disposable)
— Needle disposal box
— Urinary catheter
— System for delivering intravenous fluids
— Venous tourniquet
— Sponge gauze
— Tape – adhesive
— Surgical mask
— Emergency tracheal catheter (or large gauge intravenous cannula)
— Umbilical cord clamp
— Thermometers (non-mercury)
— Basic life support cards
— Bag-valve mask
— Flashlight and batteries

Medication

— Epinephrine 1:1 000
— Antihistamine – injectable
— Dextrose 50% (or equivalent) – injectable: 50 ml
— Nitroglycerin tablets, or spray
— Major analgesic
— Sedative anticonvulsant – injectable
— Antiemetic – injectable
— Bronchial dilator – inhaler
— Atropine – injectable
— Adrenocortical steroid – injectable
— Diuretic – injectable
— Medication for postpartum bleeding
— Sodium chloride 0.9% (minimum 250 ml)
— Acetyl salicylic acid (aspirin) for oral use
— Oral beta blocker
—A list of contents in at least 2 languages (English and one other). This should include information on the effects and side effects of drugs carried.

If a cardiac monitor is available (with or without an AED) add to the above list:

— Epinephrine 1:10 000 (can be a dilution of epinephrine 1:1 000)

Note: The United Nations Conference for Adoption of a Single Convention on Narcotic Drugs in March 1961 adopted such a Convention, Article 32 of which contains special provisions concerning the carriage of drugs in medical kits of aircraft engaged in international flight.

IEM OPS 1.760
First-aid Oxygen
See ANTR OPS 1.760

1 First–aid oxygen is intended for those passengers who, having been provided with the supplemental oxygen required under ANTR OPS 1.770, still need to breathe undiluted oxygen when the amount of supplemental oxygen has been exhausted.

2 When calculating the amount of first-aid oxygen, the operator should take into account the fact that, following a cabin depressurisation, supplemental oxygen as calculated in accordance with Appendix 1 to ANTR OPS 1.770 should be sufficient to cope with potential effect of hypoxic:

a. all passengers when the cabin altitude is above 15 000 ft; and

b. 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 14 000 ft and 15 000 ft; and

c. 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 10 000 ft and 14 000 ft.

3 For the above reasons, the amount of first-aid oxygen should be calculated for the part of the flight after cabin depressurisation during which the cabin altitude is between 8 000 ft and 15 000 ft, when supplemental oxygen may no longer be available.

4 Moreover, following cabin depressurisation an emergency descent should be carried out to the lowest altitude compatible with the safety of the flight. In addition, in these circumstances, the aeroplane should land at the first available aerodrome at the earliest opportunity.

5 The conditions above should reduce the period of time during which the first-aid oxygen may be required and consequently should limit the amount of first-aid oxygen to be carried on board.

6 Means may be provided to decrease the flow to not less than 2 litres per minute, STPD, at any altitude.

AMC OPS 1.770
Supplemental Oxygen – Pressurised Aeroplanes
See ANTR OPS 1.770

I. 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 competent 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.

II. 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.

III. 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.

IV. AEROPLANES WITHOUT AUTOMATIC DEPLOYABLE OXYGEN-DISPENSING UNITS

(a) For operations with aeroplanes first issued with an individual certificate of airworthiness (C of A) after 8 November 1998, operated at pressure altitudes at or below 25 000 ft, and not fitted with automatic deployable oxygen-dispensing units, the flight crew should manage the descent in case of a loss of power in order to ensure that the cabin pressure altitude is not higher that 13 000 ft for more than 4 min.

(b) The operator should specify in the operations manual (OM) the aircraft capability in terms of cabin pressure leak rate in case of engine power loss, as well as the relevant procedures.

(c) For operations approved in accordance with IMC requirement, should a loss of engine power occur, it is required that sufficient supplemental oxygen for all occupants is available to allow descent from the maximum certified cruising altitude, performed at the best-range gliding speed and in the best gliding configuration, assuming the maximum cabin pressure leak rate, during the entire flying time when the cabin pressure altitude exceeds 13 000 ft.

(d) In the case of pressurised aeroplanes first issued with an individual certificate of airworthiness (CofA) after 8 November 1998, with a maximum certified cruising altitude above 25 000 ft, and not fitted with automatically deployable oxygen-dispensing units, the amount of supplemental oxygen should be based on a cruising altitude of 25 000 ft as Para (c) to Appendix 1 to ANTR OPS 1.770 limits the operations of such aeroplanes to the aforementioned altitude.

(e) For such single-engined turbine aeroplanes, with the energy source of the pressurisation system being lost (this is at least the case of pressurisation systems relying on bleed air inflow), the cabin pressure altitude increases at a rate dependent upon the pressurisation system design and the cabin pressure leak rate.

Therefore, following an engine failure during such operations, the cabin pressure altitude will remain below 13 000 ft for a certain duration, which should allow the flight crew to descend at the best gliding speed during this period.

The intent of the Para (c) to Appendix 1 to ANTR OPS 1.770 requirement is to ensure that this does not result in any unsafe conditions for the passengers, as the cabin pressure altitude might increase above 13 000 ft, as well as not jeopardise the safety of operations approved in accordance with IMC requirement by maximising the chances of reaching an appropriate landing site.

V. AEROPLANES NOT CERTIFIED TO FLY ABOVE 25 000 ft

(a) With respect to Para (c) to Appendix 1 to ANTR OPS 1.770, 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 10 000 ft and 13 000 ft, the oxygen should be provided either by:

(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.

AMC OPS 1.790
Hand Fire Extinguishers
See ANTR OPS 1.790

1 The number and location of hand fire extinguishers should be such as to provide adequate availability for use, account being taken of the number and size of the passenger compartments, the need to minimise the hazard of toxic gas concentrations and the location of toilets, galleys etc. These considerations may result in the number being greater than the minimum prescribed.

2 There should be at least one fire extinguisher suitable for both flammable fluid and electrical equipment fires installed on the flight deck. Additional extinguishers may be required for the protection of other compartments accessible to the crew in flight. Dry chemical fire extinguishers should not be used on the flight deck, or in any compartment not separated by a partition from the flight deck, because of the adverse effect on vision during discharge and, if non-conductive, interference with electrical contacts by the chemical residues.

3 Where only one hand fire extinguisher is required in the passenger compartments it should be located near the cabin crew member’s station, where provided.

4 Where two or more hand fire extinguishers are required in the passenger compartments and their location is not otherwise dictated by consideration of paragraph 1 above, an extinguisher should be located near each end of the cabin with the remainder distributed throughout the cabin as evenly as is practicable.

5 Unless an extinguisher is clearly visible, its location should be indicated by a placard or sign. Appropriate symbols may be used to supplement such a placard or sign.

AMC OPS 1.810
Megaphones
See ANTR OPS 1.810

Where one megaphone is required, it should be readily accessible from a cabin crew member’s assigned seat. Where two or more megaphones are required, they should be suitably distributed in the passenger cabin(s) and readily accessible to crew members assigned to direct emergency evacuations. This does not necessarily require megaphones to be positioned such that they can be reached by a crew member when strapped in a cabin crew member’s seat.

AC OPS 1.820
Emergency Locator Transmitter (ELT)
See ANTR OPS 1.820, ANTR OPS 1.830(c) and ANTR OPS 1.835(b)

1. An Emergency Locator Transmitter (ELT) is a generic term describing equipment which broadcasts distinctive signals on designated frequencies and, depending on application, may be activated by impact or be manually activated. An ELT is one of the following:

a. Automatic Fixed (ELT(AF)). An automatically activated ELT which is permanently attached to an aircraft;

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

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

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

2. An automatic portable ELT, (ELT(AP)), as installed in accordance with ANTR OPS 1.820, may be used to replace one ELT(S) provided that it meets the ELT(S) requirements. A water activated ELT(S) is not an ELT(AP).

4. The judicious choice of numbers of ELTs, their type and placement on aircraft and associated floatable life support systems will ensure the greatest chance of ELT activation in the event of an accident for aircraft operating over water or land, including areas especially difficult for search and rescue. Placement of transmitter units is a vital factor in ensuring optimal crash and fire protection. The placement of the control and switching devices (activation monitors) of automatic fixed ELTs and their associated operational procedures will also take into consideration the need for rapid detection of inadvertent activation and convenient manual switching by crew members.

Note: ADFR may replace an automatic ELT. (See IEM OPS 1.820 below)

IEM OPS 1.822
Location of an aeroplane in distress
See ANTR OPS 1.822

GUIDANCE FOR LOCATION OF AN AEROPLANE IN DISTRESS

1. Introduction

a. The following material provides guidance on locating an aeroplane in distress. The Triggered Transmission of Flight Data Working Group (TTFDWG) reviewed forty-two accidents to determine an indication of the distance from a last-known aeroplane position to the location of an accident site. The report concluded that in approximately 95 per cent of the cases, when the aircraft position was known one minute prior to the accident, the accident site location was within a 6 NM radius of that position. (See the TTFDWG Report at https://www.bea.aero/en/).

b. When an aeroplane has an accident into water and becomes submerged, the location of the accident site within a 6 NM radius on the surface becomes more important. Starting the initial search area beyond a 6 NM radius reduces the amount of time available to search for and locate the aeroplane. At current estimated underwater search capabilities of 100 km^2/day, an area with a 6 NM radius could be searched in four days. Allowing for naval assets to reach the search area and conduct the search, it is estimated that an area of 2 300 km^2, equivalent to a radius of 14 NM, will be able to be searched before the ULD battery degrades. Starting at an area of more than 6 NM radius reduces the probability of a successful location during an initial search, whilst extending the location requirement beyond 6 NM radius reduces the time available to search with no appreciable gain in the probability of recovery.

2. Clarification of Purpose of Equipment

a. Information from which a position can be determined: Information from an aircraft system which either is active, or, when automatically or manually activated, can provide position information which includes a time stamp. This is a performance-based requirement which is not system-specific and may also bring operational benefits.

b. Emergency locator transmitter (ELT): The current generation of ELTs was designed to provide the position of impact for a survivable accident. The next generation of ELTs may have the capability to activate a transmission in flight when any of the conditions detailed in EUROCAE ED-237, Minimum Aviation System Performance Specification (MASPS) for Criteria to Detect In-Flight Aircraft Distress Events to Trigger Transmission of Flight Information are met. When an ELT sinks below the surface of water, its signal is not detectable.

c. Automatic deployable flight recorder (ADFR): The purpose of an ADFR is to have flight recorder data available soon after an accident, in particular for accidents over water. The integrated ELT provides for both locating the accident site for accident investigation and search and rescue purposes. Being floatable, it will assist in locating the accident site by providing an ELT signal when the wreckage sinks below the surface of the water. It also ensures redundancy for one ELT.

d. Underwater locator device (ULD): A ULD operating at a frequency of 8.8 kHz is attached to the airframe to locate aeroplane wreckage below the surface of water when an ELT signal is not possible to detect. The ULDs operating at 37.5 kHz are attached to the flight recorders and are used for locating the flight recorders under water.

3. Equipage Compliance

a. The advancement of technology has made it possible to meet the equipage requirements by different means. Table K-1 below provides examples of compliance. In such potential installations, the cost will be minimized, and the effectiveness of the current installation improved.

Table 1. Examples of compliance

Current	After 1 January 2021
In-service	**Application for type certification is submitted to a Contracting State**
Two ELTs Two fixed recorders	Example: A system from which a position can be determined; and one ADFR with an integrated ELT; and one combined recorder; or A system from which a position can be determined and one ELT and two fixed recorders and an additional means to retrieve flight recorder data in a timely manner.

Note: A system from which a position can be determined and used to comply with ANTR OPS 1.822 may replace one of the ELTs required by ANTR OPS 1.820.

IEM OPS 1.825
Life Jackets
See ANTR OPS 1.825

For the purpose of ANTR OPS 1.825, seat cushions are not considered to be flotation devices.

AMC OPS 1.830(c)(1)
Life-rafts and ELT for extended overwater flights
See ANTR OPS 1.830(c)(1)

1 The following should be readily available with each life-raft:

a. Means for maintaining buoyancy;

b. A sea anchor:

c. Life-lines, and means of attaching one life-raft to another;

d. Paddles for life-rafts with a capacity of 6 or less;

e. Means of protecting the occupants from the elements;

f. A water resistant torch;

g. Signalling equipment to make the pyrotechnical distress signals described in ICAO Annex 2;

h. 100 g of glucose tablet for each 4, or fraction of 4, persons which the life-raft is designed to carry:

i. At least 2 litres of drinkable water provided in durable containers or means of making sea water drinkable or a combination of both; and

j. First-aid equipment.

2 As far as practicable, items listed above should be contained in a pack.

IEM OPS 1.835
Survival Equipment
See ANTR OPS 1.835

1 The expression ‘Areas in which search and rescue would be especially difficult’ should be interpreted in the context of this ANTR as meaning:

a. Areas so designated by the State responsible for managing search and rescue; or

b. Areas that are largely uninhabited and where:

i. The State responsible for managing search and rescue has not published any information to confirm that search and rescue would not be especially difficult; and

ii. The State referred to in (a) above does not, as a matter of policy, designate areas as being especially difficult for search and rescue.

AMC OPS 1.835(c)
Survival Equipment
See ANTR OPS 1.835(c)

1 At least the following survival equipment should be carried when required:

a. 2 litres of drinkable water for each 50, or fraction of 50, persons on board provided in durable containers;

b. One knife;

c. One set of Air/Ground codes;

In addition, when polar conditions are expected, the following should be carried:

d. A means for melting snow;

e. 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;

f. 1 Arctic/Polar suit for each crew member carried.

2 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.

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AC/AMC/IEM L — COMMUNICATION, NAVIGATION AND SURVEILLANCE EQUIPMENT

IEM OPS 1.845
Communication and Navigation Equipment - Approval and Installation
See ANTR OPS 1.845

1 For Communication and Navigation Equipment required by ANTR OPS 1 Subpart L, "Approved" means that compliance with the applicable TSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a TSO does not exist, the applicable airworthiness standards or equivalent apply unless otherwise prescribed in ANTR OPS 1 or ANTR M.

2 "Installed" means that the installation of Communication and Navigation Equipment has been demonstrated to comply with the applicable airworthiness requirements of the respective Certification Specification / TCDS as accepted by BCAA for the respective Category Aeroplane, or the relevant code used for Type Certification, and any applicable requirement prescribed in ANTR OPS 1.

3 Communication and Navigation Equipment approved in accordance with design requirements and performance specifications other than TSOs, before the applicability dates prescribed in ANTR OPS 1.001(b), are acceptable for use or installation on aeroplanes operated for the purpose of commercial air transportation provided that any relevant OPS requirement is complied with.

4 When a new version of a TSO (or of a specification other than a CS-TSO) is issued, Communication and Navigation Equipment approved in accordance with earlier requirements may be used or installed on aeroplanes operated for the purpose of commercial air transportation provided that such Communication and Navigation Equipment are operational, unless removal from service or withdrawal is required by means of an amendment to ANTR OPS 1 or ANTR M.

AMC OPS 1.865
Combinations of Instruments and Integrated Flight Systems
See ANTR OPS 1.865

Individual requirements of ANTR OPS 1.865 may be met by combinations of instruments or by integrated flight systems or by a combination of parameters on electronic displays provided that the information so available to each required pilot is not less than that provided by the instruments and associated equipment specified.

AC OPS 1.865(c)(1)(i)
IFR operations without ADF system
See ANTR OPS 1.865(c)(1)(i)

1 To perform IFR operations without an ADF system installed, the operator should consider the following guidelines on equipment carriage, operational procedures and training criteria.

2 The removal/non installation of ADF equipment from an aeroplane may only be done where it is not essential for navigation, provided that alternative equipment giving equivalent or enhanced navigation capability is carried. This may be accomplished by the carriage of an additional VOR receiver or a GNSS receiver approved for IFR operations.

3 For IFR operations without ADF, the operator should ensure that:

a. route segments that rely solely on ADF for navigation are not flown;

b. a firm commitment is made not to fly any ADF/NDB procedures;

c. that the MEL has been amended to take account of the non-carriage of ADF;

d. that the Operations Manual does not reference any procedures based on NDB signals for the aeroplanes concerned;

e. that flight planning and dispatch procedures are consistent with the above mentioned criteria.

4 The removal of ADF should be taken into account by the operator in the initial and recurrent training of flight crew.

AC OPS 1.865(e)
FM Immunity Equipment Standards
See ANTR OPS 1.865(e)

1 FM immunity performance Standards for ILS Localiser, VOR receivers and VHF communication receivers have been incorporated in ICAO Annex 10, Volume I - Radio Navigation Aids Fifth Edition dated July 1996, Chapter 3, Paragraphs 3.1.4, 3.3.8 and Volume III, Part II - Voice Communications Systems, Paragraph 2.3.3.

2 Acceptable equipment standards, consistent with ICAO Annex 10, are contained in EUROCAE Minimum Operational Performance Specifications, documents ED-22B for VOR receivers, ED-23B for VHF communication receivers and ED-46B for LOC receivers and the corresponding RTCA documents DO-186, DO-195 and DO-196.

Note: Operations within the Bahraini FIR do not require FM Immunity.

AC OPS 1.865(f)
HF Equipment on Certain NAT HLA Routes
See ANTR OPS 1.865(f)

1 A HF system is considered to be Long Range Communication Equipment.

2 Other two way communication systems may be used if allowed by the relevant airspace procedures.

3 When using one communication system only, the BCAA may restrict the NAT HLA approval to the use of the specific routes**.**

AC OPS 1.870
Additional Navigation Equipment for operations in NAT HLA Airspace
See ANTR OPS 1.870

1 A Long Range Navigation System may be one of the following:

a. One Inertial Navigation System (INS);~~.~~

b. One Global Navigation Satellite System (GNSS); or~~.~~

c. One navigation system using inputs from one or more Inertial Reference Systems (IRS), or any other NAT HLA approved sensor system complying with NAT HLA requirement.

2 To conform to the Long range navigation System Specification, a GNSS and its operational use shall be approved in accordance with the relevant requirements for NAT HLA ~~of~~ airspace based on Regional Air Navigation Agreement.

3. An integrated navigation system which offers equivalent functional availability, integrity and redundancy, when approved may, for the purpose of this requirement, be considered as two independent Long Range Navigation Systems.

4. In case of the GNSS is used as a stand-alone system for LRNS, an integrity check should be carried out.

AC/AMC/IEM M – AEROPLANE MAINTENANCE (WITHDRAWN)

This Subpart has been entirely withdrawn due to the implementation of ANTR M

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AC/AMC/IEM N — FLIGHT CREW

AMC OPS 1.940(a)(4)
Crewing of inexperienced flight crew members
See ANTR OPS 1.940(a)(4)

1 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 has achieved on the Type either:

a. 100 flying hours and flown 10 sectors within a consolidation period of 120 consecutive days; or

b. 150 flying hours and flown 20 sectors (no time limit).

2 A lesser number of flying hours or sectors, subject to any other conditions which the BCAA may impose, may be acceptable to the BCAA when:

a. A new operator is commencing operations; or

b. The operator introduces a new aeroplane type; or

c. Flight crew members have previously completed a type conversion course with the same operator; or

d. The aeroplane has a Maximum Take-off Mass below 10 tonnes or a Maximum Approved Passenger Seating Configuration of less than 20.

AMC OPS 1.945
Conversion Course Syllabus
See ANTR OPS 1.945 and Appendix 1 to ANTR OPS 1.945

1 General

1.1 Type rating training when required may be conducted separately or as part of conversion training. When the type rating training is conducted as part of conversion training, the conversion training programme should include all the requirements of ANTR–FCL.

2 Ground training

2.1 Ground training should comprise a properly organised programme of ground instruction by training staff with adequate facilities, including any necessary audio, mechanical and visual aids. However, if the aeroplane concerned is relatively simple, private study may be adequate if the operator provides suitable manuals and/or study notes.

2.2 The course of ground instruction should incorporate formal tests on such matters as aeroplane systems, performance and flight planning, where applicable.

3 Emergency and safety equipment training and checking

3.1 On the initial conversion course and on subsequent conversion courses as applicable, the following should be addressed:

a. Instruction on first aid in general (Initial conversion course only); Instruction on first aid as relevant to the aeroplane type of operation and crew complement including where no cabin crew are required to be carried (Initial and subsequent);

b. Aeromedical topics including:

i. Hypoxia;

ii. Hyperventilation;

iii. Contamination of the skin/eyes by aviation fuel or hydraulic or other fluids;

iv. Hygiene and food poisoning; and

v. Malaria;

c. The effect of smoke in an enclosed area and actual use of all relevant equipment in a simulated smoke-filled environment;

d. The operational procedures of security, rescue and emergency services.

e. 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.

f. A comprehensive drill to cover all ditching procedures should be practised where flotation equipment is carried. This should include practice of the actual donning and inflation of a lifejacket, together with a demonstration or film of the inflation of life-rafts and/or slide-rafts and associated equipment. This practice should, on an initial conversion course, be conducted using the equipment in water, although previous certificated training with another operator or the use of similar equipment will be accepted in lieu of further wet-drill training.

g. Instruction on the location of emergency and safety equipment, correct use of all appropriate drills, and procedures that could be required of flight crew in different emergency situations. Evacuation of the aeroplane (or a representative training device) by use of a slide where fitted should be included when the Operations Manual procedure requires the early evacuation of flight crew to assist on the ground.

4 Aeroplane/FSTD training

4.1 Flying training should be structured and sufficiently comprehensive to familiarise the flight crew member thoroughly with all aspects of limitations and normal /abnormal and emergency procedures associated with the aeroplane and should be carried out by suitably qualified Type Rating Instructors and/or Type Rating Examiners. For specialised operations such as steep approaches, EDTO All Weather Operations or QFE operations, additional training should be carried out.

4.2 In planning aeroplane/FSTD training on aeroplanes with a flight crew of two or more, particular emphasis should be placed on the practice of Line Orientated Flying Training (LOFT) with emphasis on Crew Resource Management (CRM).

4.3 Normally, the same training and practice in the flying of the aeroplane 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 ANTR OPS 1.965.

4.4 Unless the type rating training programme has been carried out in a Flight Simulator usable for zero flight-time (ZFT) conversion, the training should include at least 3 takeoffs and landings in the aeroplane.

5 Line flying under supervision

5.1 Following completion of aeroplane/FSTD training and checking as part of the operator’s conversion course, each flight crew member should operate a minimum number of sectors and/or flying hours under the supervision of a flight crew member nominated by the operator and acceptable to the BCAA.

5.2 The minimum sectors/hours should be specified in the Operations Manual and should be determined by the following:

a. Previous experience of the flight crew member;

b. Complexity of the aeroplane; and

c. The type and area of operation.

5.3 A line check in accordance with ANTR OPS 1.945(a)(8) should be completed upon completion of line flying under supervision.

6 System Panel Operator

6.1 Conversion training for system panel operators should approximate to that of pilots.

6.2 If the flight crew includes a pilot with duties of a systems panel operator, he should, after training and the initial check in these duties, operate a minimum number of sectors under the supervision of a nominated additional flight 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 aeroplane and the experience of the flight crew member.

IEM OPS 1.945
Line Flying under Supervision
See ANTR OPS 1.945

1 Introduction

1.1 Line flying under supervision provides the opportunity for a flight crew member to carry into practice the procedures and techniques he has been made familiar with during the ground and flying training of a conversion course. This is accomplished under the supervision of a flight 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 crew member station.

1.2 The following minimum figures for details to be flown under supervision are guidelines for operators to use when establishing their individual requirements.

2 Turbo jet aircraft

a. Co-pilot undertaking first conversion course:

i. Total accumulated 100 hours or minimum 40 sectors;

b. Co-pilot upgrading to commander:

i. Minimum 20 sectors when converting to a new type;

ii. Minimum 10 sectors when already qualified on the aeroplane type.

AC OPS (AMC) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)
Crew Resource Management (CRM)
See ANTR OPS 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)/1.965(a)(3)(iv)
See AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)

1 General

1.1 Crew Resource Management (CRM) is the effective utilisation of all available resources (e.g. crew members, aeroplane systems, supporting facilities and persons) to achieve safe and efficient operation.

1.2 The objective of CRM is to enhance the communication and management skills of the flight crew member concerned. The emphasis is placed on the non-technical aspects of flight crew performance.

2 Initial CRM Training

2.1 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 one day for single pilot operations and two days for all other types of operations. It should cover all elements in Table 1, column (a) to the level required by column (b) (Initial CRM training).

2.2

a. A CRM trainer should possess group facilitation skills and should at least:

i. Have current commercial air transport experience as a flight crew member; and have either:

(A) Successfully passed the Human Performance and Limitations (HPL) examination whilst recently obtaining the ATPL (see the requirements applicable to the issue of Flight Crew Licences); or,

(B) If holding a Flight Crew Licence acceptable under ANTR OPS 1.940(a)(3) prior to the introduction of HPL into the ATPL syllabus, followed a theoretical HPL course covering the whole syllabus of the HPL examination.

ii. Have completed initial CRM training; and

iii. Be supervised by suitably qualified CRM training personnel when conducting their first initial CRM training session; and

iv. Have received additional education in the fields of group management, group dynamics and personal awareness.

b. Notwithstanding paragraph (a) above, and when acceptable to the BCAA;

i. 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;

ii. An experienced non-flight crew CRM trainer having a knowledge of HPL, may also continue to be a CRM trainer;

iii. A former flight crew member having knowledge of HPL may become a CRM trainer if he maintains adequate knowledge of the operation and aeroplane type and meets the provisions of paragraphs 2.2a ii, iii and iv.

2.3 The operator should ensure that initial CRM training addresses the nature of the operations of the company concerned, as well as the associated procedures and the culture of the company. This will include areas of operations which produce particular difficulties or involve adverse climatic conditions and any unusual hazards.

2.4 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 acceptable to the BCAA. In this event the operator should ensure that the content of the course meets his operational requirements. When crew members from several companies follow the same course, CRM core elements should be specific to the nature of operations of the companies and the trainees concerned.

2.5 A flight crew member's CRM skills should not be assessed during initial CRM training.

3 Conversion Course CRM training

3.1 If the flight crew member undergoes a conversion course with a change of aeroplane type, all elements in Table 1, column (a) should be integrated into all appropriate phases of the operator's conversion course and covered to the level required by column (c) (conversion course when changing type), unless the two operators use the same CRM training provider.

3.2 If the flight crew member undergoes a conversion course with a change of operator, all elements in Table 1, column (a) should be integrated into all appropriate phases of the operator's conversion course and covered to the level required by column (d) (conversion course when changing operator).

3.3 A flight crew member should not be assessed when completing elements of CRM training which are part of the operator's conversion course.

4 Command course CRM training

4.1 The operator should ensure that all elements in Table 1, column (a) are integrated into the command course and covered to the level required by column (e) (command course).

4.2 A flight crew member should not be assessed when completing elements of CRM training which are part of the command course, although feedback should be given.

5 Recurrent CRM training

5.1 The operator should ensure that:

a. Elements of CRM are integrated into all appropriate phases of recurrent training every year; and that all elements in Table 1, column (a) are covered to the level required by column (f) (recurrent training); and that modular CRM training covers the same areas over a maximum period of 3 years.

b. Relevant modular CRM training is conducted by CRM trainers qualified according to paragraph 2.2.

5.2 A flight crew member should not be assessed when completing elements of CRM training which are part of recurrent training.

6 Implementation of CRM

6.1 The following table indicates which elements of CRM should be included in each type of training:

Table 1

<table>
<tr><th>Core Elements

(a)</th><th>Initial CRM Training

(b)</th><th>Operator's conversion course when changing type

(c)</th><th>Operator's conversion course when changing operator

(d)</th><th>Command course

(e)</th><th>Recurrent training

(f)</th></tr>
<tr><td>Human error and reliability, error chain, error prevention and detection</td><td rowspan="7">In depth</td><td>In depth</td><td>Overview</td><td>Overview</td><td rowspan="7">Overview</td></tr>
<tr><td>Company safety culture, SOPs, organisational factors</td><td rowspan="2">Not required</td><td>In depth</td><td rowspan="6">In-depth</td></tr>
<tr><td>Stress, stress management, fatigue & vigilance</td><td rowspan="3">Not required</td></tr>
<tr><td>Information acquisition and processing situation awareness, workload management</td><td rowspan="4">Overview</td></tr>
<tr><td>Decision making</td></tr>
<tr><td>Communication and co-ordination inside and outside the cockpit</td><td rowspan="2">Overview</td></tr>
<tr><td>Leadership and team behaviour synergy</td></tr>
<tr><td>Automation, philosophy of the use of automation (if relevant to the type)</td><td rowspan="2">As required</td><td rowspan="2">In depth</td><td>In depth</td><td rowspan="2">As required</td><td rowspan="2">As required</td></tr>
<tr><td>Specific type-related differences</td><td>Not required</td></tr>
<tr><td>Case based studies</td><td>In depth</td><td>In depth</td><td>In depth</td><td>In depth</td><td>As appropriate</td></tr>
</table>

7 Co-ordination between flight crew and cabin crew training

7.1 Operators should, as far as is practicable, provide combined training for flight crew and cabin crew including briefing and debriefing.

7.2 There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew instructors to observe and comment on each other's training.

8 Assessment of CRM Skills (See AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e), paragraph 4)

8.1 Assessment of CRM skills should:

a. Provide feedback to the individual and serve to identify retraining where needed; and

b. Be used to improve the CRM training system.

8.2 Prior to the introduction of CRM skills assessment, a detailed description of the CRM methodology including terminology used, acceptable to the BCAA, should be published in the Operations Manual.

8.3 Operators should establish procedures including retraining, to be applied in the event that personnel do not achieve or maintain the required standards (Appendix 1 to 1.1045, Section D, paragraph 3.2 refers).

8.4 If the operator proficiency check is combined with the Type Rating revalidation/renewal check, the assessment of CRM skills will satisfy the Multi Crew Co-operation requirements of the Type Rating revalidation/renewal. This assessment will not affect the validity of the Type Rating.

AC OPS (IEM) 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)
Crew Resource Management (CRM)
See ANTR OPS 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)
See AMC-ANTR OPS 1.943/1.945(a)(9)/1.955(b)(6)/1.965(e)

1 CRM training should reflect the culture of the operator and be conducted by means of both classroom training and practical exercises including group discussions and accident and serious incident reviews to analyse communication problems and instances or examples of a lack of information or crew management.

2 Whenever it is practicable to do so, consideration should be given to conducting relevant parts of CRM training in synthetic training devices which reproduce, in an acceptable way, a realistic operational

environment and permit interaction. This includes, but is not limited to, simulators with appropriate LOFT scenarios.

3 It is recommended that, whenever possible, initial CRM training be conducted in a group session outside the company premises so that the opportunity is provided for flight crew members to interact and communicate away from the pressures of their usual working environment.

4 Assessment of CRM Skills

4.1 Assessment of CRM skills is the process of observing, recording, interpreting and evaluating debriefing crews' and crew members, where appropriate, pilot performance and knowledge against a required standard using an acceptable methodology in the context of overall performance. It includes the concept of self-critique, and feedback which can be given continuously during training or in summary following a check. In order to enhance the effectiveness of the programme this methodology should, where possible, be agreed with flight crew representatives.

4.2 NOTECHS or other acceptable methods of CRM skills assessment should be used included in an overall assessment of the flight crew members performance and be in accordance with approved standards. Suitable methods of assessment should be established, together with t. The selection criteria and training requirements of the assessors and their relevant qualifications, knowledge and skills should be established.

4.3 Individual assessments are not appropriate until the crew member has completed the initial CRM course and completed the first OPC. For first CRM skills assessment, the following methodology is considered satisfactory: Methodology of CRM skills assessment:

a. 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.

b. A training and standardisation programme for training personnel should then be established.

c. The assessment should be based on the following principles:

i. only observable, repetitive behaviours are assessed,

ii. the assessment should positively reflect any CRM skills that result in enhanced safety,

iii. assessments should include behaviour which contributes to a technical failure, such technical failure being errors leading to an event which requires debriefing by the person conducting the line check,

iv. the crew and, where needed, the individual are orally debriefed.

4.4 De-identified summaries of all CRM assessments by the operator should be used to provide feedback to update and improve the operator's CRM training.

5. Levels of Training.

a. Overview. When Overview training is required it will normally be instructional in style. Such training should refresh knowledge gained in earlier training.

b. In Depth. When In Depth Training is required it will 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.

AMC OPS 1.945(a)(9)
Crew Resource Management - Use of Automation
See ANTR OPS 1.945(a)(9)

1 The conversion course should include training in the use and knowledge of automation and in the recognition of systems and human limitations associated with the use of automation. The operator should therefore ensure that a flight crew member receives training on:

a. The application of the operations policy concerning the use of automation as stated in the Operations Manual; and

b. System and human limitations associated with the use of automation.

2 The objective of this training should be to provide appropriate knowledge, skills and behavioural patterns for managing and operating automated systems. Special attention should be given to how automation increases the need for crews to have a common understanding of the way in which the system performs, and any features of automation which make this understanding difficult.

AMC OPS 1.965(c)
Line checks
See ANTR OPS 1.965(c)

1 Where a pilot is required to operate as pilot flying and pilot non-flying, he should be checked on one sector as pilot flying and on another sector as pilot non-flying.

2 However, where the operator's procedures require integrated flight preparation, integrated cockpit initialisation and that each pilot performs both flying and non-flying duties on the same sector, then the line check may be performed on a single sector.

AMC OPS 1.965(d)
Emergency and Safety Equipment Training
See ANTR OPS 1.965(d)

1 The successful resolution of aeroplane emergencies requires interaction between flight crew and cabin crew and emphasis should be placed on the importance of effective co-ordination and two-way communication between all crew members in various emergency situations.

2 Emergency and Safety Equipment training should include joint practice in aeroplane evacuations so that all who are involved are aware of the duties other crew members should perform. When such practice is not possible, combined flight crew and cabin crew training should include joint discussion of emergency scenarios.

3 Emergency and safety equipment training should, as far as is practicable, take place in conjunction with cabin crew undergoing similar training with emphasis on co-ordinated procedures and two-way communication between the flight deck and the cabin.

IEM OPS 1.965
Recurrent training and checking
See ANTR OPS 1.965

1 Line checks, route and aerodrome competency and recent experience requirements are intended to ensure the crew member's ability to operate efficiently under normal conditions, whereas other checks and emergency and safety equipment training are primarily intended to prepare the crew member for abnormal/emergency procedures.

2 The line check is performed in the aeroplane. All other training and checking should be performed in the aeroplane of the same type or a FSTD or, an approved flight simulator or, in the case of emergency and safety equipment training, in a representative training device. The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the aeroplane type operated by the flight crew member.

3 Line Checks

3.1 The line check is considered a particularly important factor in the development, maintenance and refinement of high operating standards, and can provide the operator with a valuable indication of the usefulness of his training policy and methods. Line checks are a test of a flight crew member's ability to perform a complete line operation satisfactorily, including pre-flight and post flight procedures and use of the equipment provided, and an opportunity for an overall assessment of his ability to perform the duties required as specified in the Operations Manual. The route chosen should be such as to give adequate representation of the scope of a pilot's normal operations. When weather conditions preclude a manual landing, an automatic landing is acceptable. The line check is not intended to determine competence on any particular route. The commander, or any pilot who may be required to relieve the commander, should also demonstrate his ability to 'manage' the operation and take appropriate command decisions.

4 Proficiency Training and Checking

4.1 When a FSTD is used, the opportunity should be taken, where possible, to use Line Oriented Flying Training (LOFT).

4.2 Proficiency training and checking for System Panel Operators should, where practicable, take place at the same time a pilot is undergoing proficiency training and checking.

AMC to Appendix 1 to ANTR OPS 1.965
Pilot incapacitation training
See Appendix 1 to ANTR OPS 1.965, paragraph (a)(1)

1 Procedures should be established to train flight crew to recognise and handle pilot incapacitation. This training should be conducted every year and can form part of other recurrent training. It should take the form of classroom instruction, discussion or video or other similar means.

2 If a Flight Simulator is available for the type of aeroplane operated, practical training on pilot incapacitation should be carried out at intervals not exceeding 3 years.

AMC OPS 1.970
Recency
See ANTR OPS 1.970

When using a Flight Simulator for meeting the landing requirements in ANTR OPS 1.970(a)(1) and (a)(2), complete visual traffic patterns or complete IFR procedures starting from the Initial Approach Fix should be flown.

IEM OPS 1.970(a)(2)
Co-pilot proficiency
See ANTR OPS 1.970(a)(2)

A co-pilot serving at the controls means that that pilot is either pilot flying or pilot non-flying. The only required take-off and landing proficiency for a co-pilot is the operator's and type-rating proficiency checks.

AMC OPS 1.975
Route and aerodrome competence qualification
See ANTR OPS 1.975

Route competence / Area and Aerodrome Knowledge for commercial operations

For commercial 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:

1 Area and Route competence

1.1 Route competence training should include knowledge of:

a. Terrain and minimum safe altitudes;

b. Seasonal meteorological conditions;

c. Meteorological, communication and air traffic facilities, services and procedures;

d. Search and rescue procedures; and

e. Navigational facilities associated with the route along which the flight is to take place.

1.2 Depending on the complexity of the route, as assessed by the operator, the following methods of familiarisation should be used:

a. For the less complex routes, familiarisation by self-briefing with route documentation, or by means of programmed instruction; and

b. For the more complex routes, in addition to sub-paragraph 1.2.a above, inflight familiarisation as a commander, co-pilot or observers under supervision, or familiarisation in a Synthetic Training Device using a database appropriate to the route concerned.

2 Aerodrome competence

2.1 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.

2.2 The Operations Manual should specify a method of categorisation of aerodromes and specify the requirements necessary for each of these categories. If the least demanding aerodromes are Category A, Category B and C would be applied to progressively more demanding aerodromes. The Operations Manual should specify the parameters which qualify an aerodrome to be considered Category A and then provide a list of those aerodrome categorised as B or C.

2.3 All aerodromes to which the operator operates should be categorised in one of these three categories. The operator's categorisation should be acceptable to the BCAA.

3.1 Category A. An aerodrome which satisfies all of the following requirements:

a. An approved instrument approach procedure;

b. At least one runway with no performance limited procedure for take-off and/or landing;

c. Published circling minima not higher than 1 000 feet above aerodrome level; and

d. Night operations capability.

3.2 Category B. An aerodrome which does not satisfy the Category A requirements or which requires extra considerations such as:

a. Non-standard approach aids and/or approach patterns; or

b. Unusual local weather conditions; or

c. Unusual characteristics or performance limitations; or

d. Any other relevant considerations including obstructions, physical layout, lighting etc.

Prior to operating to a Category B aerodrome, the commander should be briefed, or self-briefed by means of programmed instruction, on the Category B aerodrome(s) concerned and 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.

3.3 Category C. An aerodrome, which requires additional considerations to a Category B aerodrome.

Prior to operating to a Category C aerodrome, the commander should be briefed and visit the aerodrome as an observer and/or undertake instruction in a Flight Simulator. The completion of the briefing, visit, and/or instruction should be/certified by the operator.

AC OPS 1.978
Terminology
See ANTR OPS 1.978 and Appendix 1 to ANTR OPS 1.978

1 Terminology

1.1 Line Oriented Evaluation (LOE). LOE is an evaluation methodology used in the ATQP to evaluate trainee performance, and to validate trainee proficiency. LOEs consist of flight simulator scenarios that are developed by the operator in accordance with a methodology approved as part of the ATQP. The LOE should be realistic and include appropriate weather scenarios and in addition should fall within an acceptable range of difficulty. The LOE should include the use of validated event sets to provide the basis for event based assessment. See paragraph 1.4 below.

1.2 Line Oriented Quality Evaluation (LOQE). LOQE is one of the tools used to help evaluate the overall performance of an operation. LOQEs consist of line flights that are observed by appropriately qualified operator personnel to provide feedback to validate the ATQP. The LOQE should be designed to look at those elements of the operation that are unable to be monitored by FDM or Advanced FDM programmes.

1.3 Skill based training. Skill based training requires the identification of specific knowledge and skills. The required knowledge and skills are identified within an ATQP as part of a task analysis and are used to provide targeted training.

1.4 Event based Assessment. This is the assessment of flight crew to provide assurance that the required knowledge and skills have been acquired. This is achieved within an LOE. Feedback to the flight crew is an integral part of event based assessment.

AC to Appendix 1 to ANTR OPS 1.978(b)(1)
Requirements, Scope and Documentation of the Programme
See Appendix 1 to ANTR OPS 1.978(b)(1)

1 The documentation should demonstrate how the operator should establish the scope and requirements of the programme. The documentation should include:

1.1 How the ATQP should enable the operator to establish an alternative training programme that substitutes the requirements as listed in ANTR OPS 1 E and N. The programme should demonstrate that the operator is able to improve the training and qualification standards of flight crew to a level that exceeds the standard prescribed in ANTR OPS 1.

1.2 The operator's training needs and established operational and training objectives.

1.3 How the operator defines the process for designing of and gaining approval for the operator's flight crew qualification programmes. This should include quantified operational and training objectives identified by the operator's internal monitoring programmes. External sources may also be used.

1.4 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 the 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;

i. Make efficient use of training resources, specifically to match the use of training media to the training needs.

AC to Appendix 1 to ANTR OPS 1.978(b)(2)
Task Analysis
See Appendix 1 to ANTR OPS 1.978(b)(2)

1 For each aeroplane type/class to be included within the ATQP the operator should establish a systematic review that determines and defines the various tasks to be undertaken by the flight crew when operating that type(s)/class. Data from other types/class may also be used. The analysis should determine and describe the knowledge and skills required to complete the various tasks specific to the aeroplane type/class and/or type of operation. In addition the analysis should identify the appropriate behavioural markers that should be exhibited. The task analysis should be suitably validated in accordance with Appendix 1 to ANTR OPS 1.978(c)(iii). The task analysis, in conjunction with the data gathering programme(s) permit the operator to establish a programme of targeted training together with the associated training objectives described in AC to Appendix 1 to ANTR OPS 1.978(b)(3) paragraph (c) below.

AC to Appendix 1 to ANTR OPS 1.978(b)(3)
Training Programme
See Appendix 1 to ANTR OPS 1.978(b)(3)

1 The training programme should have the following structure:

1.1 Curriculum.

1.2 Daily lesson plan.

2 The curriculum should specify the following elements:

2.1 Entry requirements: A list of topics and content, describing what training level will be required before start or continuation of training.

2.2 Topics: A description of what will be trained during the lesson;

2.3 Targets/Objectives

a. Specific target or set of targets that have to be reached and fulfilled before the training course can be continued.

b. Each specified target should have an associated objective that is identifiable both by the flight crew and the trainers.

c. Each qualification event that is required by the programme should specify the training that is required to be undertaken and the required standard to be achieved. (See paragraph 1.4 below)

3 Each lesson/course/training or qualification event should have the same basic structure. The topics related to the lesson have to be listed and the lesson targets should be unambiguous.

4 Each lesson/course or training event whether classroom, CBT or simulator should specify the required topics with the relevant targets to be achieved.

AC to Appendix 1 to ANTR OPS 1.978(b)(4)
Training Personnel
See Appendix 1 to ANTR OPS 1.978(b)(4)

1 Personnel who perform training and checking of flight crew in the operator's ATQP should receive the following additional training on:

1.1 ATQP principles and goals;

1.2 Knowledge/skills/behaviour as learned from task analysis;

1.3 LOE/ LOFT Scenarios to include triggers / markers / event sets / observable behaviour;

1.4 Qualification standards;

1.5 Harmonisation of assessment standards;

1.6 Behavioural markers and the systemic assessment of CRM;

1.7 Event sets and the corresponding desired knowledge/skills and behaviour of the flight crew;

1.8 The processes that the operator has implemented to validate the training and qualification standards and the instructors part in the ATQP quality control; and

1.9 LOQE.

AC to Appendix 1 to ANTR OPS 1.978(b)(5)
Feedback Loop
See Appendix 1 to ANTR OPS 1.978(b)(5)

1 The feedback should be used as a tool to validate that the curricula are implemented as specified by the ATQP; this enables substantiation of the curriculum, and that proficiency and training objectives have been met. The feedback loop should include data from operations flight data monitoring, advanced FDM programme and LOE/LOQE programmes. In addition the evaluation process shall describe whether the overall targets/objectives of training are being achieved and shall prescribe any corrective action that needs to be undertaken.

2 The programmes established quality control mechanisms should at least review the following:

2.1 Procedures for approval of recurrent training;

2.2 ATQP instructor training approvals;

2.3 Approval of event set(s) for LOE/LOFT;

2.4 Procedures for conducting LOE and LOQE.

AC to Appendix 1 to ANTR OPS 1.978(b)(6)
Crew Performance Measurement and Evaluation
See Appendix 1 to ANTR OPS 1.978(b)(6)

1 The qualification and checking programmes should include at least the following elements:

1.1 A specified structure;

1.2 Elements to be tested/examined;

1.3 Targets and/or standards to be attained;

1.4 The specified technical and procedural knowledge and skills, and behavioural markers to be exhibited.

2 An LOE event should comprise of tasks and sub-tasks performed by the crew under a specified set of conditions. Each event has one or more specific training targets/objectives, which require the performance of a specific manoeuvre, the application of procedures, or the opportunity to 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.).

3 The markers specified under the operator's ATQP should form one of the core elements in determining the required qualification standard. A typical set of markers are shown in the table below:

EVENT	MARKER
Awareness	1 Monitors and reports changes in automation status.
of Aeroplane Systems:	2 Applies closed loop principle in all relevant situations.
	3 Uses all channels for updates.
	4 Is aware of remaining technical resources.

4 The topics / targets integrated into the curriculum have to be measurable and progression on any training/course is only allowed if the targets are fulfilled.

AC to Appendix 1 to ANTR OPS 1.978(b)(9)
Data Monitoring/Analysis Programme
See Appendix 1 to ANTR OPS 1.978(b)(9)

1 The data analysis programme should consist of:

1.1 A Flight Data Monitoring (FDM) programme: This programme should include systematic evaluation of operational data derived from equipment that is able to record the flight profile and relevant operational information during flights conducted by the operator's aeroplane. Data collection should reach a minimum of 60% of all relevant flights conducted by the operator before ATQP approval is granted. This proportion may be increased at the discretion of the BCAA.

1.2 An Advanced FDM when an extension to the ATQP is requested: An advanced FDM programme is determined by the level of integration with other safety initiatives implemented by the operator, such as the operator's Quality System. The programme should include both systematic evaluations of data from an FDM programme and flight crew training events for the relevant crews. Data collection should reach a minimum of 80% of all relevant flights and training conducted by the operator. This proportion may be varied at the discretion of the BCAA.

2 The purpose of either an FDM or advanced FDM programme is to enable the operator to:

2.1 Provide data to support the programme's implementation and justify any changes to the ATQP;

2.2 Establish operational and training objectives based upon an analysis of the operational environment;

2.3 Monitor the effectiveness of flight crew training and qualification.

3 Data Gathering.

3.1 FDM programmes should include a system that captures flight data, and then transforms the data into an appropriate format for analysis. The programme should generate information to assist the operations safety personnel in analysing the data. The analysis should be made available to the ATQP postholder.

3.2 The data gathered should:

a. Include all fleets that plan to operate 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.

4 Data Handling.

4.1 The operator should establish a process, which ensures the strict adherence to any data handling protocols, agreed with flight crew representative bodies, to ensure the confidentiality of individual flight crew members.

4.2 The data handling protocol should define the maximum period of time that detailed FDM or advanced FDM programme data, including exceedences, should be retained. Trend data may be retained permanently.

5 The operator that has an acceptable operations flight data monitoring programme prior to the proposed introduction of ATQP may, with the approval of the BCAA, use relevant data from other fleets not part of the proposed ATQP.

AC to Appendix 1 to ANTR OPS 1.978(c)(1)(i)
Safety Case
See Appendix 1 to ANTR OPS 1.978(c)(1)(i)

1 Safety Case

1.1 A documented body of evidence that provides a demonstrable and valid justification that the programme (ATQP) is adequately safe for the given type of operation. The safety case should encompass each phase of implementation of the programme and be applicable over the lifetime of the programme that is to be overseen.

1.2 The safety case should:

a. Demonstrate the required level of safety;

b. Ensure the required safety is maintained throughout the lifetime of the programme;

c. Minimise risk during all phases of the programmes implementation and operation.

2 Elements of a Safety Case:

2.1 Planning: Integrated and planned with the operation (ATQP) that is to be justified;

2.2 Criteria: Develop the applicable criteria - see paragraph 3 below;

2.3 `Documentation: Safety related documentation – including a safety checklist;

2.4 Programme of implementation: To include controls and validity checks;

2.5 Oversight: Review and audits.

3 Criteria for the establishment of a Safety Case.

3.1 The Safety Case should:

a. Be able to demonstrate that the required or equivalent level of safety is maintained throughout all phases of the programme, including as required by paragraph (c) below;

b. Be valid to the application and the proposed operation (ATQP);

c. Be adequately safe and ensure the required regulatory safety standards or approved equivalent safety standards are achieved;

d. Be applicable over the entire lifetime of the programme;

e. Demonstrate Completeness and Credibility of the programme;

f. Be fully documented;

g. Ensure integrity of the operation and the maintenance of the operations and training infra-structure;

h. Ensure robustness to system change;

i. Address the impact of technological advance, obsolescence and change;

j. Address the impact of regulatory change.

4 In accordance with Appendix 1 to ANTR OPS 1.978 paragraph (c) the operator may develop an equivalent method other than that specified above.

AMC OPS 1.980
Operation on more than one type or variant
See ANTR OPS 1.980

1 Terminology

1.1 The terms used in the context of the requirement for operation of more than one type or variant have the following meaning:

a. Base aeroplane. An aeroplane, or a group of aeroplanes, designated by the operator and used as a reference to compare differences with other aeroplane types/variants within the operator's fleet.

b. Aeroplane variant. An aeroplane, or a group of aeroplanes, with the same characteristics but which have differences from a base aeroplane which require additional flight crew knowledge, skills, and or abilities that affect flight safety.

c. Credit. The acceptance of training, checking or recent experience on one type or variant as being valid for another type or variant because of sufficient similarities between the two types or variants.

d. Differences training. See ANTR OPS 1.950(a)(1).

e. Familiarisation training. See ANTR OPS 1.950(a)(2).

f. Major change. A change, or changes, within an aeroplane type or related type, which significantly affect the flight crew interface with the aeroplane (e.g. flight characteristics, procedures, design/number of propulsion units, change in number of required flight crew).

g. Minor change. Any change other than a major change.

h. Operator Difference Requirements (ODRs). A formal description of differences between types or variants flown by a particular operator.

1.2 Training and checking difference levels

a. Level A

i. Training. Level A training can be adequately addressed through self-instruction by a crew member through page revisions, bulletins or differences handouts. Level A introduces a different version of a system or component which the crew member has already shown the ability to use and understand. The differences result in no, or only minor, changes in procedures.

ii. Checking. A check related to differences is not required at the time of training. However, the crew member is responsible for acquiring the knowledge and may be checked during proficiency checking.

b. Level B

i. Training. Level B training can be adequately addressed through aided instruction such as slide/tape presentation, computer based instruction which may be interactive, video or classroom instruction. Such training is typically used for part-task systems requiring knowledge and training with, possibly, partial application of procedures (e.g. fuel or hydraulic systems etc.).

ii. Checking. A written or oral check is required for initial and recurrent differences training.

c. Level C

i Training. Level C training should be accomplished by use of “hands on” FSTDs qualified according to ANTR-FSTD A, Level 1 or higher. The differences affect skills, abilities as well as knowledge but do not require the use of “real time” devices. Such training covers both normal and non-normal procedures (for example for flight management systems).

ii. Checking. A FSTD used for training level C or higher is used for a check of conversion and recurrent training. The check should utilise a “real time” flight environment such as the demonstration of the use of a flight management system. Manoeuvres not related to the specific task do not need to be tested.

d. Level D

i Training. Level D training addresses differences that affect knowledge, skills and abilities for which training will be given in a simulated flight environment involving, “real time” flight manoeuvres for which the use of an STD qualified according to ANTR-FSTD A, Level 1 would not suffice, but for which motion and visual clues are not required. Such training would typically involve an FSTD as defined in ANTR-FSTD A, Level 2.

ii Checking. A proficiency check for each type or variant should be conducted following both initial and recurrent training. However, credit may be given for manoeuvres common to each type or variant and need not be repeated. Items trained to level D differences may be checked in FSTDs qualified according to ANTR-FSTD A, Level 2. Level D checks will therefore comprise at least a full proficiency check on one type or variant and a partial check at this level on the other.

e. Level E

i. Training. Level E provides a realistic and operationally oriented flight environment achieved only by the use of Level C or D Flight Simulators or the aeroplane itself. Level E training should be conducted for types and variants which are significantly different from the base aeroplane and/or for which there are significant differences in handling qualities.

ii. Checking. A proficiency check on each type or variant should be conducted in a level C or D Flight Simulator or the aeroplane itself. Either training or checking on each Level E type or variant should be conducted every 6 months. If training and checking are alternated, a check on one type or variant should be followed by training on the other so that a crew member receives at least one check every 6 months and at least one check on each type or variant every 12 months.

AMC OPS 1.980(b)
Methodology - Use of Operator Difference Requirement (ODR) Tables
See ANTR OPS 1.980(b)
See also IEM OPS 1.980(b)

1 General

1.1 Use of the methodology described below is acceptable to the BCAA 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

2.1 Before requiring flight crew members to operate more than one type or variant, operators should first nominate one aeroplane as the Base Aeroplane from which to show differences with the second aeroplane type or variant, the 'difference aeroplane', in terms of technology (systems), procedures, pilot handling and aeroplane management. These differences, known as Operator Difference Requirements (ODR), preferably presented in tabular format, constitute part of the justification for operating more than one type or variant and also the basis for the associated differences/familiarisation training for the flight crew.

3 The ODR Tables should be presented as follows:

3.1 Table 1 - ODR 1 – General

BASE AEROPLANE: DIFFERENCE AEROPLANE:				COMPLIANCE METHOD		
GENERAL	DIFFERENCES	FLT CHAR	PROC CHNG	Training	Checking	Recent Experience
General description of aircraft (dimensions weight, limitations, etc.)	Identification of the relevant differences between the base aeroplane and the difference aeroplane.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

3.2 Table 2 - ODR 2 - systems

BASE AEROPLANE: DIFFERENCE AEROPLANE:				COMPLIANCE METHOD		
SYSTEM	DIFFERENCES	FLT CHAR	PROC CHNG	Training	Checking	Recent Experience
Brief description of systems and subsystems classified according to the ATA 100 index.	list of differences for each relevant subsystem between the base aeroplane and the difference aeroplane.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

3.3 Table 3 - ODR 3 - manoeuvres

BASE AEROPLANE: DIFFERENCE AEROPLANE:				COMPLIANCE METHOD		
MANOEUVRES	DIFFERENCES	FLT CHAR	PROC CHNG	Training	Checking	Recent Experience
Described according to phase of flight (gate, taxi, flight, taxi, gate)	List of relevant differences for each manoeuvre between the base aeroplane and the difference aeroplane.	Impact on flight characteristics (performance and/or handling)	Impact on procedures (Yes or No)	Assessment of the difference levels according to Table 4		

4 Compilation of ODR Tables

4.1 ODR 1 - Aeroplane general

a. The general characteristics of the difference aeroplane should be compared with the base aeroplane with regard to:

i. General dimensions and aeroplane design;

ii. Flight deck general design;

iii. Cabin layout;

iv. Engines (number, type and position);

v. Limitations (flight envelope).

4.2 ODR 2 - Aeroplane systems

a. Consideration should be given to differences in design between the difference aeroplane and the base aeroplane. This comparison should be completed using the ATA 100 index to establish system and subsystem classification and then an analysis performed for each index item with respect to main architectural, functional and/or operations elements, including controls and indications on the systems control panel.

4.3 ODR 3 - Aeroplane manoeuvres (operational differences)

a. Operational differences encompass normal, abnormal and emergency situations and include any change in aeroplane handling and flight management. It is necessary to establish a list of operational items for consideration on which an analysis of differences can be made. The operational analysis should take the following into account:

i. Flight deck dimensions (e.g. size, cut-off angle and pilot eye height);

ii. Differences in controls (e.g. design, shape, location, function);

iii. Additional or altered function (flight controls) in normal or abnormal conditions;

iv. Procedures;

v. Handling qualities (including inertia) in normal and abnormal configurations;

vi. Performance in manoeuvres;

vii. Aeroplane status following failure;

vii. Management (e.g. ECAM, EICAS, navaid selection, automatic checklists).

4.4 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.

4.5 Difference Levels - crew training, checking and currency

4.5.1 The final stage of the operator’s proposal to operate more than one type or variant is to establish crew training, checking and currency requirements. This may be established by applying the coded difference levels from Table 4 to the Compliance Method column of the ODR Tables.

5 Differences items identified in the ODR systems as impacting flight characteristics, and/or procedures, should be analysed in the corresponding ATA section of the ODR manoeuvres. Normal, abnormal and emergency situations should be addressed accordingly.

6 Table 4 - Difference Levels versus training

Difference Level	Method/Minimum Specification for Training Device
A: Represents knowledge requirement.	Self Instruction through operating bulletins or differences handouts
B: Aided instruction is required to ensure crew understanding, emphasise issues, aid retention of information, or : aided instruction with partial application of procedures	Aided instruction e.g. computer based training (CBT), class room instruction or video tapes. Interactive CBT
C: For variants having part task differences affecting skills or abilities as well as knowledge. Training device required to ensure attainment and retention of crew skills	FSTD (ANTR-FSTD A, Level 1)
D: Full task differences affecting knowledge, skills and/or abilities using FSTDs capable of performing flight manoeuvres.	FSTD (ANTR-FSTD A, Level 2)
E: Full tasks differences requiring high fidelity environment to attain and maintain knowledge skills and abilities.	FSTD (ANTR-FSTD A, Level C)

Note: Levels A and B require familiarisation training, levels C, D and E require differences training. For Level E, the nature and extent of the differences may be such that it is not possible to fly both types or variants with a credit in accordance with Appendix 1 to ANTR OPS 1.980, sub-paragraph (d)(7).

IEM OPS 1.980(b)
Operation on more than one type or variant - Philosophy and Criteria
See ANTR OPS 1.980(b)

1 Philosophy

1.1 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.

1.2 The first consideration is whether or not the two aeroplane types or variants are sufficiently similar to allow the safe operation of both.

1.3 The second consideration is whether or not the types or variants are sufficiently similar for the training, checking and recent experience items completed on one type or variant to replace those required on the similar type or variant. If these aeroplanes are similar in these respects, then it is possible to have credit for training, checking and recent experience. Otherwise, all training, checking and recent experience requirements prescribed in Subpart N should be completed for each type or variant within the relevant period without any credit.

2 Differences between aeroplane types or variants

2.1 The first stage in any operator's submission for crew multi-type or variant operations is to consider the differences between the types or variants. The principal differences are in the following three areas:

a. Level of technology. The level of technology of each aircraft type or variant under consideration encompasses at least the following design aspects:

i. Flight deck layout (e.g. design philosophy chosen by a manufacturer);

ii. Mechanical versus electronic instrumentation;

iii. Presence or absence of Flight Management System (FMS);

iv. Conventional flight controls (hydraulic, electric or manual controls) versus fly-by-wire;

v. Side-stick versus conventional control column;

vi. Pitch trim systems;

vii. Engine type and technology level (e.g. jet/turboprop/piston, with or without automatic protection systems.

b. Operational differences. Consideration of operational differences involves mainly the pilot machine interface, and the compatibility of the following:

i. Paper checklist versus automated display of checklists or messages (e.g. ECAM, EICAS) during all procedures;

ii. Manual versus automatic selection of navaids;

iii. Navigation equipment;

iv. Aircraft weight and performance.

c. Handling characteristics. Consideration of handling characteristics includes control response, crew perspective and handling techniques in all stages of operation. This encompasses flight and ground characteristics as well as performance influences (e.g. number of engines). The capabilities of the autopilot and autothrust systems may affect handling characteristics as well as operational procedures.

3 Training, checking and crew management. Alternating training and proficiency checking may be permitted if the submission to operate more than one type or variant shows clearly that there are sufficient similarities in technology, operational procedures and handling characteristics.

4 An example of completed ODR tables for the operator’s proposal for flight crews to operate more than one type or variant may appear as follows:

Table 1 - ODR 1 - AEROPLANE GENERAL

BASE AEROPLANE: ‘X’ DIFFERENCE AEROPLANE: ‘Y’				COMPLIANCE METHOD		
GENERAL	DIFFERENCES	FLT CHAR	PROC CHNG	Training	Checking	Recent Experience
Flight Deck	Same flight deck arrangement, 2 observers seats on ‘Y’	NO	NO	A	/	/
Cabin	‘Y’ max certificated passenger capacity: 335, ‘X’: 179	NO	NO	A	/	/

Table 2 - ODR 2 – SYSTEMS

BASE AEROPLANE: ‘X’ DIFFERENCE AEROPLANE: ‘Y’				COMPLIANCE METHOD		
SYSTEMS	DIFFERENCES	FLT CHAR	PROC CHNG	Training	Checking	Recent Experience
21 Air Conditioning	- Trim air system - packs - cabin temperature	NO NO NO	YES NO YES	B	B	B
22 Auto flight	- FMGS architecture - FMGES functions - reversion modes	NO NO NO	NO YES YES	B C D	B C D	B B D
23 Communications						

Table 3 - ODR 3 - MANOEUVRES

BASIC AEROPLANE: 'X' DIFFERENCE AEROPLANE: 'Y'				COMPLIANCE METHOD		
MANOEUVRES	DIFFERENCES	FLT CHAR	PROC CHNG	Training	Checking	Recent Experience
Taxi	- Pilot eye height, turn radius, - two engine taxi (1&4)	YES NO	NO NO	D A	D /	/ /
Take-off	Flight Characteristics in ground law	YES	NO	E	E	E
Rejected take-off	Reverser actuation logic	YES	NO	D	D	D
Take-off engine failure	- V_1/V_r split - Pitch attitude/lateral control	YES(P)* YES(H)*	NO NO	B E	B E	B

*P = Performance, H = Handling

IEM OPS 1.985
Training records
See ANTR OPS 1.985

A summary of training should be maintained by the operator to show a flight crew member's completion of each stage of training and checking.

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AC/AMC/IEM O — CABIN CREW

IEM OPS 1.988
Additional crew members assigned to specialist duties
See ANTR OPS 1.988

The additional crew members solely assigned to specialist duties to whom the requirements of Subpart O are not applicable include the following:

i. Child minders/escorts;

ii. Entertainers;

iii. Ground engineers;

iv. Interpreters;

v. Medical personnel;

vi. Secretaries;

vii. Security staff; and

viii Cabin auditors.

IEM OPS 1.990
Number and Composition of Cabin Crew
See ANTR OPS 1.990

1 The demonstration or analysis referred to in ANTR OPS 1.990(b)(2) should be that which is the most applicable to the type, or variant of that type, and the seating configuration used by the operator.

2 With reference to ANTR OPS 1.990(b), the BCAA may require an increased number of cabin crew members in excess of the requirements of ANTR OPS 1.990 on certain types of aeroplane or operations. Factors which should be taken into account include:

a. The number of exits;

b. The type of exits and their associated slides;

c. The location of exits in relation to cabin crew seats and the cabin layout;

d. The location of cabin crew seats taking into account cabin crew duties in an emergency evacuation including:

i. Opening floor level exits and initiating stair or slide deployment;

ii. Assisting passengers to pass through exits; and

iii. Directing passengers away from inoperative exits, crowd control and passenger flow management;

e. Actions required to be performed by cabin crew in ditchings, including the deployment of slide-rafts and the launching of life-rafts.

3 When the number of cabin crew is reduced below the minimum required by ANTR OPS 1.990(b), for example in the event of incapacitation or non-availability of cabin crew, the procedures to be specified in the Operations Manual should result in consideration being given to at least the following:

a. Reduction of passenger numbers;

b. Re-seating of passengers with due regard to exits and other applicable aeroplane limitations; and

c. Relocation of cabin crew and any change of procedures.

4 When scheduling cabin crew for a flight, the operator should establish procedures which take account of the experience of each cabin crew member such that the required cabin crew includes some cabin crew members who have at least 3 months operating experience as a cabin crew member.

AMC OPS 1.995(b)
Minimum requirements
See ANTR OPS 1.995(b)

1 The initial medical examination and any re-assessment of cabin crew members must be conducted by, or under the supervision of, a medical practitioner acceptable to the BCAA.

2 The operator should maintain a medical record for each cabin crew member.

3 The following medical requirements are applicable for each cabin crew member:

a. Good health;

b. Free from any physical or mental illness which might lead to incapacitation or inability to perform cabin crew duties;

c. Normal cardiorespiratory function;

d. Normal central nervous system;

e. Adequate visual acuity 6/9 with or without glasses;

f. Adequate hearing; and

g. Normal function of ear, nose and throat.

IEM OPS 1.1000(c)
Senior Cabin Crew Training
See ANTR OPS 1.1000(c)

Training for senior cabin crew members should include:

1 Pre-flight Briefing:

a. Operating as a crew;

b. Allocation of cabin crew stations and responsibilities; and

c. Consideration of the particular flight including:

i. Aeroplane type;

ii. Equipment;

iii. Area and type of operation including EDTO; and

iv. Categories of passengers, including the disabled, infants and stretcher cases;

2 Co-operation within the crew:

a. Discipline, responsibilities and chain of command;

b. Importance of co-ordination and communication; and

c. Pilot incapacitation;

3 Review of operators' requirements and legal requirements:

a. Passengers safety briefing, safety cards;

b. Securing of galleys;

c. Stowage of cabin baggage;

d. Electronic equipment;

e. Procedures when fuelling with passengers on board;

f. Turbulence; and

g. Documentation;

4 Human Factors and Crew Resource Management

(Where practicable, this should include the participation of Senior Cabin Crew Members in flight simulator Line Oriented Flying Training exercises);

5 Accident and incident reporting; and

6 Flight and duty time limitations and rest requirements.

AC OPS 1.1005/1.1010/1.1015
Crew Resource Management Training
See ANTR OPS 1.1005/1.1010/1.1015 and Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015

1 Introduction

1.1 Crew Resource Management (CRM) should be the effective utilisation of all available resources (e.g. crew members, aeroplane systems, and supporting facilities) to achieve safe and efficient operation.

1.2 The objective of CRM should be to enhance the communication and management skills of the crew member, as well as the importance of effective co-ordination and two-way communication between all crew members.

1.3 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 which produce particular difficulties.

2 General Principles for CRM Training for Cabin Crew

2.1 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 co-ordination of the tasks and functions of flight crew and cabin crew should be addressed.

2.2 Whenever it is practicable to do so, operators should provide combined training for flight crew and cabin crew, including feedback, as appropriate to Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 Table 1, Columns (d), (e) and (f). This is of particular importance for senior cabin crew members.

2.3 Where appropriate, CRM principles should be integrated into relevant parts of cabin crew training.

2.4 CRM training should include group discussions and the review of accidents and incidents (case based studies).

2.5 Whenever it is practicable to do so, relevant parts of CRM training should form part of the training conducted in cabin mock-ups or aircraft.

2.6 CRM training should take into account the items listed in Appendix 2 to ANTR OPS 1.1005/1.1010/1.1015 Table 1. CRM training courses should be conducted in a structured and realistic manner.

2.7 The operator should be responsible for the quality of all CRM training, including any training provided by sub-contractors/third parties (in accordance with ANTR OPS 1.035 and AMC-ANTR OPS 1.035, paragraph 5.1).

2.8 CRM training for cabin crew should include, an Introductory CRM Course, Operator's CRM Training, and Aeroplane Type Specific CRM, all of which may be combined.

2.9 There should be no assessment of CRM skills. Feedback from instructors or members of the group on individual performance should be given during training to the individuals concerned.

3 Introductory CRM Course

3.1 The Introductory CRM Course should provide cabin crew members with a basic knowledge of Human Factors relevant to the understanding of CRM.

3.2 Cabin crew members from different operators may attend the same Introductory CRM Course provided that operations are similar (see paragraph 1.3).

4 Operator's CRM Training

4.1 Operator's CRM training should be the application of the knowledge gained in the Introductory CRM Course to enhance communication and co-ordination skills of cabin crew members relevant to the operator's culture and type of operation.

5 Aeroplane Type Specific CRM

5.1 Aeroplane Type Specific CRM should be integrated into all appropriate phases of the operator's conversion training on the specific aeroplane type.

5.2 Aeroplane Type Specific CRM should be the application of the knowledge gained in previous CRM training on the specifics related to aircraft type, including, narrow/wide bodied aeroplanes, single/multi deck aeroplanes, and flight crew and cabin crew composition.

6 Annual Recurrent Training

6.1 When a cabin crew member undergoes annual recurrent training, CRM training should be integrated into all appropriate phases of the recurrent training and may include stand-alone modules.

6.2 When CRM elements are integrated into all appropriate phases of the recurrent training, the CRM elements should be clearly identified in the training syllabus.

6.3 Annual Recurrent CRM Training should include realistic operational situations.

6.4 Annual Recurrent CRM Training should include areas as identified by the operator's accident prevention and flight safety programme (see ANTR OPS 1.037).

7 CRM Training for Senior Cabin Crew

7.1 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.

7.2 The senior cabin crew member should demonstrate ability to manage the operation and take appropriate leadership/management decisions.

8 CRM Instructor Qualifications

8.1 The operator should ensure that all personnel conducting relevant training are suitably qualified to integrate elements of CRM into all appropriate training programmes.

8.2 A training and standardisation programme for CRM instructors should be established.

8.3 Cabin crew CRM instructors should:

a. Have suitable experience of commercial air transport as a cabin crew member; and

b. Have received instruction on Human Factors Performance Limitations (HPL); and

c. Have completed an Introductory CRM Course and the Operator's CRM training; and

d. Have received instructions in training skills in order to conduct CRM courses; and

e. Be supervised by suitably qualified CRM instructors when conducting their first CRM training course.

8.4 An experienced non-cabin crew CRM instructor may continue to be a cabin crew CRM instructor, provided that the provisions of paragraph 8.3 b) to e) are satisfied and that a satisfactory knowledge has been demonstrated of the nature of the operation and the relevant specific aeroplane types. In such circumstances, the operator should be satisfied that the instructor has a suitable knowledge of the cabin crew working environment.

8.5 Instructors integrating elements of CRM into conversion, recurrent training, or Senior Cabin Crew Member training, should have acquired relevant knowledge of human factors and have completed appropriate CRM training.

9 Co-ordination between flight crew and cabin crew training departments

9.1 There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew instructors to observe and comment on each other's training. Consideration should be given to creating flight deck scenarios on video for playback to all cabin crew during recurrent training, and to providing the opportunity for cabin crew, particularly senior cabin crew, to participate in Flight Crew LOFT exercises.

AMC OPS 1.1012
Familiarisation
See ANTR OPS 1.1012

1 New entrant cabin crew

1.1 Each new entrant cabin crew member having no previous comparable operating experience should:

a. Participate in a visit to the aeroplane to be operated; and

b. Participate in familiarisation flights as described in paragraph 3 below.

2 Cabin crew operating on a subsequent aeroplane type

2.1 A cabin crew member assigned to operate on a subsequent aeroplane type with the same operator should either:

a. Participate in a familiarisation flight as described in paragraph 3 below; or

b. Participate in an aeroplane visit to the aeroplane to be operated.

3 Familiarisation Flights

3.1 During familiarisation flights, the cabin crew member should be additional to the minimum number of cabin crew required by ANTR OPS 1.990.

3.2 Familiarisation flights should be conducted under the supervision of the senior cabin crew member.

3.3 Familiarisation flights should be structured and involve the cabin crew member in the participation of safety related pre-flight, in-flight and post-flight duties.

3.4 Familiarisation flights should be operated with the cabin crew member in the operator's uniform.

3.5 Familiarisation flights should form part of the training record for each cabin crew member.

4 Aeroplane visits

4.1 The purpose of aeroplane visits is to familiarise each cabin crew member with the aeroplane environment and its equipment. Accordingly, aeroplane visits should be conducted by suitably qualified persons and in accordance with a syllabus described in the Operations Manual, Part D. The aeroplane visit should provide an overview of the aeroplane's exterior, interior and systems including the following:

a. Interphone and public address systems;

b. Evacuation alarm systems;

c. Emergency lighting;

d. Smoke detection systems;

e. Safety/emergency equipment;

f. Flight deck;

g. Cabin crew stations;

h. Toilet compartments;

i. Galleys, galley security and water shut-off;

j. Cargo areas if accessible from the passenger compartment during flight;

k. Circuit breaker panels located in the passenger compartment;

l. Crew rest areas;

m. Doors/Exit location and its environment;

n. IFE system used for covering safety related information.

4.2 An aeroplane familiarisation visit may be combined with the conversion training required by ANTR OPS 1.1010(c)(3).

AC OPS (IEM) 1.1005/1.1010/1.1015/1.1020
Representative Training Devices
See ANTR OPS 1.1005/1.1010/1.1015/1.1020

1 A representative training device may be used for the training of cabin crew as an alternative to the use of the actual aeroplane or required equipment.

2 Only those items relevant to the training and testing intended to be given, should accurately represent the aeroplane in the following particulars:

a. Layout of the cabin in relation to exits, galley areas and safety equipment stowage;

b. Type and location of passenger and cabin crew seats;

c. Where practicable, exits in all modes of operation (particularly in relation to method of operation, their mass and balance and operating forces) including failure of power assist systems where fitted

d. Safety equipment of the type provided in the aeroplane (such equipment may be 'training use only' items and, for oxygen and protective breathing equipment, units charged with or without oxygen may be used).

3 When determining whether an exit can be considered to be a variant of another type, the following factors should be assessed:

a. Exit arming/disarming;

b. Direction of movement of the operating handle;

c. Direction of exit opening;

d. Power assist mechanisms;

e. Assist means, e.g. evacuation slides

IEM OPS 1.1015
Recurrent training
See ANTR OPS 1.1015

Operators should ensure that a formalised course of recurrent training is provided for cabin crew in order to ensure continued proficiency with all equipment relevant to the aeroplane types that they operate.

AMC OPS 1.1020
Refresher Training
See ANTR OPS 1.1020

In developing the content of any refresher training programme prescribed in ANTR OPS 1.1020, operators should consider (in consultation with the BCAA) whether, for aeroplanes with complex equipment or procedures, refresher training may be necessary for periods of absence that are less than the 6 months prescribed in ANTR OPS 1.1020(a).

IEM OPS 1.1020(a)
Refresher training
See ANTR OPS 1.1020(a)
See AMC OPS 1.1020

The operator may substitute recurrent training for refresher training if the re-instatement of the cabin crew member's flying duties commences within the period of validity of the last recurrent training and checking. If the period of validity of the last recurrent training and checking has expired, conversion training is required.

AMC OPS 1.1025
Checking
See ANTR OPS 1.1025

1 Elements of training which require individual practical participation should be combined with practical checks.

2 The checks required by ANTR OPS 1.1025 should be accomplished by the method appropriate to the type of training including:

a. Practical demonstration; and/or

b. Computer based assessment; and/or

c. In-flight checks; and/or

d. Oral or written tests.

AC OPS 1.1030
Operation on more than one type or variant
See ANTR OPS 1.1030

1 For the purposes of ANTR OPS 1.1030(b)(1), when determining similarity of exit operation the following factors should be assessed to justify the finding of similarity:

a. Exit arming/disarming;

b. Direction of movement of the operating handle;

c. Direction of exit opening;

d. Power assist mechanisms;

e. Assist means, e.g. evacuation slides.

Self-help exits, for example Type III and Type IV exits, need not be included in this assessment.

2 For the purposes of ANTR OPS 1.1030(a)(2) and (b)(2), when determining similarity of location and type of portable safety equipment the following factors should be assessed to justify the finding of similarity:

a. All portable safety equipment is stowed in the same, or in exceptional circumstances, in substantially the same location;

b. All portable safety equipment requires the same method of operation;

c. Portable safety equipment includes:

i. Fire fighting equipment;

ii. Protective Breathing Equipment (PBE);

iii. Oxygen equipment;

iv. Crew lifejackets;

v. Torches;

vi. Megaphones;

vii. First aid equipment;

viii. Survival equipment and signalling equipment;

ix. Other safety equipment where applicable.

3 For the purposes of sub-paragraph of ANTR OPS 1.1030(a)(2) and (b)(3), type specific emergency procedures include, but are not limited, to the following:

a. Land and water evacuation;

b. In-flight fire;

c. Decompression;

d. Pilot incapacitation.

4 When changing aeroplane type or variant during a series of flights, the cabin crew safety briefing required by AMC OPS 1.210(a), should include a representative sample of type specific normal and emergency procedures and safety equipment applicable to the actual aeroplane type to be operated.

IEM OPS 1.1035
Training records
See ANTR OPS 1.1035

The operator should maintain a summary of training to show a trainee's completion of every stage of training and checking.

IEM to Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020
Crowd Control
See Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020

1 Crowd control

1.1 Operators should provide training in the application of crowd control in various emergency situations. This training should include:

a. Communications between flight crew and cabin crew and use of all communications equipment, including the difficulties of co-ordination in a smoke-filled environment;

b. Verbal commands;

c. The physical contact that may be needed to encourage people out of an exit and onto a slide;

d. The re-direction of passengers away from unusable exits;

e. The marshalling of passengers away from the aeroplane;

f. The evacuation of disabled passengers; and

g. Authority and leadership.

IEM to Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020
Training Methods
See Appendix 1 to ANTR OPS 1.1005/1.1010/1.1015/1.1020

Training may include the use of mock-up facilities, video presentations, computer based training and other types of training. A reasonable balance between the different training methods should be achieved.

IEM to Appendix 1 to ANTR OPS 1.1010/1.1015
Conversion and recurrent training
See Appendix 1 to ANTR OPS 1.1010/1.1015

1 A review should be carried out of previous initial training given in accordance with ANTR OPS 1.1005 in order to confirm that no item has been omitted. This is especially important for cabin crew members first transferring to aeroplanes fitted with life-rafts or other similar equipment.

2 Fire and smoke training requirements

Training requirement/interval	**Required activity**		
First conversion to aeroplane type (e.g. new entrant)	Actual fire fighting and handling equipment		(Note 1)
Every year during recurrent training		Handling equipment	
Every 3 years during recurrent training	Actual fire fighting and handling equipment		(Note 1)
Subsequent a/c conversion	(Note 1)	(Note 1)	(Notes 2 & 3)
New fire fighting equipment		Handling equipment	

NOTES:

1. Actual fire fighting during training must include use of at least one fire extinguisher and extinguishing agent as used on the aeroplane type. An alternative extinguishing agent may be used in place of Halon.

2. Fire fighting equipment is required to be handled if it is different to that previously used.

3. Where the equipment between aeroplane types is the same, training is not required if within the validity of the 3 year check.

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AC/MC/IEM P – MANUALS, LOGS & RECORDS

IEM OPS 1.1040(b)
Elements of the Operations Manual subject to approval
See ANTR OPS 1.1040(b)

1 A number of the provisions of ANTR OPS require the prior approval of the BCAA. As a consequence, the related sections of the Operations Manual should be subject to special attention. In practice, there are two possible options:

a. The BCAA approves a specific item (e.g. with a written response to an application) which is then included in the Operations Manual. In such cases, the BCAA merely checks that the Operations Manual accurately reflects the content of the approval. In other words, such text has to be acceptable to the BCAA; or

b. The operator's application for an approval includes the related, proposed, Operations Manual text in which case, the BCAA's written approval encompasses approval of the text.

2 In either case, it is not intended that a single item should be subject to two separate approvals.

3 The following list indicates only those elements of the Operations Manual which require specific approval by the BCAA.

Ops Manual Section (App. 1 to ANTR OPS 1.1045)	**Subject**	**OPS Reference**
A 2.4	Operational Control	1.195
A 5.2(f)	Procedures for flight crew to operate on more than 1 type or variant	1.980
A 5.3(c)	Procedures for cabin crew to operate on four airplane types	1.1030(a)
A 8.1.1	Method of determination of minimum flight attitudes	1.250(b)
A 8.1.4	En-route single engine safe forced landing area for land planes	1.542(a)
A 8.1.8 Mass & balance:	(i) Standard mass values other than those specified in Subpart J	1.620(g)
	(ii) Alternative documentation and related procedures	1.625(c)
	(iii) Omission of data from documentation	App. 1, 1.625, § (a)(1)(ii)
	(iv) Special standard masses for the traffic load	App. 1, 1.605, § (b)
A 8.1.11	Tech Log	1.1071
A 8.4	Cat II/III Operations	1.440(a)(3), (b) & App. 1 to ANTR OPS 1.455, Note
A 8.5	EDTO Approval	1.246
A 8.6	Use of MEL	1.030(a)
A 9	Dangerous Goods	1.1155
A 8.3.2(b)	NAT HLA	1.243
A 8.3.2(c)	RNAV (PBN)	1.243
A 8.3.2(f)	RVSM	1.241
B 1.1(b)	Max. approved passenger seating configuration	1.480(a)(6)
B 2(g)	Alternate method for verifying approach mass (DH < 200ft) - Performance Class A	1.510(b)
B 4.1(h)	Steep Approach Procedures and Short Landing Operations - Performance Class B	1.515(a)(3) & (a)(4) & 1.550(a)
B 6(b)	Use of on-board mass and balance systems	App. 1 to ANTR OPS 1.625, § (c)
B 9	MEL	1.030(a)
D 2.1	Cat II/III Training syllabus flight crew	1.450(a)(2)
	Recurrent training programme flight crew	1.965(a)(2)
	Advanced qualification, programme	1.978(a)
D 2.2	Initial training cabin crew	1.1005
	Recurrent training programme cabin crew	1.1015(b)
D 2.3(a)	Dangerous Goods	1.1220(a)

IEM OPS 1.1040(c)
Operations Manual - Language
See ANTR OPS 1.1040(c)

1 ANTR OPS 1.1040(c) requires the Operations Manual to be prepared in the English language. However, it is recognised that there may be circumstances where approval for the use of another language, for part or all of the Operations Manual, is justifiable. The criteria on which such an approval may be based should include at least the following:

a. The language(s) commonly used by the operator;

b. The language of related documentation used, such as the AFM;

c. Size of the operation;

d. Scope of the operation i.e. domestic or international route structure;

e. Type of operation e.g. VFR/IFR; and

f. The period of time requested for the use of another language.

AMC OPS 1.1045
Operations Manual Contents
See ANTR OPS 1.1045

1 Appendix 1 to ANTR OPS 1.1045 prescribes in detail the operational policies, instructions, procedures and other information to be contained in the Operations Manual in order that operations personnel can satisfactorily perform their duties. When compiling an Operations Manual, the operator may take advantage of the contents of other relevant documents. Material produced by the operator for Part B of the Operations Manual may be supplemented with or substituted by applicable parts of the Aeroplane Flight Manual required by ANTR OPS 1.1050 or, where such a document exists, by an Aeroplane Operating Manual produced by the manufacturer of the aeroplane. In the case of performance class B aeroplanes. it is acceptable that a “Pilot Operating Handbook” (POH) or equivalent document is used as Part B of the Operations Manual, provided that the POH covers the necessary items. For Part C of the Operations Manual, material produced by the operator may be supplemented with or substituted by applicable Route Guide material produced by a specialised professional company.

2 If the operator chooses to use material from another source in his Operations Manual he should either copy the applicable material and include it directly in the relevant part of the Operations Manual, or the Operations Manual should contain a statement to the effect that a specific manual(s) (or parts thereof) may be used instead of the specified part(s) of the Operations Manual.

3 If the operator chooses to make use of material from an alternative source (e.g. a Route Manual producer, an aeroplane manufacturer or a training organisation) as explained above, this does not absolve the operator from the responsibility of verifying the applicability and suitability of this material. (See ANTR OPS 1.1040(k)). Any material received form an external source should be given its status by a statement in the Operations Manual.

IEM OPS 1.1055(a)(12)
Signature or equivalent
See ANTR OPS 1.1055(a)(12)

1 ANTR OPS 1.1055 requires a signature or its equivalent. This IEM gives an example of how this can be arranged where normal signature by hand is impracticable and it is desirable to arrange the equivalent verification by electronic means.

2 The following conditions should be applied in order to make an electronic signature the equivalent of a conventional hand-written signature:

i. Electronic ‘signing’ should be achieved by entering a Personal Identification Number (PIN) code with appropriate security etc;

ii. Entering the PIN code should generate a print-out of the individual’s name and professional capacity on the relevant document(s) in such a way that it is evident, to anyone having a need for that information, who has signed the document;

iii. The computer system should log information to indicate when and where each PIN code has been entered;

iv. The use of the PIN code is, from a legal and responsibility point of view, considered to be fully equivalent to signature by hand;

v. The requirements for record keeping remain unchanged; and.

vi. All personnel concerned should be made aware of the conditions associated with electronic signature and should confirm this in writing.

IEM OPS 1.1055(b)
Journey log
See ANTR OPS 1.1055(b)

The 'other documentation' referred to in this paragraph might include such items as the operational flight plan, the aeroplane technical log, flight report, crew lists etc.

AMC/GM Q FTL — FLIGHT AND DUTY TIME LIMITATIONS AND REST REQUIREMENTS

Introduction

This AMC/GM section of Subpart Q gives the Acceptable Means of Compliance (AMC) and Guidance Material (GM) where possible / applicable for easy implementation of the regulation in a standardized manner.

Each AMC & GM will describe the intent of the requirement at ANTR OPS FTL as applicable to commercial air transport (CAT) by aeroplanes for scheduled and charter operations.

The BCAA has introduced the subject regulations, based upon scientific principles, knowledge and operational experience, specifying the limitations applicable to the flight time and flight duty periods for crew members as encompassed by ICAO through their studies and researches. These regulations also make provision for establishing the Flight Time, Flight Duty Time, Duty Period, adequate Rest Period and for authorizing the operators in establishing the **Fatigue Risk Management System** (FRMS) rest periods to ensure that fatigue occurring either in a flight or successive flights, or accumulated over a period of time due to these and other tasks, does not endanger the safety of a flight.

To get approval, the operator must demonstrate to the regulator that it has appropriate processes and mitigations to achieve an acceptable level of safety.

GM1 to ANTR OPS FTL 1.1105(1) Definitions

ACCLIMATISED

(a) A crew member remains acclimatised to the local time of his or her reference time during 47 hours 59 minutes after reporting no matter how many time zones he/she has crossed.

(b) The maximum daily FDP for acclimatised crew members is determined by using table 2 of ANTR OPS FTL 1.1205(b)(1) with the reference time of the point of departure. As soon as 48 hours have elapsed, the state of acclimatisation is derived from the time elapsed since reporting at reference time and the number of time zones crossed.

(c) A crew member is considered to be in an unknown state of acclimatisation after the first 48 hours of the rotation have elapsed unless he or she remains in the first arrival destination time zone (either for rest or any duties) in accordance with the table in ANTR OPS FTL 1.1105(1).

(d) Should a crew member's rotation include additional duties that end in a different time zone than his or her first arrival destination's time zone while he or she is considered to be in an unknown state of acclimatisation, then the crew member remains in an unknown state of acclimatisation until he or she:

(1) has taken the rest period required by ANTR OPS FTL CS 1.1235(b)(3) at home base;

(2) has taken the rest period required by ANTR OPS FTL CS 1.1235(b)(3) at the new location; or

(3) has been undertaking duties starting at and returning to the time zone of the new location until he or she becomes acclimatised in accordance with the values in the table in ANTR OPS FTL 1.1105(1).

To determine the state of acclimatisation, the two following criteria should be applied:

(i) the greater of the time differences between the time zone where he or she was last acclimatised or the local time of his or her last departure point and the new location; and

(ii) the time elapsed since reporting at home base for the first time during the rotation.

GM2 to ANTR OPS FTL 1.1105(1) Definitions

ACCLIMATISED 'POINT OF DEPARTURE'

The point of departure refers to the reporting point for a flight duty period or positioning duty after a rest period.

GM3 to ANTR OPS FTL 1.1105(1) Definitions

ACCLIMATISED 'TIME ELAPSED SINCE REPORTING AT REFERENCE TIME'

The time elapsed since reporting at reference time for operations applying ANTR OPS FTL CS 1.1235(b)(3)(ii) at home base refers to the time elapsed since reporting for the first time at home base for a rotation.

GM1 to ANTR OPS FTL 1.1105(2) Definitions

REFERENCE TIME

(a) Reference time refers to reporting points in a 2-hour wide time zone band around the local time where a crew member is acclimatised.

(b) Example: A crew member is acclimatised to the local time in Helsinki and reports for duty in London. The reference time is the local time in London.

GM1 to ANTR OPS FTL 1.1105(3) Definitions

ADEQUATE FURNITURE FOR 'ACCOMMODATION'

Adequate furniture for crew member accommodation should include a seat that reclines at least 45° back angle to the vertical, has a seat width of at least 20 inches (50cm) and provides leg and foot support.

GM1 to ANTR OPS FTL 1.1105(8) Definitions

DETERMINATION OF DISRUPTIVE SCHEDULES

If a crew member is acclimatised to the local time at his/her home base, the local time at the home base should be used to consider an FDP as 'disruptive schedule'. This applies to operations within the 2-hour wide time zone surrounding the local time at the home base, if a crew member is acclimatised to the local time at his/her home base.

GM1 to ANTR OPS FTL 1.1105(10) Definitions

ELEMENTS OF STANDBY FOR DUTY

ANTR OPS FTL 1.1225(c) and (d) and ANTR OPS FTL CS 1.1225(b)(2) determine which elements of standby count as duty.

GM1 to ANTR OPS FTL 1.1105(17) Definitions

OPERATING CREW MEMBER

A person on board an aircraft is either a crew member or a passenger. If a crew member is not a passenger on board an aircraft he/she should be considered as 'carrying out duties'. The crew member remains an operating crew member during in-flight rest. In-flight rest counts in full as FDP, and for the purpose of ANTR OPS FTL 1.1210.

AMC1 to ANTR OPS FTL 1.1110 Operator responsibilities

SCHEDULING

(a) Scheduling has an important impact on a crew member's ability to sleep and to maintain a proper level of alertness. When developing a workable roster, the operator should strike a fair balance between the commercial needs and the capacity of individual crew members to work effectively. Rosters should be developed in such a way that they distribute the amount of work evenly among those that are involved.

(b) Schedules should allow for flights to be completed within the maximum permitted flight duty period and flight rosters should take into account the time needed for pre-flight duties, taxiing, the flight- and turnaround times. Other factors to be considered when planning duty periods should include:

(1) the allocation of work patterns which avoid undesirable practices such as alternating day/night duties, alternating eastward-westward or westward-eastward time zone transitions, positioning of crew members so that a serious disruption of established sleep/work patterns occurs;

(2) scheduling sufficient rest periods especially after long flights crossing many time zones; and

(3) preparation of duty rosters sufficiently in advance with planning of recurrent extended recovery rest periods and notification of the crew members well in advance to plan adequate pre-duty rest.

(4) should not require a flight crew member to operate an aeroplane if it is known or suspected that the flight crew member is fatigued to the extent that the safety of flight may be adversely affected.

AMC1 to ANTR OPS FTL 1.1110(a) Operator responsibilities

PUBLICATION OF ROSTERS

Rosters should be published 14 days in advance and must establish minimum periods of notification of duty for operating crew, or where this is not practicable due to the nature of the operation, must establish in advance minimum periods of notification of days off, during which a crew member will not be required for any duties.

AMC1 to ANTR OPS FTL 1.1110(j) Operator responsibilities

OPERATIONAL ROBUSTNESS OF ROSTERS

The operator should establish and monitor performance indicators for operational robustness of rosters.

GM1 to ANTR OPS FTL 1.1110(j) Operator responsibilities

OPERATIONAL ROBUSTNESS OF ROSTERS

Performance indicators for operational robustness of rosters should support the operator in the assessment of the stability of its rostering system. Performance indicators for operational robustness of rosters should at least measure how often a rostered crew pairing for a duty period is achieved within the planned duration of that duty period. Crew pairing means rostered positioning and flights for crew members in one duty period.

GM1 to ANTR OPS FTL 1.1120 Fatigue Risk Management (FRM)

ICAO DOC 9966 — MANUAL FOR THE OVERSIGHT OF FATIGUE MANAGEMENT APPROACHES

Further guidance on FRM processes, appropriate fatigue management, the underlying scientific principles and operational knowledge may be found in ICAO Doc 9966 and to select the appropriate models based on the complexity of the operations conducted by the operator with due consideration to the operational experiences.

AMC1 to ANTR OPS FTL 1.1120(b)(1) Fatigue Risk Management (FRM)

CAT OPERATORS FRM POLICY

(a) The operator’s FRM policy should identify all the elements of FRM.

(b) The FRM policy should define to which operations FRM applies.

(c) The FRM policy should:

(1) reflect the shared responsibility of management, flight and cabin crew, and other involved personnel;

(2) state the safety objectives of FRM;

(3) be signed by the accountable manager;

(4) be communicated, with visible endorsement, to all the relevant areas and levels of the organisation;

(5) declare management commitment to effective safety reporting;

(6) declare management commitment to the provision of adequate resources for FRM;

(7) declare management commitment to continuous improvement of FRM;

(8) require that clear lines of accountability for management, flight and cabin crew, and all other involved personnel are identified; and

(9) require periodic reviews to ensure it remains relevant and appropriate.

AMC2 to ANTR OPS FTL 1.1120(b)(2) Fatigue Risk Management (FRM)

CAT OPERATORS FRM DOCUMENTATION

The operator should develop and keep current FRM documentation that describes and records:

(a) FRM policy and objectives;

(b) FRM processes and procedures;

(c) accountabilities, responsibilities and authorities for these processes and procedures;

(d) mechanisms for on-going involvement of management, flight and cabin crew members, and all other involved personnel;

(e) FRM training programmes, training requirements and attendance records;

(f) scheduled and actual flight times, duty periods and rest periods with deviations and reasons for deviations; and

(g) FRM outputs including findings from collected data, recommendations, and actions taken.

GM1 to ANTR OPS FTL 1.1120(b)(3) Fatigue Risk Management (FRM)

SCIENTIFIC METHOD

'Scientific method' is defined as 'a method or procedure that has characterized natural science since the 17th century, consisting in systematic observation, measurement, and experiment, and the formulation, testing, and modification of hypotheses'.

A scientific study may be required as an element of proactive fatigue hazard identification. Such a study should be based on scientific principles, i.e. use the scientific method. That means that the study should consist of the following elements as applicable to each individual case:

(a) an introduction with a summary and the description of the study design, methods and results;

(b) a statement of the hypothesis being tested, how it is being tested and a conclusion as to whether the hypothesis was found to be true or not;

(c) a description of the data collection method and tools, e.g. the sensitivity of the activity monitors, further information on any model and its limitations and how it is being used as part of the study;

(d) a description of how the study subjects were selected and how representative of the crew member population the study group is;

(e) a description of the rosters the study participants have worked containing data such as e.g. flight and duty hours, number of sectors, duty start/finish times;

(f) reports on mean sleep duration and efficiency and data for other standard measures (e.g. sleep timing, self-rated sleepiness/fatigue, sources of sleep disruption, performance, safety);

(g) a description of how sleep and the other measures varied across the roster (i.e. day-to-day) and where and why minimum sleep occurred;

(h) statistical data analysis to test the hypothesis; and

(i) the explanation of how the study results have been used to influence the design of the roster or other fatigue mitigations.

AMC1 to ANTR OPS FTL 1.1120(b)(4) Fatigue Risk Management (FRM)

CAT OPERATORS IDENTIFICATION OF HAZARDS

The operator should develop and maintain three documented processes for fatigue hazard identification:

(a) Predictive

The predictive process should identify fatigue hazards by examining crew scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include, but are not limited to:

(1) operator or industry operational experience and data collected on similar types of operations;

(2) evidence-based scheduling practices; and

(3) bio-mathematical models.

(b) Proactive

The proactive process should identify fatigue hazards within current flight operations. Methods of examination may include, but are not limited to:

(1) self-reporting of fatigue risks;

(2) crew fatigue surveys;

(3) relevant flight and cabin crew performance data;

(4) available safety databases and scientific studies; and

(5) analysis of planned versus actual time worked.

(c) Reactive

The reactive process should identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimised. At a minimum, the process may be triggered by any of the following:

(1) fatigue reports;

(2) confidential reports;

(3) audit reports;

(4) incidents; or

(5) flight data monitoring (FDM) events.

AMC2 to ANTR OPS FTL 1.1120(b)(4) Fatigue Risk Management (FRM)

CAT OPERATORS RISK ASSESSMENT

An operator should develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation. The risk assessment procedures should review identified hazards and link them to:

(a) operational processes;

(b) their probability;

(c) possible consequences; and

(d) the effectiveness of existing safety barriers and controls.

AMC1 to ANTR OPS FTL 1.1120(b)(5) Fatigue Risk Management (FRM)

CAT OPERATORS RISK MITIGATION

An operator should develop and implement risk mitigation procedures that:

(a) select the appropriate mitigation strategies;

(b) implement the mitigation strategies; and

(c) monitor the strategies' implementation and effectiveness.

AMC1 to ANTR OPS FTL 1.1120(b)(6) Fatigue Risk Management (FRM)

CAT OPERATORS FRM SAFETY ASSURANCE PROCESSES

The operator should develop and maintain FRM safety assurance processes to:

(a) provide for continuous FRM performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to:

 (1) hazard reporting and investigations;

 (2) audits and surveys; and

 (3) reviews and fatigue studies;

(b) provide a formal process for the management of change which should include, but is not limited to:

 (1) identification of changes in the operational environment that may affect FRM;

 (2) identification of changes within the organisation that may affect FRM; and

 (3) consideration of available tools which could be used to maintain or improve FRM performance prior to implementing changes; and

(c) provide for the continuous improvement of FRM. This should include, but is not limited to:

 (1) the elimination and/or modification of risk controls have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;

 (2) routine evaluations of facilities, equipment, documentation and procedures; and

 (3) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

AMC1 to ANTR OPS FTL 1.1120(b)(7) Fatigue Risk Management (FRM)

CAT OPERATORS FRM PROMOTION PROCESS

FRM promotion processes should support the on-going development of FRM, the continuous improvement of its overall performance, and attainment of optimum safety levels.

The following should be established and implemented by the operator as part of its FRM:

(a) training programmes to ensure competency commensurate with the roles and responsibilities of management, flight and cabin crew, and all other involved personnel under the planned FRM; and

(b) an effective FRM communication plan that:

 (1) explains FRM policies, procedures and responsibilities to all relevant stakeholders; and

 (2) describes communication channels used to gather and disseminate FRM-related information.

GM1 to ANTR OPS FTL CS 1.1200 Home base

TRAVELLING TIME

Crew members should consider making arrangements for temporary accommodation closer to their home base if the travelling time from their residence to their home base usually exceeds 90 minutes.

GM1 to ANTR OPS FTL 1.1205(a)(1) Flight Duty Period (FDP)

REPORTING TIMES

The operator should specify reporting times taking into account the type of operation, the size and type of aircraft and the reporting airport conditions.

GM1 to ANTR OPS FTL CS 1.1205(a)(2) Flight Duty Period (FDP)

NIGHT DUTIES – APPROPRIATE FATIGUE RISK MANAGEMENT

(a) When rostering night duties of more than 10 hours (referred to below as 'long night duties'), it is critical for the crew member to obtain sufficient sleep before such duties when he/she is adapted to being awake during day time hours at the local time where he/she is acclimatised. To optimise alertness on long night duties, the likelihood of obtaining sleep as close as possible to the start of the FDP should be considered, when rostering rest periods before long night duties, by providing sufficient time to the crew member to adapt to being awake during the night. Rostering practices leading to extended wakefulness before reporting for such duties should be avoided. Fatigue risk management principles that could be applied to the rostering of long night duties may include:

  (1) avoiding long night duties after extended recovery rest periods.

  (2) progressively delaying the rostered ending time of the FDPs preceding long night duties;

  (3) starting a block of night duties with a shorter FDP; and

  (4) avoiding the sequence of early starts and long night duties.

(b) Fatigue risk management principles may be applied to the rostering of long night duties by means of:

  (1) considering operator or industry operational experience and data collected on similar operations;

  (2) evidence-based scheduling practices; and

  (3) bio-mathematical models.

GM1 to ANTR OPS FTL 1.1205(b)(1) Flight Duty Period (FDP)

REFERENCE TIME

The start time of the FDP in the table refers to the 'reference time'. That means, to the local time of the point of departure, if this point of departure is within a 2-hour wide time zone band around the local time where a crew member is acclimatised.

GM1 to ANTR OPS FTL CS 1.1205(c)(1)(ii) Flight Duty Period (FDP)

IN-FLIGHT REST

In-flight rest should be taken during the cruise phase of the flight.

GM2 to ANTR OPS FTL CS 1.1205 (c)(1)(ii) Flight Duty Period (FDP)

IN-FLIGHT REST

In-flight rest periods should be allocated in order to optimise the alertness of those flight crew members at control during landing.

GM1 to ANTR OPS FTL CS 1.1205 (d) Flight Duty Period (FDP)

DELAYED REPORTING

Operator procedures for delayed reporting should:

(a) specify a contacting mode;

(b) establish minimum and maximum notification times; and

(c) avoid interference with sleeping patterns when possible.

AMC1 to ANTR OPS FTL 1.1205(f) Flight Duty Period (FDP)

UNFORESEEN CIRCUMSTANCES IN ACTUAL FLIGHT OPERATIONS — COMMANDER'S DISCRETION

(a) As general guidance when developing a commander's discretion policy, the operator should take into consideration the shared responsibility of management, flight and cabin crew in the case of unforeseen circumstances. The exercise of commander's discretion be considered exceptional and shall be avoided at home base and/or company hubs where standby or reserve crew members should be available. Operators should asses on a regular basis the series of pairings where commander's discretion has been exercised in order to be aware of possible inconsistencies in their rostering.

(b) The operator's policy on commander's discretion should state the safety objectives, especially in the case of an extended FDP or reduced rest and should take due consideration of additional factors that might decrease a crew member's alertness levels, such as:

(1) WOCL encroachment;

(2) weather conditions;

(3) complexity of the operation and/or airport environment;

(4) aeroplane malfunctions or specifications;

(5) flight with training or supervisory duties;

(6) increased number of sectors;

(7) circadian disruption; and

(8) individual conditions of affected crew members (time since awake, sleep-related factor, workload, etc.).

GM1 to ANTR OPS FTL 1.1205(f)(1)(i) Flight Duty Period (FDP)

COMMANDER'S DISCRETION

The maximum basic daily FDP that results after applying ANTR OPS FTL 1.1205(b) should be used to calculate the limits of commander's discretion, if commander's discretion is applied to an FDP which has been extended under the provisions of ANTR OPS FTL 1.1205(d).

AMC1 to ANTR OPS FTL 1.1210(c) Flight times and duty periods

POST-FLIGHT DUTIES

The operator should specify post-flight duty times taking into account the type of operation, the size and type of aircraft and the airport conditions.

GM1 to ANTR OPS FTL CS 1.1220(b) Split duty

POST, PRE-FLIGHT DUTY AND TRAVELLING TIMES

The operator should specify post and pre-flight duty and travelling times taking into account aircraft type, type of operation and airport conditions.

GM1 to ANTR OPS FTL CS 1.1225 Standby

MINIMUM REST AND STANDBY

(a) If airport or other standby initially assigned is reduced by the operator during standby that does not lead to an assignment to a flight duty period, the minimum rest requirements specified in ANTR OPS FTL 1.1235 should apply.

(b) If a minimum rest period as specified in ANTR OPS FTL 1.1235 is provided before reporting for the duty assigned during the standby, this time period should not count as standby duty.

(c) Standby other than airport standby counts (partly) as duty for the purpose of ANTR OPS FTL 1.1210 only. If a crew member receives an assignment during standby other than airport standby, the actual reporting time at the designated reporting point should be used for the purpose of ANTR OPS FTL 1.1235.

GM1 to ANTR OPS FTL CS 1.1225(b) Standby

STANDBY OTHER THAN AIRPORT STANDBY NOTIFICATION

Operator procedures for the notification of assigned duties during standby other than airport standby should avoid interference with sleeping patterns if possible.

GM1 to ANTR OPS FTL CS 1.1225(b)(2) Standby

AWAKE TIME

Scientific research shows that continuous awake in excess of 18 hours can reduce the alertness and should be avoided.

GM1 to ANTR OPS FTL CS 1.1230 Reserve

RESERVE NOTIFICATION

Operator procedures for the notification of assigned duties during reserve should avoid interference with sleeping patterns if possible.

GM2 to ANTR OPS FTL CS 1.1230 Reserve

NOTIFICATION IN ADVANCE

The minimum 'at least 10 hours' between the notification of an assignment for any duty and reporting for that duty during reserve may include the period of 8 hours during which a crew member on reserve is not contacted by the operator.

GM1 to ANTR OPS FTL 1.1230(a) Reserve

ROSTERING OF RESERVE

Including reserve in a roster, also referred to as ‘rostering’, implies that a reserve period that does not result in a duty period may not retrospectively be considered as part of a recurrent extended recovery rest period.

GM2 to ANTR OPS FTL CS 1.1230(c) Reserve

RECURRENT EXTENDED RECOVERY REST

ANTR OPS CS 1.1235(d) applies to a crew member on reserve.

GM1 to ANTR OPS FTL 1.1235(a)(2) Rest periods

MINIMUM REST PERIOD AT HOME BASE IF SUITABLE ACCOMMODATION IS PROVIDED

An operator may apply the minimum rest period away from home base during a rotation which includes a rest period at a crew member's home base. This applies only if the crew member does not rest at his/her residence, or temporary accommodation, because the operator provides suitable accommodation. This type of roster is known as "back-to-back operation".

AMC1 to ANTR OPS FTL 1.1235(b) Rest Periods

MINIMUM REST PERIOD AWAY FROM HOME BASE

The time allowed for physiological needs should be 1hour. Consequently, if the travelling time to the suitable accommodation is more than 30 minutes, the operator should increase the rest period by twice the amount of difference of travelling time above 30 minutes.

GM1 to ANTR OPS FTL CS 1.1235(b)(3) Rest periods

TIME ELAPSED SINCE REPORTING

The time elapsed since reporting for a rotation involving at least a 4-hour time difference to the reference time stops counting when the crew member returns to his/her home base for a rest period during which the operator is no longer responsible for the accommodation of the crew member.

GM2 to ANTR OPS FTL CS 1.1235(b)(3) Additional rest to compensate for time zone differences

REST AFTER ROTATIONS WITH THREE OR MORE FLIGHT DUTY PERIODS

For a rotation with three or more FDPs, the greatest time zone difference from the original reference time should be used to determine the minimum number of local nights of rest to compensate for time zone differences. If such a rotation includes time zones crossings in both directions, the calculation is based on the highest number of time zones crossed in any one FDP during the rotation.

AMC1 to ANTR OPS FTL 1.1240 Nutrition

(a) The operations manual should specify the minimum duration of the meal opportunity, when a meal opportunity is provided, in particular when the FDP encompasses the regular meal windows (e.g. if the FDP starts at 11:00 hours and ends at 22:00 hours meal opportunities for two meals should be given).

(b) It should define the time frames in which a regular meal should be consumed in order not to alter the human needs for nutrition without affecting the crew member's body rhythms.

AMC1 to ANTR OPS FTL 1.1250 Fatigue management training

TRAINING SYLLABUS FATIGUE MANAGEMENT TRAINING

The training syllabus should contain the following:

(a) applicable regulatory requirements for flight, duty and rest;

(b) the basics of fatigue including sleep fundamentals and the effects of disturbing the circadian rhythms;

(c) the causes of fatigue, including medical conditions that may lead to fatigue;

(d) the effect of fatigue on performance;

(e) fatigue countermeasures;

(f) the influence of lifestyle, including nutrition, exercise, and family life, on fatigue;

(g) familiarity with sleep disorders and their possible treatments;

(h) where applicable, the effects of long range operations and heavy short range schedules on individuals;

(i) the effect of operating through and within multiple time zones; and

(j) the crew member responsibility for ensuring adequate rest and fitness for flight duty.

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AC/AMC/IEM R — TRANSPORT OF DANGEROUS GOODS BY AIR

AC OPS (IEM) 1.1150(a)(5) & (a)(6)
Terminology - Dangerous Goods Accident and Dangerous Goods Incident
See ANTR OPS 1.1150(a)(5) & (a)(6)

As a dangerous goods accident (See ANTR OPS 1.1150(a)(5)) and dangerous goods incident (See ANTR OPS 1.1150(a)(6)) may also constitute an aircraft accident, serious incident or incident the criteria for the reporting both types of occurrence should be satisfied.

AC OPS 1.1160(a)
Medical Aid for a Patient
See ANTR OPS 1.1160(a)

1 Gas cylinders, medications, other medical material (such as sterilising wipes) and wet cell or lithium batteries are the dangerous goods which are normally provided for use in flight as medical aid for a patient. However, what is carried may depend on the needs of the patient. These dangerous goods are not those which are a part of the normal equipment of the aeroplane.

AC OPS (IEM) 1.1160(b)
Dangerous goods on an aeroplane in accordance with the relevant regulations or for operating reasons
See ANTR OPS 1.1160(b)

1 Dangerous goods required to be on board an aeroplane in accordance with the relevant ANTRs or for operating reasons are those which are for:

a. The airworthiness of the aeroplane;

b. The safe operation of the aeroplane; or

c. The health of passengers or crew.

2 Such dangerous goods include but are not limited to:

a. Batteries;

b. Fire extinguishers;

c. First-aid kits;

d. Insecticides/Air fresheners;

e. Life saving appliances; and

f. Portable oxygen supplies.

AC OPS (IEM) 1.1160(c)(1)
Scope – Dangerous goods carried by passengers or crew
See ANTR OPS 1.1160(c)(1)

1 The Technical Instructions exclude some dangerous goods from the requirements normally applicable to them when they are carried by passengers or crew members, subject to certain conditions.

2 For the convenience of operators who may not be familiar with the Technical Instructions, these requirements are repeated below.

3 The dangerous goods which each passenger or crew member can carry are:

a. Alcoholic beverages containing more than 24% but not exceeding 70% alcohol by volume, when in retail packagings not exceeding 5 litres and with a total not exceeding 5 litres per person;

b. Non-radioactive medicinal or toilet articles (including aerosols, hair sprays, perfumes, medicines containing alcohol); and, in checked baggage only, aerosols which are non-flammable, non-toxic and without subsidiary risk, when for sporting or home use. Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release. The net quantity of each single article should not exceed 0·5 litre or 0·5 kg and the total net quantity of all articles should not exceed 2 litres or 2 kg;

c. Safety matches or a lighter for the person’s own use and when carried on the person. ‘Strike anywhere’ matches, lighters containing unabsorbed liquid fuel (other than liquefied gas), lighter fuel and lighter refills are not permitted;

d. A hydrocarbon gas-powered hair curler, providing the safety cover is securely fitted over the heating element. Gas refills are not permitted;

e. Small cylinders of a gas of division 2.2 worn for the operation of mechanical limbs and spare cylinders of a similar size if required to ensure an adequate supply for the duration of the journey;

f. Radioisotopic cardiac pacemakers or other devices (including those powered by lithium batteries) implanted in a person, or radio-pharmaceuticals contained within the body of a person as a result of medical treatment;

g. A small medical or clinical thermometer containing mercury, for the person’s own use, when in its protective case;

h. Dry ice, when used to preserve perishable items, providing the quantity of dry ice does not exceed 2 kg and the package permits the release of the gas. Carriage may be in carry-on (cabin) or checked baggage, but when in checked baggage the operator’s agreement is required;

i. When carriage is allowed by the operator, small gaseous oxygen or air cylinders for medical use;

j. When carriage is allowed by the operator, not more than two small cylinders, or other suitable gas of division 2.2, fitted into a self-inflating life-jacket and not more than two spare cylinders;

k. When carriage is allowed by the operator, wheelchairs or other battery-powered mobility aids with non-spillable batteries, providing the equipment is carried as checked baggage. The battery should be securely attached to the equipment, be disconnected and the terminals insulated to prevent accidental short circuits;

l. When carriage is allowed by the operator, wheelchairs or other battery-powered mobility aids with spillable batteries, providing the equipment is carried as checked baggage. When the equipment can be loaded, stowed, secured and unloaded always in an upright position, the battery should be securely attached to the equipment, be disconnected and the terminals insulated to prevent accidental short circuits. When the equipment cannot be kept upright, the battery should be removed and carried in a strong, rigid packaging, which should be leak-tight and impervious to battery fluid. The battery in the packaging should be protected against accidental short circuits, be held upright and be surrounded by absorbent material in sufficient quantity to absorb the total liquid contents. The package containing the battery should have on it ‘Battery wet, with wheelchair’ or ‘Battery wet, with mobility aid’, bear a ‘Corrosives’ label and be marked to indicate its correct orientation. The package should be protected from upset by securement in the cargo compartment of the aeroplane. The commander should be informed of the location of a wheelchair or mobility aid with an installed battery or of a packed battery;

m. When carriage is allowed by the operator, cartridges for weapons, (UN0012 and UN0014 only) in Division 1.4S providing they are for that person’s own use, they are securely boxed and in quantities not exceeding 5 kg gross mass and they are in checked baggage. Cartridges with explosive or incendiary projectiles are not permitted. Allowances for more than one person must not be combined into one or more packages.;

NOTE: Division 1.4S is a classification assigned to an explosive. It refers to cartridges which are packed or designed so that any dangerous effects from the accidental functioning of one or more cartridges in a package are confined within the package unless it has been degraded by fire, when the dangerous effects are limited to the extent that they do not hinder fire fighting or other emergency response efforts in the immediate vicinity of the package. Cartridges for sporting use are likely to be within Division 1.4S.

n. When carriage is allowed by the operator, a mercurial barometer or mercurial thermometer in carry-on (cabin) baggage when in the possession of a representative of a government weather bureau or similar official agency. The barometer or thermometer should be packed in a strong packaging having inside a sealed inner liner or bag of strong leak-proof and puncture resistant material impervious to mercury closed in such a way as to prevent the escape of mercury from the package irrespective of its position. The commander should be informed when such a barometer or thermometer is to be carried;

o. When carriage is allowed by the operator, heat producing articles (i.e. battery operated equipment, such as under-water torches and soldering equipment, which if accidentally activated will generate extreme heat which can cause a fire), providing the articles are in carry-on (cabin) baggage. The heat producing component or energy source should be removed to prevent accidental functioning;

p. With the approval of the operator(s), one avalanche rescue backpack per person equipped with a pyrotechnic trigger mechanism containing not more than 200 mg net of division 1.4S and not more than 250 mg of compressed gas in division 2.2. The backpack must be packed in such a manner that it cannot be accidentally activated. The airbags within the backpack must be fitted with pressure relief valves;

q. Consumer electronic devices (watches, calculating machines, cameras, cellphones, lap top computers, camcorders, etc.) containing lithium or lithium ion cells or batteries when carried by passengers or crew for personal use. Spare batteries must be individually protected so as to prevent short circuits and carried in carry on baggage only. In addition, each spare battery must not exceed the following quantities:

- For lithium metal or lithium alloy batteries, lithium content of not more than 2 grams; or for lithium ion batteries, an aggregate equivalent lithium content of not more than 8 grams.

- Lithium ion batteries with an aggregate equivalent lithium content of more than 8 grams but not more than 25 grams may be carried in carry on baggage if they are individually protected so as to prevent short circuits and are limited to two spare batteries per person.

4. The list in the Technical Instructions of items permitted for carriage by passengers or crew may be revised periodically and OPS may not always reflect the current list. Consequently the latest version of the Technical Instructions should also be consulted.

AC OPS (IEM) 1.1165(b)
States concerned with exemptions
See ANTR OPS 1.1165(b)

1 The Technical Instructions provide that in certain circumstances dangerous goods, which are normally forbidden on an aeroplane, may be carried. These circumstances include cases of extreme urgency or when other forms of transport are inappropriate or when full compliance with the prescribed requirements is contrary to the public interest. In these circumstances all the States concerned may grant exemptions from the provisions of the Technical Instructions provided that every effort is made to achieve an overall level of safety which is equivalent to that provided by the Technical Instructions. Although exemptions are most likely to be granted for the carriage of dangerous goods which are not permitted in normal circumstances, they may also be granted in other circumstances, such as when the packaging to be used is not provided for by the appropriate packing method or the quantity in the packaging is greater than that permitted. The Instructions also make provision for some dangerous goods to be carried when an approval has been granted only by the State of Origin, providing specific conditions, which are laid down in the Technical Instructions, are met.

2 The States concerned are those of origin, transit, overflight and destination of the consignment and that of the operator. However, the Technical Instructions allow for the State of overflight to consider an application for exemption based solely on whether an equivalent level of safety has been achieved, if none of the other criteria for granting an exemption are relevant.

3 The Technical Instructions provide 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.

4 The exemption or approval referred to in ANTR OPS 1.1165(b) is in addition to the approval required by ANTR OPS 1.1155.

AC OPS 1.1215(c)(1)
Information to the Commander
See JAR-ANTR OPS 1.1215(c)(1)

If the volume of information provided to the commander is such that it would be impracticable to transmit it in the event of an in-flight emergency, a summary of the information should be provided to the commander by the operator, containing at least the quantities and class or division of the dangerous goods in each cargo compartment.

AC OPS (AMC) 1.1215(e)
Information in the Event of an Inflight Emergency
See ANTR OPS 1.1215(e)

1. To assist the ground services in preparing for the landing of an aeroplane in an emergency situation, it is essential that adequate and accurate information about any dangerous goods carried on board as cargo be given to the appropriate air traffic services unit. Wherever possible this information should include the proper shipping name and/or the UN/ID number, the class/division and for Class 1 the compatibility group, any identified subsidiary risks(s), the quantity and the location on board the aeroplane.

2. When it is not possible to include all the information, those parts thought most relevant in the circumstances should be given, such as the UN/ID numbers or classes/divisions and quantity or a summary of the quantities and class/division in each cargo compartment. As an alternative, a telephone number can be given from where a copy of the written information to the commander can be obtained during the flight.

3. It is accepted that due to the nature of the in-flight emergency, the situation may never permit the commander to inform the appropriate air traffic services unit of the dangerous goods carried as cargo on board the aeroplane.

AC OPS (AMC) 1.1220
Training
See ANTR OPS 1.1220

1 Application for Approval of Training Programmes

Applications for approval of training programmes should indicate how the training will be carried out. Training intended to give general information and guidance may be by any means including handouts, leaflets, circulars, slide presentations, videos, etc, and may take place on-the-job or off-the-job. 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. Applications for formal training courses should include the course objectives, the training programme syllabus/curricula and examples of the written examination to be undertaken.

2 Instructors. Instructors should have knowledge not only of training techniques but also of the transport of dangerous goods by air, in order that the subject be covered fully and questions adequately answered.

3 Aspects of training. The aspects of training specified in the Technical Instructions are applicable whether the training is for general information and guidance or to give an in-depth and detailed appreciation. The extent to which any aspect of training should be covered is dependent upon whether it is for general information or to give in-depth appreciation. Additional aspects not identified in the Technical Instructions may need to be covered, or some aspects omitted, depending on the responsibilities of the individual.

4 Levels of Training

a. Where it is intended to give an in-depth and a detailed appreciation of the whole subject or of the area(s) being covered, such that the person being trained gains in knowledge so as to be able to apply the detailed requirements of the Technical Instructions. This training should include establishing, by means of a written examination covering all the areas of the training programme, that a required minimum level of knowledge has been acquired; or

b. Where it is intended to give general information and guidance about the area(s) being covered, such that the person being trained receives an overall awareness of the subject. This training should include establishing by means of a written or oral examination covering all areas of the training programme, that a required minimum level of knowledge has been acquired.

5 How to Achieve Training

5.1 Training providing general information and guidance is intended to give a general appreciation of the requirements for the transport by air of dangerous goods. It may be achieved by means of handouts, leaflets, circulars, slide presentations, videos, etc, or a mixture of several of these means. The training does not need to be given by a formal training course and may take place ‘on-the-job’ or ‘off-the-job’.

5.2 Training providing in-depth guidance and a detailed appreciation of the whole subject or particular areas of it is intended to give a level of knowledge necessary for the application of the requirements for the transport by air of dangerous goods. It should be given by a formal training course which takes place at a time when the person is not undertaking normal duties. The course may be by means of tuition or as a self-study programme or a mixture of both of these. It should cover all the areas of dangerous goods relevant to the person receiving the training, although areas not likely to be relevant may be omitted (for instance, training in the transport of radioactive materials may be excluded where they will not be carried by the operator).

6 Training in Emergency Procedures.

a. Except for crew members whose emergency procedures training is covered in sub-paragraphs 6b or 6c (as applicable) below:

i. Dealing with damaged or leaking packages; and

ii. Other actions in the event of ground emergencies arising from dangerous goods;

b. For flight crew members:

i. Actions in the event of emergencies in flight occurring in the passenger cabin or in the cargo compartments; and

ii. The notification to Air Traffic Services should an in-flight emergency occur (See ANTR OPS 1.1215(e)).

c. 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.

7 Recurrent training should cover the areas relevant to initial Dangerous Goods training unless the responsibility of the individual has changed.

8 Test to verify understanding. It is necessary to have some means of establishing that a person has gained an understanding as a result of training; this is achieved by requiring the person to undertake a test. The complexity of the test, the manner of conducting it and the questions asked should be commensurate with the duties of the person being trained; and the test should demonstrate that the training has been adequate. If the test is completed satisfactorily a certificate should be issued confirming this.

AC OPS (AMC) 1.1225
Dangerous Goods Incident and Accident Reports
See ANTR OPS 1.1225

Use of a standard form for the reporting of dangerous goods incidents and accidents would assist the Authorities and enable them to establish quickly the essential details of an occurrence. The following form has been developed for such use and its correct and full completion means that all the details required by Appendix 1 to ANTR OPS 1.1225 would have been covered. It may be sent to the relevant Authorities by any appropriate means including fax, mail, electronic mail, etc.

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AC S – SECURITY

AC OPS 1.1240
Training programmes
See ANTR OPS 1.1240

Individual crew member knowledge and competence should be based on the relevant elements described in ICAO doc 9811, “Manual of the implementation of the Security provisions of Annex 6” and ECAC DOC 30 part “Training for Cockpit and Cabin crew”.

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