BELIZE DEPARTMENT OF CIVIL AVIATION

BELIZE
CIVIL AVIATION REGULATION

COMECIAL AIR TRANSPORTATION (AEROPLANES)

(BCAR-OPS 1)

SECTION 2

ACCEPTABLE MEANS OF COMPLIANCE AND Ii INTERPRETATIVE / EXPLANATORY MATERIAL (AMC & IEM)

SECTION 2 -ADVISORY CIRCULARS JOINT (ACJ)/ACCEPTABLE MEANS OF COMPLIANCE (AMC)/INTERPRETATIVE/EXPLANATORY MATERIAL (IEM)

ACJ/AMC/IEM N — FLIGHT CREW

SECTION 2 – ACCEPTABLE MEANS OF COMPLIANCE AND INTERPRETATIVE/ EXPLANATORY MATERIAL (AMC & IEM)

1 *GENERAL*

1.1 This Section contains Acceptable Means of Compliance and Interpretative/Explanatory Material that has been agreed for inclusion in BCAR–OPS 1.

1.2 Where a particular BCAR paragraph does not have an Acceptable Means of Compliance or any Interpretative/Explanatory Material, it is considered that no supplementary material is required.

2 *PRESENTATION*

2.1 The 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 and/or the Amendment number under which it is amended or reissued.

2.2 A numbering system has been used in which the Acceptable Means of Compliance or Interpretative/Explanatory Material uses the same number as the BCAR paragraph to which it refers. The number is introduced by the letters AMC or IEM to distinguish the material from the BCAR 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:

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 NPA procedure.

Interpretative/Explanatory Material (IEM) helps to illustrate the meaning of a requirement.

2.4 Any person who considers that there may be alternative AMCs or IEMs to those published should submit details to the BDCA for alternatives to be properly considered. Possible alternative AMCs or IEMs may not be used until published by the BDCA as AMCs, IEMs.

2.5 Explanatory Notes not forming part of the AMC or IEM text appear in a smaller typeface.

2.6 New, amended or corrected text is enclosed within heavy brackets.

AMC OPS 1.035
Quality System
See BCAR-OPS 1.035

1 Introduction

1.1 In order to show compliance with BCAR-OPS 1.035, an 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 an operator's Quality System have the following meanings:

i. Accountable Manager. The person acceptable to the BDCA who has corporate authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the BDCA, 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 BDCA, responsible for the management of the Quality System, monitoring function and requesting corrective actions.

2.2 Quality Policy

2.2.1 An operator should establish a formal written Quality Policy Statement that is a commitment by the Accountable Manager as to what the Quality System is intended to achieve. The Quality Policy should reflect the achievement and continued compliance with BCAR-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 organization. With regard to the text in BCAR 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 organization, who by virtue of his position has overall responsibility (including financial) for managing the organization .

2.2.3 The Accountable Manager will have overall responsibility for the AOC holders 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 BCAR-OPS 1, the Operations Manual, the Operator's Maintenance Management Exposition, and any other

standards specified by that operator, or the BDCA, 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 airplanes, as required by BCAR-OPS 1.035(a), may be carried out by more than one person by means of different, but complementary, Quality Assurance Programs.

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 BDCA, and any additional requirements defined by the operator, are being carried out under the supervision of the relevant Nominated Post holder.

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. Not be one of the nominated post holders; and
c. Have access to all parts of the operator's and, as necessary, any sub-contractor's organization.

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 post holders.

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 BCAR-OPS;
b. The operator's additional standards and operating procedures;
c. The operator's Quality Policy;
d. The operator's organizational 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 organization;
e. The allocation of duties and responsibilities;
f. Operational procedures to ensure regulatory compliance;
g. Accident Prevention and Flight Safety Programme;
h. The Quality Assurance Programme, reflecting;
   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 BCAR-OPS 1.035(b).)

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 Program, 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 An operator should decide, depending on the complexity of the operation, whether to make use of a dedicated audit team or a single auditor. In any event, the auditor or audit team should have relevant operational and/or maintenance experience.

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. An operator may, in addition to using the services of full-time dedicated personnel belonging to a separate quality department, undertake the monitoring of specific areas or activities by the use of part-time auditors. An operator whose structure and size does not justify the establishment of full-time auditors, may undertake the audit function by the use of part-time personnel from within his own organization or from an external source under the terms of an agreement acceptable to the BDCA. 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. Organization;
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 Programs 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 An operator should establish a schedule of audits to be completed during a specified calendar period. **All aspects of the operation should be reviewed within every period of 12 months** in accordance with the program unless an extension to the audit period is accepted by the CAA. An operator may increase the frequency of audits at his discretion but should not decrease the frequency without the agreement of the BDCA.

4.7.3 When an operator defines the audit schedule, significant changes to the management, organization, 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. Organizational 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 BDCA, 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 organization 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 an operator to analyze 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 dispatch);
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 Program.

5.1.3 The operator should ensure that the sub-contractor has the necessary authorization/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 authorization/approval, the operator is responsible for ensuring that the sub-contractor's quality assurance takes account of such additional requirements.

6 Quality System Training

6.1.1 An 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 an operator should consider whether to offer such courses to those likely to be involved in the management of Quality Systems. Operators with sufficient appropriately qualified staff should consider whether to carry out in-house training.

7 Organizations 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 tones 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 categorized 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 Program 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 organizations to perform the quality audits on behalf of the Quality Manager.

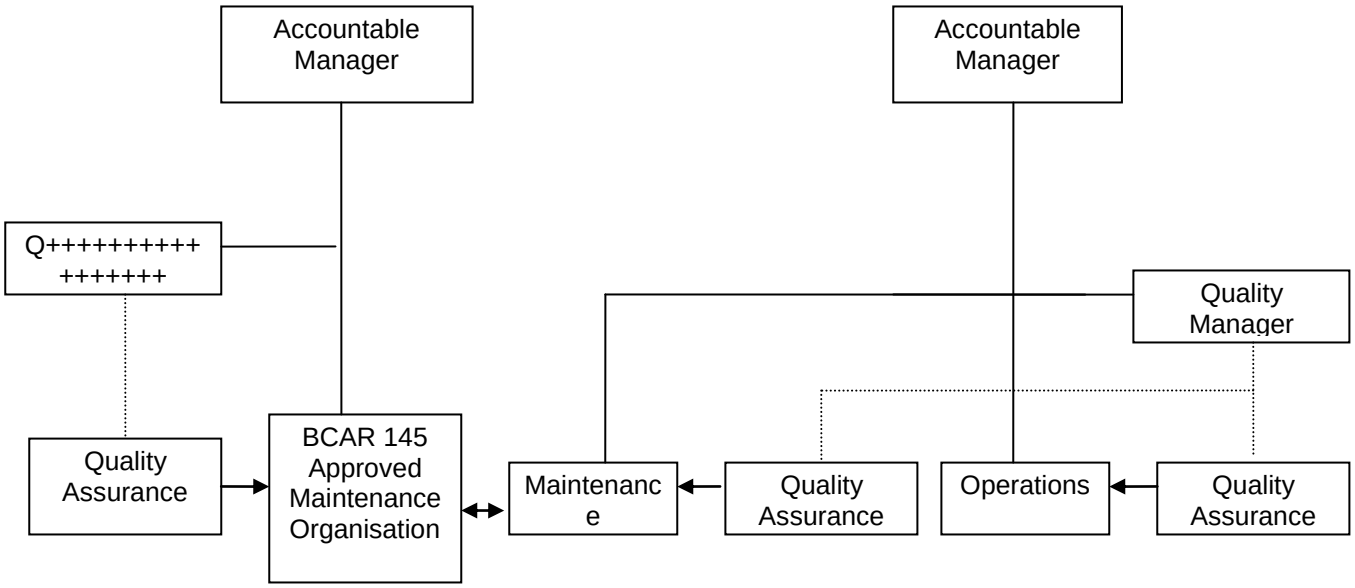
7.3.3 If the independent quality audit function is being conducted by external auditors, the audit schedule should be shown in the relevant documentation.

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.

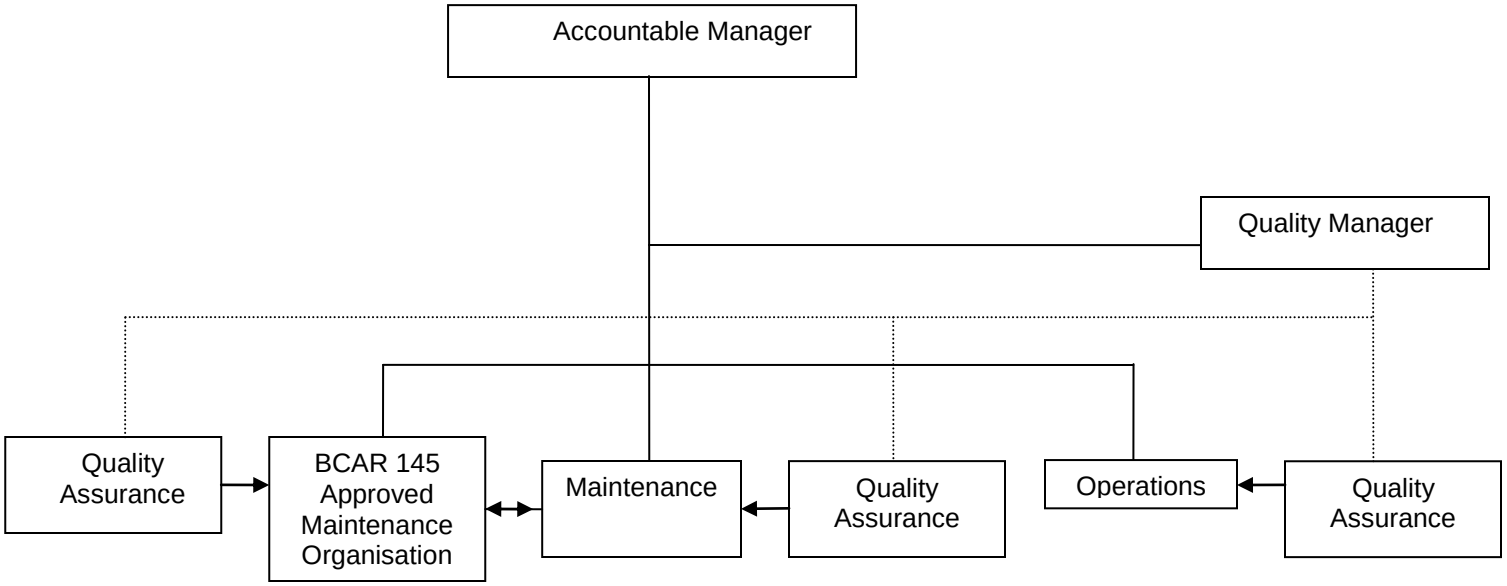
IEM OPS 1.035 Quality System – Organization examples See BCAR–OPS 1.035

The following diagrams illustrate two typical examples of Quality organizations

1 The quality system of an air operator that is also a BCAR 145 approved maintenance organisation



2 The quality system of an air operator that is not a BCAR 145 approved maintenance organisation



Note. - The Quality System and Quality Audit Programme of the AOC holder should assure that the maintenance carried out by the BCAR-145 approved maintenance organisation is in accordance with requirements specified by the AOC holder.

JAR-145 Approved Maintenance Organization AOC Holder Organization. (to be developed)

Note: The Quality System and Quality Audit Programme of the AOC holder should assure that the maintenance carried out by the BCAR-145 approved organization is in accordance with requirements specified by the AOC holder.

IEM OPS 1.037 Accident prevention and flight safety program (See BCAR-OPS 1.037)

1. Guidance material for the establishment of a safety programme can be found in:
a. ICAO Doc 9422 (Accident Prevention Manual); and
b. ICAO Doc 9376 (Preparation of an Operational Manual).
2. Where available, use may be made of analysis of flight data recorder information (See also BCAR-OPS 1.160(c).)

ACJ OPS 1.037(a) (2) Occurrence Reporting Scheme See BCAR-OPS 1.037(a) (2)

1. The overall objective of the scheme described in BCAR-OPS 1.037(a) (2) 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 organizations 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 BCAR-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.

ACJ OPS 1.038Flight Safety Document System
(See MRAC OPS 1.038)

The following ACJ is an acceptable means of compliance for the development of an operator's flight safety document system.

(a) Introduction

It is important that operational documents are coherent and compatible with the rules, manufacturer's requirements, and human factors principles. Likewise, it is necessary to ensure compatibility among departments and coherence during implementation. Therefore, a comprehensive scope, based on the idea of operational documents as a complete system is essential.

(b) Organisation

(1) The flight safety document system shall be organised following the criteria that ensures access to the information required for ground and flight operations. This information is included in the different operational documents part of the system and facilitates the management of the distribution and revision of the operational documentation.

(2) The information contained in the flight safety document system shall be gathered according to its importance and use in the following way:

a) Time critical information, e.g information that can hazard safety of operations if not available immediately;

b) Time sensitive information, e.g information that may affect the safety level or delay the operation if not available in a short term;

c) Frequently used information;

d) Reference information, e.g information needed from the operational point of view but that is not b) or c) and

e) Information gathered based on stage of the operations where it is used.

(3) Time critical information shall appear at the beginning of the flight safety document system.

(4) Time critical information, time sensitive information, and frequently used information shall be provided in cards and quick reference guides.

(c) Validation

The flight safety document system shall be rendered valid before being introduced. Critical aspects regarding the use of information shall be included in the validation process to verify its effectiveness. Interaction that can result between all groups during operations shall be also included in the validation process.

(d) Design

(1) The flight safety document system shall be coherent concerning terminology and use of terms standardised for common elements and actions.

(2) Operational documents shall include a glossary with terms, acronyms, and their standardised definitions. The glossary shall be updated periodically to ensure access to updated terminology. Important terms and acronyms that appear in the flight safety document system shall be defined.

(3) The flight safety document system shall ensure the standardisation of all types of documents, including style, terminology, use of charts and symbols, and their format. This implies a hrmonized establishment of concrete information and the use of a system of measurement and codes.

(4) The flight safety document system shall include a master index to find the information included in more than one operational document at the appropriate time.

Note: the master index shall appear at the beginning of each document and it shall have a maximum of three levels. Pages with information about abnormal or emergency procedures should be highlighted to have direct access to them.

(5) The flight safety document system shall satisfy the requirements of the operator's quality system.

(e) Implementation

The implementation progress of the flight safety document system shall be monitored to ensure the actual and appropriate use of the documents. This monitoring is also important to ensure that

the system takes into account the characteristics of the operational environment and is appropriate and useful for personnel in charge of the operations. Monitoring should include an official information exchange system to get the feedback from personnel in charge of the operations.

(f) Amendment

(1) It is necessary to develop a control system to collect, analyse, distribute, and review the information to process the data obtained from all sources related to the operation carried out such as State of the Operator, State of Design, State of Registry, manufactures, and equipment suppliers.

Note: It is necessary to ensure that the information on the operation of the aircrafts provided by the manufacturers satisfies the needs of the local authorities.

(2) A system to collect, analyse, and distribute the information to process the data resulting from changes during the implementation phase including changes:

a) due to installation of new equipment;
b) in response to operational experience;
c) in operator's policies and procedures;
d) in an operator's certification and
e) to keep the standardisation in the fleet.

Note: It is necessary to ensure that the flight crew coordination philosophy, policies, and procedures correspond to their duties.

(3) The flight safety document system shall be examined:
a) periodically (at least once a year);
b) after important events (merger, takeover, fast growing, cutback);
c) due to technological changes(introduction of new equipment) and
d) when safety rules are notified.

(4) Methods to disseminate new information shall be developed. Concrete methods should be used in response to the level of urgency of communication.

Note: Because frequent changes reduce the importance of new or modified procedures, it will be convenient to minimise changes to the flight safety document system.

(5) New information shall be analysed and validated taking into account the effect to all flight safety document systems.

(6) the method of communicating new information should be in accordance with a surveillance system in order to ensure that personell in charge of operations remain current. The surveillance system should include a procedure to ensure that the aforementioned persons have the most recent recurrent training.

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

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

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

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

IEM OPS 1.070 Carriage of sporting weapons See BCAR-OPS 1.070

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

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

3. In the absence of a specific definition, for the purpose of BCAR-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 munition of war, should be treated as a sporting weapon for the purposes of its carriage on an airplane.

5. Other procedures for the carriage of sporting weapons may need to be considered if the airplane 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 BCAR-OPS 1.070(b) (1) are applied, the commander should be notified accordingly.

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IEM OPS 1.175
The management organization of an AOC holder
See BCAR-OPS 1.175(g)-(o)

1 Function and Purpose

1.1 The safe conduct of air operations is achieved by an operator and a BDCA 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 BDCA 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 BCAR-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(c) (2)
Principal place of business
See BCAR-OPS 1.175(c) (2)

1. BCAR-OPS 1.175(c) (2) requires an operator to have his principal place of business located in the State responsible for issuing the AOC.

2. In order to ensure proper jurisdiction by that State 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.

ACJ OPS 1.175(i)
Nominated Postholders – Competence
See BCAR-OPS 1.175(i)

1. General.

Nominated Post holders should, in the normal way, be expected to satisfy the BDCA that they possess the appropriate experience and licensing requirements which are listed in paragraphs 2 to 6 below. In particular cases, and exceptionally, the BDCA 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 BDCA 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. BCAR-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 organization; 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 License according to BCAR-LPTA and appropriate to the type of operation conducted under the AOC in accordance with the following:

3.1 If the AOC includes airplanes certificated for a minimum crew of 2 pilots - An Airline Transport Pilot's License (ATPL) issued or validated by an AOC State issuer:

3.2 If the AOC is limited to airplanes certificated for a minimum crew of 1 pilot - A Commercial Pilot's License (CPL), and if appropriate to the operation, an Instrument Rating (IR) issued or validated by an AOC State issuer.

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 BDCA. '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 organization's Maintenance Management Exposition (MME).

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.

5.1 The nominated post holder or his deputy should have a valid certificate in one of the aircraft type under OAC.

5.2 The nominated Postholder should have a thorough knowledge of the AOC 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 holder's ground operations concept.

ACJ OPS 1.175(j)
Combination of nominated postholder's responsibilities
See BCAR-OPS 1.175(j)

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 organization 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 BCAR-OPS 1.175 is neither to prescribe any specific organizational hierarchy within the operator's organization nor to prevent a BCAA from requiring a certain hierarchy before it is satisfied that the management organization is suitable.

ACJ OPS 1.175(j) & (k)
Employment of staff
See BCAR-OPS 1.175(j) & (k)

In the context of BCAR-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.

ACJ OPS 1.175
Air operator certificate (AOC)

1. Purpose and scope

1.1 The AOC and its associated model-specific operations specifications shall contain the minimum information required in paragraphs 2 and 3 respectively, in a standardized format.

1.2 The air operator certificate and its associated operations specifications shall define the operations for which an operator is authorized.

2. AOC template

AIR OPERATOR CERTIFICATE		
(1)	**STATE OF THE OPERATOR (2)** **ISSUING AUTHORITY (3)**	(1)
AOC #: (4) Expiry date5 (5)	**OPERATOR NAME (6)** Dba trading name (7): Operator address8: Telephone9: Fax: E-mail:	**OPERATIONAL POINTS OF CONTACT (10)** Contact details, at which operational management can be contacted without undue delay, are listed in _____(11).
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 _____(13) .		
Date of issue (14):	Name and signature (15): Title:	

Notes.

1. For use of the State of the Operator.
2. Replace by the name of the State of the Operator.
3. Replace by the identification of the issuing authority of the State of the Operator.
4. Unique AOC number, as issued by the State of the Operator.
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 "doing business 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 without undue 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 may be applied on the AOC.

3. Operations specifications for each aircraft model

3.1 For each aircraft model in the operator's fleet, identified by aircraft make, model and series, the following list of authorizations, conditions and limitations shall be included: 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, special limitations and authorizations.

3.2 The operations specifications layout referred to in Appendix 1 BCAR- OPS 1.175 (c), shall be as follows:

OPERATIONS SPECIFICATIONS
(subject to the approved conditions in the operations manual)

ISSUING AUTHORITY CONTACT DETAILS (1)
Telephone: ; Fax: ; Email:

AOC# (2): _____ Operator name (3): _____ Date (4): _____Signature: _____

Dba trading name: _____

Aircraft model (5):
Types of operation: Commercial air transportation ☐ Passengers ☐ Cargo ☐ Other6: _____

Area(s) of operation (7):

Special limitations (8):

SPECIAL AUTHORIZATIONS	Yes	No	SPECIFIC APPROVALS (9)	
Dangerous goods	❑	❑		
Low visibility operations Approach and landing Take-off	❑ ❑	❑ ❑	CAT[1] ....(10) RVR: m DH: ft RVR: (11) m	
RVSM (12) ❑ N/A	❑	❑		
ETOPS (13) ❑ N/A	❑	❑	Maximum diversion time (14): _____ minutes	
Navigation specifications for PBN operations (15)	❑	❑		(16)
Continuing airworthiness			(17)	
Other (18)				

Notes.—

1. Telephone and fax contact details of the authority, including the country code. E-mail 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 Commercial Aviation Safety Team (CAST)/ICAO designation of the aircraft make, model and series, or master series, if a series has been designated (e.g. Boeing-737-3K2 or Boeing-777-232). The CAST/ICAO taxonomy is available at: http://www.intlaviationstandards.org/.
6. Other type 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).
8. List the applicable special limitations (e.g. VFR only, day only).
9. List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria).
10. Insert the applicable precision approach category (CAT I, II, IIIA, IIIB or IIIC). 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. One line per approval may be used if different approvals are granted.
12. "Not applicable (N/A)" box may be checked only if the aircraft maximum ceiling is below FL 290.
13. Extended range operations (ETOPS) currently applies only to twin-engined aircraft. Therefore the "Not applicable (N/A)" box may be checked if the aircraft model has more than 2 engines. Should the concept be extended to 3 or 4-engined aircraft in the future, the "Yes" or "No" checkbox will be required to be checked.
14. The threshold distance may also be listed (in NM), as well as the engine type.
15. Performance-based navigation (PBN): one line is used for each PBN specification authorization (e.g. RNAV 10, RNAV 1, RNP 4), with appropriate limitations or conditions listed in the "Specific Approvals" and/or "Remarks" columns.
16. Limitations, conditions and regulatory basis for operational approval associated with the performance-based navigation specifications (e.g. GNSS, DME/DME/IRU). Information on performance-based navigation, and guidance concerning the implementation and operational approval process, are contained in the Performance-based Navigation Manual (Doc 9613).
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. EC2042/2003, Part M, Subpart G).
18. Other authorizations or data can be entered here, using one line (or one multi-line block) per authorization (e.g. special approach authorization, MNPS, approved navigation performance).

IEM OPS 1.185(b)
Maintenance Management Exposition details
See BCAR-OPS 1.185(b)

1. The BCAR-145 organization's Maintenance Management Exposition should reflect the details of any sub-contract(s).

2. A change of airplane type or of the BCAR-145 approved maintenance organization may require the submission of an acceptable amendment to the BCAR-145 Maintenance Management Exposition.

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ACJ OPS 1.195
Operational Control
See BCAR-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. This does not imply a requirement for licensed flight dispatchers or a full flight watch system.

2. The organization 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.

MAC-OPS 1.195 (a)
Conversion training for flight dispatchers
(See BCAR-OPS 1.195)
(See Appendix 1 to BCAR-OPS 1.195)

As minimum, this course should contain the following:

(a) Operator conversion training
1. Flight operator duties and responsibility.

2. Training on the BDCAR related to their functions.

3. Training on those parts of the Operations Manual related to their functions.

4. AOC knowledge and the operations specifications. Type of operation authorized to the operator: VFR, IFR, Cat I/II/III, RVSM, MNPS, ETOPS, etc.

5. Use of the communications systems including characteristics and normal and emergency procedures.

6. Meteorology, including the different types of meteorological and previsions information; meteorological data interpretation including the use of current forecast meteorological charts of in order to distinguish altitudes, wind conditions.

7. Prevailing meteorological phenomena and different available meteorological source of information.

8. NOTAM system.

9. Navigation aims and associated publications.

10. Pilot-dispatcher shared responsibilities.

11. Characteristics of the airports used by the operator.

12. ATC and instrumental approach procedures.

13. CSM and DRM training.

(b) Aircraft conversion training.

1. A general aircraft description emphasizing on its operational and performance characteristics, navigation systems, equipment for instrumental approaches, communication systems, emergency equipment and procedures, contingency procedures.

2. Operational limitations.

3. Operational procedures.

4. Mass and balance calculations.

5. Dispatch basic performance. Requirements and procedures.

6. Flight planning including selected routes, flight time assessment and fuel requirements.

7. Emergency procedures.

8. MEL, CDL use.

(c) Conversion course minimum length.

1. Reciprocal propeller aircrafts: 30 hours.

2. Turbo-propeller aircrafts: 48 hours.

3. Turbojet aircrafts: 48 hours.

MAC-OPS 1.195 (c)
Recurrent training for flight dispatchers
(See Appendix 1 to BCAR-OPS 1.195)
(See BCAR-OPS 1.195)

(a) Recurrent training for flight dispatchers, at least, should include the following:

1. Necessary training on the conversion training items and updates.

2. CRM, DRM Recurrent training.

(b) Minimum training length
1. Reciprocal motor propeller aircraft: 8 hours

2. Turbo-propeller aircraft: 10 hours

3. Turbojet aircraft: 20 hours

AMC OPS 1.200
Organization and contents of an operations manual
See BCAR OPS 1.200

1. Organization

1.1 An operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with BCAR OPS 1.200 should be organized with the following structure:

a) General;

b) Aircraft operating information;

c) Areas, routes and aerodromes; and

d) Training.

1.2 An operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with BCAR OPS 1.200 shall be organized with the following structure:

a) General;

b) Aircraft operating information;

c) Areas, routes and aerodromes; and

d) Training.

2. Contents
The operations manual referred to in 1.1 and 1.2 shall contain at the least the following:

2.1 General

2.1.1 Instructions outlining the responsibilities of operations personnel pertaining to the conduct of flight operations.

2.1.2 Rules limiting the flight time and flight duty periods and providing for adequate rest periods for flight crew members and cabin crew as required by Sub part Q.

2.1.3 A list of the navigational equipment to be carried including any requirements relating to operations where performance- based navigation is prescribed.

2.1.4 Where relevant to the operations, the long-range navigation procedures, engine failure procedure for ETOPS and the nomination and utilization of diversion aerodromes.

2.1.5 The circumstances in which a radio listening watch is to be maintained.

2.1.6 The method for determining minimum flight altitudes.

2.1.7 The methods for determining aerodrome operating minima.

2.1.8 Safety precautions during refuelling with passengers on board.

2.1.9 Ground handling arrangements and procedures.

2.1.10 Procedures, as prescribed in BCAR ANS (Annex 12), for pilots-in-command observing an accident.

2.1.11 The flight crew for each type of operation including the designation of the succession of command.

2.1.12 Specific instructions for the computation of the quantities of fuel and oil to be carried, having regard to all circumstances of the operation including the possibility of loss of pressurization and the failure of one or more power-units while en route.

2.1.13 The conditions under which oxygen shall be used and the amount of oxygen determined in accordance with BCAR OPS 1.770 (a)(1), (b)(2)(iv).

2.1.14 Instructions for mass and balance control.

2.1.15 Instructions for the conduct and control of ground de-icing/anti-icing operations.

2.1.16 The specifications for the operational flight plan.

2.1.17 Standard operating procedures (SOP) for each phase of flight.

2.1.18 Instructions on the use of normal checklists and the timing of their use.

2.1.19 Departure contingency procedures.

2.1.20 Instructions on the maintenance of altitude awareness and the use of automated or flight crew altitude call-out.

2.1.21 Instructions on the use of autopilots and auto-throttles in IMC.

2.1.22 Instructions on the clarification and acceptance of ATC clearances, particularly where terrain clearance is involved.

2.1.23 Departure and approach briefings.

2.1.24 Procedures for familiarization with areas, routes and aerodromes.

2.1.25 Stabilized approach procedure.

2.1.26 Limitation on high rates of descent near the surface
.
2.1.27 Conditions required to commence or to continue an instrument approach.

2.1.28 Instructions for the conduct of precision and non-precision instrument approach procedures.

2.1.29 Allocation of flight crew duties and procedures for the management of crew workload during night and IMC instrument approach and landing operations.

2.1.30 Instructions and training requirements for the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system (GPWS).

2.1.31 Policy, instructions, procedures and training requirements for the avoidance of collisions and the use of the airborne collision avoidance system (ACAS).

2.1.32 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 Annex 2.

2.1.33 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.

2.1.34 Details of the accident prevention and flight safety programme provided in accordance with Chapter 3, 3.3, including a statement of safety policy and the responsibility of personnel.

2.1.35 Information and instructions on the carriage of dangerous goods, including action to be taken in the event of an emergency.

2.1.36 Security instructions and guidance.

2.1.37 The search procedure checklist provided in accordance with BCAR OPS 1.1250

2.2 Aircraft operating information

2.2.1 Certification limitations and operating limitations.

2.2.2 The normal, abnormal and emergency procedures to be used by the flight crew and the checklists relating thereto as required by BAR OPS 1.1050.

2.2.3 Operating instructions and information on climb performance with all engines operating, if provided in accordance with BCAR OPS 1.475(e).

2.2.4 Flight planning data for pre-flight and in-flight planning with different thrust/power and speed settings.

2.2.5 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.

2.2.6 Instructions and data for mass and balance calculations.

2.2.7 Instructions for aircraft loading and securing of load.

2.2.8 Aircraft systems, associated controls and instructions for their use, as required by BCAR OPS 1.1050.

2.2.9 The minimum equipment list and configuration deviation list for the aeroplane types operated and specific operations authorized, including any requirements relating to operations where performance-based navigation is prescribed.

2.2.10 Checklist of emergency and safety equipment and instructions for its use.

2.2.11 Emergency evacuation procedures, including type specific procedures, crew coordination, assignment of crew's emergency positions and the emergency duties assigned to each crew member.

2.2.12 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.

2.2.13 Survival and emergency equipment for different routes and the necessary procedures to verify its normal functioning before take-off, including procedures to determine the required amount of oxygen and the quantity available.

2.2.14 The ground-air visual signal code for use by survivors, as contained in Annex 12.

2.3 Routes and aerodromes

2.3.1 A route guide to ensure that the flight crew will have, for each flight, information relating to communication facilities, navigation aids, aerodromes, instrument approaches, instrument arrivals and instrument departures as applicable for the operation, and such other information as the operator may deem necessary for the proper conduct of flight operations.

2.3.2 The minimum flight altitudes for each route to be flown.

2.3.3 Aerodrome operating minima for each of the aerodromes that are likely to be used as aerodromes of intended landing or as alternate aerodromes.
2.3.4 The increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities.

2.3.5 The necessary information for compliance with all flight profiles required by regulations, including but not limited to, the determination of:

a) take-off runway length requirements for dry, wet and contaminated conditions, including those dictated by system failures which affect the take-off distance;

b) take-off climb limitations;

c) en-route climb limitations;

d) Approach climb limitations and landing climb limitations;

e) landing runway length requirements for dry, wet and contaminated conditions, including systems failures which affect the landing distance; and

f) Supplementary information, such as tire speed limitations.

2.4 Training

2.4.1 Details of the flight crew training programme, as required by BCAR OPS 1.941.

2.4.2 Details of the cabin crew duties training programme as required by BCAR OPS 1.1005 and Appendix1 BRAC OPS 1.1015(b)

2.4.3 Details of the flight operations officer/flight dispatcher training programme when employed in conjunction with a method of flight supervision in accordance with BCAR OPS 1.175.

AMC OPS 1.210(a)
Establishment of procedures
See BCAR-OPS 1.210(a)

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

2. An operator should specify procedures to be followed by cabin crew with respect to:
a. Arming and disarming of slides;
b. The operation of cabin lights, including emergency lighting;
c. The prevention and detection of cabin, oven and toilet fires;
d. Action to be taken when turbulence is encountered; and
e. Actions to be taken in the event of an emergency and/or an evacuation.

IEM OPS 1.210(b)
Establishment of procedures
See BCAR-OPS 1.210(b)

When an operator establishes procedures and a checklist system for use by cabin crew with respect to the aeroplane cabin, at least the following items should be taken into account: **See graphic 1.** (to be developed).

IEM OPS 1.210(c)
Critical phases of flight
See BCAR-OPS 1.210(c)

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. (See also BCAR-OPS 1.085(c) (8)).

IEM OPS 1.220
Authorization of aerodromes
See BCAR-OPS 1.220

1 When defining aerodromes for the type of aeroplane(s) and operation(s) concerned, an operator should take account of the following:

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.
a. For an ETOPS en-route alternate aerodrome, the following additional points should be considered:
i. The availability of an ATC facility; and
ii. The availability of at least one letdown aid (ground radar would so qualify) for an instrument approach.

IEM OPS 1.243
Operations in areas with specific navigation performance requirements
See BCAR-OPS 1.243

1 The requirements and procedures relating to areas in which minimum navigation performance specifications are prescribed, based on Regional Air Navigation Agreements, are covered (as indicated for the type of navigation performance specification) in the following documentation:
(a) MNPS - ICAO DOC 7030;
(b) RNP information and associated procedures - ICAO DOC 9613;
(c) EUROCONTROL Standards on Area Navigation to comply with RNP/RNAV.

2. The following explanatory material has been developed to explain the subject of Required Navigation Performance (RNP) more fully:
(a) Objective of RNP. The RNP concept will replace the conventional method of ensuring required navigation performance by requiring the carriage of specific navigation equipment by worldwide, uniform standards of navigation performance for defined airspace and/or flight procedures. It is therefore up to an operator to decide which system(s) he will utilize to meet the requirements. However, the operator must ensure that the system(s) used is certificated for operations in the airspace concerned.

(b) Navigational Accuracy. RNP is defined as a statement of the navigational accuracy required for operation within a defined area of airspace. Navigational accuracy is based upon a combination of navigation signal error, airborne sensor error, display error and flight technical error in the horizontal plane.
The level of accuracy is expressed as a single parameter and it defines the distance from aeroplane's intended position within which the aircraft must be maintained for at least 95% of the total flying time. As an example, RNP 4 means that all aircraft remain within 4nm of their intended positions for at least 95% of the total flying time.

(c) RNP Types for En-Route Operations. In order to consider the requirements for navigation performance for various areas of airspace and/or routes, RNP types have been defined for worldwide, uniform application in en-route operations as follows:
i. RNP 1 requires highly accurate position information and will be associated with high-density continental traffic. Full exploitation of the benefits of RNP 1 (in connection with area navigation (RNAV)) will require that a high percentage of aircraft achieve this level of navigation performance.
ii. RNP 4 will normally be applied in continental areas in which the route structure is presently based on VOR/DME.
iii. RNP 12.6 equates to the navigational performance required for the North Atlantic Region.

iv. RNP 20 describes the minimum capability considered acceptable for airspace and/or routes with low traffic volume (eg. other oceanic regions).
v. RNP 'xxx' (e.g. RNP 2, RNP 5, RNP 10 etc.) describes the minimum capability considered acceptable in accordance with procedures based upon Regional Air Navigation Agreements.

IEM OPS 1.245(a)
Maximum distance from an adequate aerodrome
for two-engined aeroplanes without ETOPS Approval
See BCAR-OPS 1.245

See graphic 4 (to be developed)

Notes:
1. MAPSC - Maximum Approved Passenger Seating Configuration
2. MTOM - Maximum Take-Off Mass

AMC OPS 1.245(a) (2)
Operation of non-ETOPS compliant twin turbojet aeroplanes between 120 and 180 minutes from an adequate aerodrome
See BCAR-OPS 1.245(a) (2)

1. As prescribed in BCAR-OPS 1.245(a) (2), an 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 45 360Kg beyond 120 minutes from an adequate aerodrome at the one engine inoperative cruise speed calculated in accordance with BCAR-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 an operator's experience related to such operations. An operator should ensure that the following items are addressed. Where necessary, information should be included in the Operations Manual and the Operator's Maintenance Management Exposition.

Note: Mention of "the aeroplane's design" in paragraph 1 above does not imply any additional Type Design Approval
requirements (beyond the applicable original Type Certification requirements) before the BCAA will permit operations
beyond the 120 minute threshold.

2 Systems capability - Aeroplanes should be certificated to BCAR-25 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 BCAR 25 and BCAR E or equivalents, concerning engine type certification, installation and system operation. In addition to the performance standards established by the BDCA at the time of engine certification, the engines should comply with all subsequent mandatory safety standards specified by the BDCA, 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 BCAR-25 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 BCAR 25 provisions (Subpart J-APU parts A and B, 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 CAA in the State of the operator.

b. These events should be evaluated by the operator in consultation with his CAA and with the engine and airframe manufacturers.

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. Maintenance: The operator's maintenance requirements should address the following:

a. Release to service - A pre-departure check, additional to the pre-flight inspection required by BCAR-OPS 1.890(a) (1) should be reflected in the Operator's Maintenance Management Exposition. These checks should be conducted and certified by an organisation appropriately approved/accepted in accordance with BCAR-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 programs - Such programs are intended to support engine condition trend monitoring (see below).

c. Engine condition trend monitoring program - A program 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. Flight Crew Training: Flight crew training for this type of operation should include, in addition to the requirements of BCAR 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 indicate fuel remaining). Confirm 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 program required, which should be approved by the BDCA, should cover all relevant maintenance actions with particular emphasis on checking required fluid levels.

6. MEL - The MEL should take into account all items specified by the manufacturer relevant to operations in accordance with this AMC.

7. Dispatch/Flight Planning Requirements: The operator's dispatch requirements should address the following:

a. Fuel and oil supply - An aeroplane should not be dispatched on an extended range flight unless it carries sufficient fuel and oil to comply with the applicable operational requirements and any additional reserves determined in accordance with sub-paragraphs (a)(i) (ii) and (iii) below.
(i) Critical fuel scenario - The critical point is the furthest point from an alternate aerodrome assuming a simultaneous failure of an engine and the pressurization 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) Ice protection - Additional fuel used when operating in icing conditions (e.g. operation of ice protection systems (engine/airframe as applicable)) and, when manufacturer's data is available, take account of ice accumulation on unprotected surfaces if icing conditions are likely to be encountered during a diversion;

(iii) APU operation - If an APU has to be used to provide additional electrical power, consideration should be given to the additional fuel required.

b. Communication facilities - The availability of communications facilities in order to allow reliable two way voice communications between the aeroplane and the appropriate air traffic control unit at one-engine inoperative cruise altitudes.

c. Aircraft Technical Log review to ensure proper MEL procedures, deferred items, and required maintenance checks completed.

d. En-route alternate aerodrome(s) - Ensuring that en-route alternate aerodromes are available for the intended route, within 180 minutes based upon the one-engine inoperative cruise speed

which is a speed within the certificated limits of the aeroplane, selected by the operator and approved by the BDCA, 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 BCAR-OPS 1.297). **See figure 3**. (to be developed).

IEM OPS 1.250
Establishment of Minimum Flight Altitudes
See BCAR-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, to be developed).

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, to be developed).

2.1.4 MOCA does not cover any overlapping of the corridor.

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) (to be developed)
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.

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: **See figure 9** (to be developed)

The resulting value is adjusted to the nearest 100 ft.

IEM OPS 1.260 Carriage of persons with Reduced Mobility
See BCAR-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 BCAR-OPS 1.270

1. In establishing procedures for the carriage of cargo in the passenger cabin of an aeroplane, an operator should observe the following:
a. That dangerous goods are not permitted (See also BCAR-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 BCAR-25.789 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.

ACJ OPS 1.280 Passenger Seating
See BCAR-OPS 1.280
See IEM OPS 1.280

1 An 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 BCDA that the correct seat allocation will, in due course, be made.

IEM OPS 1.280 Passenger Seating
See BCAR-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.

ACJ OPS 1.295 Location of an En Route Alternate Aerodrome
See BCAR-OPS 1.295

The en-route alternate (see AMC OPS 1.255 1.3 a. ii) should be located within a circle having a radius equal to 20% of the total flight plan distance, the centre of which lies on the planned route at a distance from the destination 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 example in Appendix 1 to ACJ OPS 1.295).

IEM OPS 1.295(c) (1) (ii) Separate runways
See BCAR-OPS 1.295(c) (1) (ii)

1. Runways on the same aerodrome are considered to be separate runways when:
i. They are separate landing surfaces which may overlay or cross such that if one of the runways is blocked, it will not prevent the planned type of operations on the other runway; and
ii. Each of the landing surfaces has a separate approach procedure based on a separate aid.

ACJ OPS 1.297(b) (2) Planning Minima for Alternate Aerodromes
See BCAR-OPS 1.297(b) (2)

'Non precision minima' in BCAR 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.

SECTION
AMC OPS 1.297 Application of aerodrome forecasts
See BCAR-OPS 1.297
See figure 10 (to be developed)

AMC OPS 1.300 Submission of ATS Flight plan
See BCAR-OPS 1.300

1. Flights without ATS flight plan. When unable to submit or to close the ATS flight plan due to lack of ATS facilities or any other means of communications to ATS, an operator should

establish procedures, instructions and a list of authorised persons to be responsible for alerting search and rescue services.

2. To ensure that each flight is located at all times, these instructions should:
a. Provide the authorised person with at least the information required to be included in a VFR Flight plan, and the location, date and estimated time for re-establishing communications;
b. If an aeroplane is overdue or missing, provide for notification to the appropriate ATS or Search and Rescue facility; and
c. Provide that the information will be retained at a designated place until the completion of the flight.

IEM OPS 1.305 Refuelling/Defuelling with passengers embarking, on board or disembarking. See BCAR–OPS 1.305

When re/defuelling with passengers on board, ground servicing activities and work inside the aeroplane, such as catering and cleaning, should be conducted in such a manner that they do not create a hazard and that the aisles and emergency doors are unobstructed.

IEM OPS 1.307 Refuelling/Defuelling with wide-cut fuel
See BCAR-OPS 1.307

1. 'Wide cut fuel' (designated JET B, JP-4 or AVTAG) is an aviation turbine fuel that falls between gasoline and kerosene in the distillation range and consequently, compared to kerosene (JET A or JET A1), it has the properties of higher volatility (vapour pressure), lower flash point and lower freezing point.

2. Wherever possible, an operator should avoid the use of wide-cut fuel types. If a situation arises such that only wide-cut fuels are available for refuelling/defuelling, operators should be aware that mixtures of wide-cut fuels and kerosene turbine fuels can result in the air/fuel mixture in the tank being in the combustible range at ambient temperatures. The extra precautions set out below are advisable to avoid arcing in the tank due to electrostatic discharge. The risk of this type of arcing can be minimised by the use of a static dissipation additive in the fuel. When this additive is present in the proportions stated in the fuel specification, the normal fuelling precautions set out below are considered adequate.

3. Wide-cut fuel is considered to be "involved" when it is being supplied or when it is already present in aircraft fuel tanks.

4. When wide-cut fuel has been used, this should be recorded in the Technical Log. The next two uplifts of fuel should be treated as though they too involved the use of wide-cut fuel.
5. When refuelling/defuelling with turbine fuels not containing a static dissipator, and where wide –cut fuels are involved, a substantial reduction on fuelling flow rate is advisable. Reduced flow rate, as recommended by fuel suppliers and/or aeroplane manufacturers, has the following benefits:
a. It allows more time for any static charge build-up in the fuelling equipment to dissipate before the fuel enters the tank;
b. It reduces any charge which may build up due to splashing; and
c. Until the fuel inlet point is immersed, it reduces misting in the tank and consequently the extension of the flammable range of the fuel.

6. The flow rate reduction necessary is dependent upon the fuelling equipment in use and the type of filtration employed on the aeroplane fuelling distribution system. It is difficult, therefore,

to quote precise flow rates. Reduction in flow rate is advisable whether pressure fuelling or over-wing 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.

IEM OPS 1.310(b) Cabin crew seating positions
See BCAR–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.

ACJ OPS 1.346 Flight in expected or actual icing conditions
See BCAR-OPS 1.346

1. The procedures to be established by an operator should take account of the design, the equipment or the configuration of the aeroplane and also of the training which is needed. For these reasons, different aeroplane types operated by the same company may require the development of different procedures. In every case, the relevant limitations are those which are defined in the Aeroplane Flight Manual (AFM) and other documents produced by the manufacturer.

2. For the required entries in the Operations Manual, the procedural principles which apply to flight in icing conditions are referred to under Appendix 1 to BCAR-OPS 1.1045, A 8.3.8 and should be crossreferenced, 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. BCAR-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.

AMC to Appendix 1 to BCAR-OPS 1.375(b) (2) Flight to an isolated aerodrome

When approaching the last possible point of diversion to an available en-route aerodrome, unless the fuel expected to remain overhead the isolated aerodrome is at least equal to the Additional Fuel calculated as being required for the flight, or unless two separate runways are available at the isolated aerodrome and the expected weather conditions at that aerodrome comply with those specified for planning in BCAR-OPS 1.297(b) (2), the commander should not proceed to the isolated aerodrome. In such circumstances, the commander should instead proceed to the en-route alternate unless according to information he has at that time, such a diversion appears inadvisable.

ACJ OPS 1.390(a) (1) Assessment of Cosmic Radiation
See BCAR-OPS 1.390(a) (1)

1. In order to show compliance with BCAR-OPS 1.390(a), an operator should assess the likely exposure for crew members so that he can determine whether or not action to comply with BCAR-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 BDCA:

Note: This table, published for illustration purposes, is based on the CARI-3 computer program; and may be superseded by updated versions, as approved by the Authority.
The uncertainty on these estimates is about ± 20%.A conservative conversion factor of 0.8 has been used to convert ambient dose equivalent to effective dose.

b. Doses from cosmic radiation vary greatly with altitude and also with latitude and with the phase of the solar cycle. Table 1 gives an estimate of the number of flying hours at various altitudes in which a dose of 1 mSv would be accumulated for flights at 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.

ACJ OPS 1.390(a) (2) Working Schedules and Record Keeping
See BCAR-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.

ACJ OPS 1.390(a) (3) Explanatory Information
See BCAR-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.

ACJ OPS 1.398 Use of Airborne Collision Avoidance System (ACAS)
See BCAR-OPS 1.398

1. The ACAS operational procedures and training programmes established by the operator should take into account Temporary Guidance Leaflet 11 "Guidance for Operators on Training Programmes for the Use of ACAS". This TGL incorporates advice contained in:
a. ICAO Annex 10 Volume 4;
b. ICAO Doc 8168 PANS OPS Volume 1;
c. ICAO Doc 4444 PANS BCAR Part X paragraph 3.1.2; and
d. ICAO guidance material “ACAS Performance - Based Training Objectives” (published under Attachment E to State letter AN 7/1.3.7.2-97/77.)

IEM OPS 1.400 Approach and Landing Conditions
See BCAR–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.

IEM OPS 1.405(a) Commencement and continuation of approach – Equivalent position
See BCAR–OPS 1.405(a)

The ‘equivalent position’ mentioned in BCAR–OPS 1.405 can be established by means of a DME distance, a suitably located NDB or VOR, SRE or PAR fix or any other suitable fix that independently establishes the position of the aeroplane.

AMC OPS 1.420(d) (4) Dangerous Goods Occurrence reporting
See BCAR-OPS 1.420(d) (4)

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 on board be given to the appropriate air traffic services unit. Wherever possible this information should include the proper shipping name and/or the UN/ID number, the class/division and for Class 1 the compatibility group, any identified subsidiary risk(s), the quantity and the location on board the aeroplane.

2. When it is not considered possible to include all the information, those parts thought most relevant in the circumstances, such as the UN/ID numbers or classes/divisions and quantity, should be given.

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 flameout 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 pressurization.

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.

Appendix 1 to [ACJ OPS 1.295 Fuel Policy: Location of a Fuel en-route alternate
See figure 12 (to be developed)

AMC OPS 1.430(b) (4) Effect on Landing Minima of temporarily failed or downgraded Ground Equipment

See BCAR-OPS 1.430(b) (4)

1. Introduction

1.1 This AMC provides operators with instructions for flight crews on the effects on landing minima of temporary failures or downgrading of ground equipment.

1.2 Aerodrome facilities are expected to be installed and maintained to the standards prescribed in ICAO Annexes 10 and 14. Any deficiencies are expected to be repaired without unnecessary delay.

2. General. These instructions are intended for use both pre-flight and in-flight. It is not expected however that the commander would consult such instructions after passing the outer marker or equivalent position. If failures of ground aids are announced at such a late stage, the approach could be continued at the commander's discretion. If, however, failures are announced before such a late stage in the approach, their effect on the approach should be considered as described in Tables 1A and 1B below, and the approach may have to be abandoned to allow this to happen.

3. Operations with no Decision Height (DH)

3.1 An operator should ensure that, for aeroplanes authorised to conduct no DH operations with the lowest RVR limitations, the following applies in addition to the content of Tables 1A and 1B, below:

i. RVR. At least one RVR value must be available at the aerodrome;
ii. Runway lights
  a. No runway edge lights, or no centre lights – Day – RVR 200 m; Night – Not allowed;
  b. No TDZ lights – No restrictions;
  c. No standby power to runway lights – Day – RVR 200 m; Night – not allowed.

4. Conditions applicable to Tables 1A & 1B

i. Multiple failures of runway lights other than indicated in Table 1B are not acceptable.
ii. Deficiencies of approach and runway lights are treated separately.
iii. Category II or III operations. A combination of deficiencies in runway lights and RVR assessment equipment is not allowed.
iv. Failures other than ILS affect RVR only and not DH.

See table 1 a and 1 b Failed or degraded equipments (to be developed)

IEM OPS 1.430

Documents containing information related to All Weather Operations
See BCAR-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 BCAR-OPS); and

k. BCAR-AWO (Airworthiness Certification).

IEM to Appendix 1 to BCAR-OPS 1.430 Aerodrome Operating Minima
See Appendix 1 to BCAR-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 BCAR-OPS 1.430, paragraphs (d) and (e)
Establishment of minimum RVR for Category II and III Operations
See Appendix 1 to BCAR-OPS 1.430, paragraphs (d) and (e)

1 General

1.1 When establishing minimum RVR for Category II and III Operations, operators should pay attention to the following information which originates in ECAC Doc 17 3rd Edition, Subpart A. It is retained as background information and, to some extent, for historical purposes although there may be some conflict with current practices.

1.2 Since the inception of precision approach and landing operations various methods have been devised for the calculation of aerodrome operating minima in terms of decision height and runway visual range. It is a comparatively straightforward matter to establish the decision height for an operation but establishing the minimum RVR to be associated with that decision height so as to provide a high probability that the required visual reference will be available at that decision height has been more of a problem.

1.3 The methods adopted by various States to resolve the DH/RVR relationship in respect of Category II and Category III operations have varied considerably. In one instance there has been a simple approach which entailed the application of empirical data based on actual operating experience in a particular environment. This has given satisfactory results for application within the environment for which it was developed. In another instance a more sophisticated method was employed which utilised a fairly complex computer programme to take account of a wide range of variables. However, in the latter case, it has been found that

with the improvement in the performance of visual aids, and the increased use of automatic equipment in the many different types of new aircraft, most of the variables cancel each other out and a simple tabulation can be constructed which is applicable to a wide range of aircraft. The basic principles which are observed in establishing the values in such a table are that the scale of visual reference required by a pilot at and below decision height depends on the task that he has to carry out, and that the degree to which his vision is obscured depends on the obscuring medium, the general rule in fog being that it becomes 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 prestated 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 goaround 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 BCAR-OPS 1.430, paragraph (e) (5) - Table 7
Crew actions in case of autopilot failure at or below decision height in fail-passive Category III operations.
See Appendix 1 to BCAR-OPS 1.430, paragraph (e) (5) Table 7

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 operator's policy.

Chart (to be developed)

IEM to Appendix 1 to BCAR-OPS 1.430, paragraph (f) Visual Manoeuvring (circling)
See Appendix 1 to BCAR-OPS 1.430, paragraph (f)

1. The purpose of this IEM is to provide operators with supplemental information regarding the application of aerodrome operating minima in relation to circling approaches.

2 Conduct of flight - General
2.1 For these procedures, the applicable visibility is the meteorological visibility (VIS).

2.2 The MDA/H and OCA/H minimums included in the procedure are related to aerodrome elevation.

3. Missed approach

3.1 If the decision to carry out a missed approach is taken when the aircraft is positioned on the approach axis (track) defined by radio-navigation aids, the published missed approach procedure must be followed. If visual reference is lost while circling to land from an instrument approach, the missed approach specified for that particular instrument approach must be followed. It is expected that the pilot will make an initial climbing turn toward the landing runway and overhead the aerodrome where he will establish the aeroplane in a climb on the missed approach track. Inasmuch as the circling manoeuvre may be accomplished in more than one direction, different patterns will be required to establish the aeroplane on the prescribed missed approach course depending on its position at the time visual reference is lost unless otherwise prescribed.

3.2 If the instrument approach procedure is carried out with the aid of an ILS, the Missed Approach Point (MAPt) associated with an ILS procedure without glide path (GP out procedure) should be taken in account.

4 Instrument approach followed by visual manoeuvring (circling) without prescribed tracks

4.1 Before visual reference is established, but not below MDA/H - The flight should follow the corresponding instrument approach procedure.

4.2 At the beginning of the level flight phase at or above the MDA/H - From the beginning of the level flight phase, the instrument approach track determined by radio navigation aids should be maintained until:

a. The pilot estimates that, in all probability, visual contact with the runway or runway environment will be maintained during the entire procedure;
b. The pilot estimates that his aircraft is within the circling area before commencing circling; and
c. The pilot is able to determine his aircraft's position in relation to the runway with the aid of the external references.

4.3 If the conditions in paragraph 4.2 above are not met by the MAPt, a missed approach must be
carried out in accordance with the instrument approach procedure.

4.4 After the aeroplane has left the track of the corresponding instrument approach procedure, the flight phase outbound from the runway should be limited to the distance which is required to align the aeroplane for the final approach. Flight manoeuvres should be conducted within the circling area and in such way that visual contact with the runway or runway environment is maintained at all times.

4.5 Flight manoeuvres should be carried out at an altitude/height which is not less than the circling minimum descent/altitude height (MDA/H).

4.6 Descent below MDA/H should not be initiated until the threshold of the runway to be used has been identified and the aeroplane is in a position to continue with a normal rate of descent and land within the touchdown zone.

5 Instrument approach followed by a visual manoeuvring (circling) with prescribed track

5.1 Before visual reference is established, but not below MDA/H - The flight should follow the corresponding instrument approach procedure.
5.2 The aeroplane should be established in level flight at or above the MDA/H and the instrument
approach track determined by the radio navigation aids maintained until visual contact can be achieved and maintained. At the divergence point, the aeroplane should leave the instrument approach track and the published routing and heights followed.

5.3 If the divergence point is reached before the necessary visual reference is acquired, a missed
approach procedure should be initiated not later than the MAPt and carried out in accordance with the instrument approach procedure.

5.4 The instrument approach track determined by radio navigation aids should only be left at the prescribed divergence point when only the published routing and heights should be followed.

5.5 Unless otherwise specified in the procedure, final descent should not be initiated until the threshold of the runway to be used has been identified and the aeroplane is in a position to continue with a normal rate of descent and land within the touchdown zone.

ACJ to Appendix 1 to BCAR-OPS 1.440
Operational Demonstrations
See Appendix 1 to BCAR-OPS 1.440

1. General

1.1 Demonstrations may be conducted in line operations or any other flight where the Operator's procedures are being used.

1.2 In unique situations where the completion of 100 successful landings could take an unreasonably long period of time due to factors such as a small number of aeroplanes in the fleet, limited opportunity to use runways having Category II/III procedures, or inability to obtain ATS sensitive area protection during good weather conditions, and equivalent reliability assurance can be achieved, a reduction in the required number of landings may be considered on a case-by-case basis. Reduction of the number of landings to be demonstrated requires a justification for the reduction, and prior approval from Authority. However, at the operator's option, demonstrations may be made on other runways and facilities. Sufficient information should be collected to determine the cause of any unsatisfactory performance (e.g. sensitive area was not protected).

1.3 If an operator has different variants of the same type of aeroplane utilising the same basic flight control and display systems, or different basic flight control and display systems on the

same type/classes of aeroplane, the operator should show that the various variants have satisfactory performance, but the operator need not conduct a full operational demonstration for each variant.

1.4 Not more than 30% of the demonstration flights should be made on the same runway.

2. Data Collection For Operational Demonstrations

2.1 Data should be collected whenever an approach and landing is attempted utilising the Category II/ III system, regardless of whether the approach is abandoned, unsatisfactory, or is concluded successfully.

2.2 The data should, as a minimum, include the following information:

a. Inability to initiate an Approach. Identify deficiencies related to airborne equipment which preclude initiation of a Category II/III approach.

b. Abandoned Approaches. Give the reasons and altitude above the runway at which approach was discontinued or the automatic landing system was disengaged.

c. Touchdown or Touchdown and Roll-out Performance. Describe whether or not the aircraft landed satisfactorily (within the desired touchdown area) with lateral velocity or cross track error which could be corrected by the pilot or automatic system so as to remain within the lateral confines of the runway without unusual pilot skill or technique. The approximate lateral and longitudinal position of the actual touchdown point in relation to the runway centreline and the runway threshold, respectively, should be indicated in the report. This report should also include any Category II/III system abnormalities which require manual intervention by the pilot to ensure a safe touchdown or touchdown and roll-out, as appropriate.

3. Data Analysis

3.1 Unsuccessful approaches due to the following factors may be excluded from the analysis:

a. ATS Factors. Examples include situations in which a flight is vectored too close to the final approach fix/point for adequate localiser and glide slope capture, lack of protection of ILS sensitive areas, or ATS requests the flight to discontinue the approach.

b. Faulty Navaid Signals. Navaid (e.g. ILS localiser) irregularities, such as those caused by other aircraft taxiing, over-flying the navaid (antenna).

c. Other Factors. Any other specific factors that could affect the success of Category II/ III operations that are clearly discernible to the flight crew should be reported.

IEM to Appendix 1 to BCAR-OPS 1.440, paragraph (b) Criteria for a successful CAT II/III approach and automatic landing
See Appendix 1 to BCAR-OPS 1.440, paragraph (b)

1. The purpose of this IEM is to provide operators with supplemental information regarding the criteria for a successful approach and landing to facilitate fulfilling the requirements prescribed in Appendix 1 to BCAR-OPS 1.440, paragraph (b).

2. An approach may be considered to be successful if:

2.1 From 500 feet to start of flare:
a. Speed is maintained as specified in ACJ-AWO 231, paragraph 2 'Speed Control'; and
b. No relevant system failure occurs; and

2.2 From 300 feet to DH:
a. No excess deviation occurs; and
b. No centralised warning gives a go-around command (if installed).

3. An automatic landing may be considered to be successful if:
a. No relevant system failure occurs;
b. No flare failure occurs;
c. No de-crab failure occurs (if installed);
d. Longitudinal touchdown is beyond a point on the runway 60 metres after the threshold and before the end of the touchdown zone lighting (900 metres from the threshold);
e. Lateral touchdown with the outboard landing gear is not outside the touchdown zone lighting edge;
f. Sink rate is not excessive;
g. Bank angle does not exceed a bank angle limit; and
h. No roll-out failure or deviation (if installed) occurs.

4. More details can be found in BCAR-AWO 131, BCAR-AWO 231 and ACJ-AWO 231.

IEM OPS 1.450(g) (1)
Low Visibility Operations - Training & Qualifications
See Appendix 1 to BCAR-OPS 1.450

The number of approaches referred to in 1.450(g) (1) includes one approach and landing that may be conducted in the aeroplane using approved Category II/III procedures. This approach and landing may be conducted in normal line operation or as a training flight. It is assumed that such flights will only be conducted by pilots qualified in accordance BCAR-OPS 1.940 and qualified for the particular category of operation.

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AMC OPS 1.475(b) Landing - Reverse Thrust Credit
See BCAR-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 recognized 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 BCAR-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 BCAR-OPS 1.515(a) (1) and BCAR-OPS 1.520, the landing mass of the aeroplane should be the lesser of:
a. The landing mass determined in accordance with BCAR-OPS 1.515(a)(1) or BCAR-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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IEM OPS 1.485(b)
General – Wet and Contaminated Runway data
See BCAR-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 BCAR-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 BCAR-25 AMJ 25X1591 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 BCAR-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 main wheels 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".
See figure 1 (to be developed)

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

See figure 2 (to be developed)

IEM OPS 1.495(a)
Take-off obstacle clearance
See BCAR-OPS 1.495(a)

1 In accordance with the definitions used in preparing the take-off distance and take-off flight path Data provided in the Aeroplane Flight Manual:

a. The net take-off flight path is considered to begin at a height of 35 ft above the runway or clearway at the end of the take-off distance determined for the aeroplane in accordance with sub-paragraph (b) below.

b. The take-off distance is the longest of the following distances:
i. 115% of the distance with all engines operating from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway; or

ii. The distance from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed (V1) for a dry runway; or

iii. If the runway is wet or contaminated, the distance from the start of the take-off to the point at which the aeroplane is 15 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed (V1) for a wet or contaminated runway.
BCAR-OPS 1.495(a) specifies that the net take-off flight path, determined from the data provided in the Aeroplane Flight Manual in accordance with sub-paragraphs 1(a) and 1(b) above, must clear all relevant obstacles by a vertical distance of 35 ft. When taking off on a wet or contaminated runway and an engine failure occurs at the point corresponding to the decision speed (V1) for a wet or contaminated runway, this implies that the aeroplane can initially be as much as 20 ft below the net take-off flight path in accordance with sub-paragraph 1 above and, therefore, may clear close-in obstacles by only 15 ft. When taking off on wet or contaminated runways, the operator should exercise special care with respect to obstacle assessment, especially if a take-off is obstacle limited and the obstacle density is high.

AMC OPS 1.495(c) (4)
Take-off obstacle clearance
See BCAR-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°	V2	1 x Aeroplane Flight Manual 15° gradient Loss
20°	V2 + 5kt	2 x Aeroplane Flight Manual 15° gradient Loss
25°	V2 + 10kt	3 x Aeroplane Flight Manual 15° gradient Loss

AMC OPS 1.495(d) (1) & (e) (1)
Required Navigational Accuracy
See BCAR-OPS 1.495(d) (1) & (e) (1)

1. Flight-deck systems. The obstacle accountability semi-widths of 300 m (see BCAR-OPS 1.495(d)(1)) and 600 m (see BCAR-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 BCAR-OPS 1.495(d)(1)) and 600 m (see BCAROPS 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, an operator should ensure that the weather conditions prevailing at the time of operation, including ceiling and visibility, are such that the obstacle and/or ground reference points can be seen and identified. The Operations Manual should specify, for the aerodrome(s) concerned, the minimum weather conditions which enable the flight crew to continuously determine and maintain the correct flight path with respect to ground reference points, so as to provide a safe clearance with respect to obstructions and terrain as follows:

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 BCAR-OPS 1.495(f)

If compliance with BCAR-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 BCAR-OPS 1.500

1. The high terrain or obstacle analysis required for showing compliance with BCAR-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 BCAR-OPS 1.500(c), one means of compliance is the use of MORA and, with BCAR-OPS 1.500(d), MEA provided that the aeroplane meets the navigational equipment standard assumed in the definition of MEA.

See figure 4 (to be developed)

IEM OPS 1.510(b) [and (c)]
Landing – Destination and Alternate Aerodromes
See BCAR-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 BCAR-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 BCAR-OPS 1.510 & 1.515

In showing compliance with BCAR-OPS 1.510 and BCAR-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 BCAR-OPS 1.515(c)

1. BCAR-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 BCAR-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 OPS 1.530(c) (4)
Take-Off Performance Correction Factors
See BCAR-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 BCAR-OPS 1.530(b).

SURFACE TYPE	CONDITION	FACTOR
Grass (on firm soil) up to 20 cm long	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 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 BCAR-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 BCAR-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 BDCA.

IEM OPS 1.535
Obstacle Clearance in Limited Visibility
See BCAR-OPS 1.535

1. The intent of the complementary requirements BCAR-OPS 1.535 and Appendix 1 to BCAR-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 BCAR-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 BCAR-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 BCAROPS 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 BCAR-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:

$$Y_{300} = \frac{0.57(Y_{ERC})}{1+(V_{ERC}^2 - V_2^2)/5647}$$

NOTE: The factor of 0.77 as required by BCAR-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:

$$Y_{200} = \frac{0.51(Y_{ERC})}{1+(V_{ERC}^2 - V_2^2)/3388}$$

NOTE: The factor of 0.77 as required by BCAR-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 BCAR-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 (to be developed) or calculated with the following formula:

$$Y_{300} = \frac{0.57(Y_{ERC})}{1+(V_{ERC}^2 - V_2^2)/5647}$$

NOTE: The factor of 0.77 as required by BCAR-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
Graphic (to be developed)

b. Assumed engine failure height 200 ft. The average all-engine gradient from 50 ft to 200 ft may be read from Figure 1b (to be developed) or calculated with the following formula:

$$Y_{200} = \frac{0.51(Y_{ERC})}{1+(V_{ERC}^2 - V_2^2)/3388}$$

NOTE: The factor of 0.77 as required by BCAR-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

Graphic (to be developed)

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. (To be developed)

IEM OPS 1.540
En-Route
See BCAR-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 BCAR-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 BCAR-OPS 1.542(a)

BCAR-OPS 1.542(a) requires an operator to ensure that in the event of an engine failure, the aeroplane should be capable of reaching a point from which a successful forced landing can be made. Unless otherwise specified by the BDCA, 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 BCAR-OPS 1.545 & 1.550

In showing compliance with BCAR-OPS 1.545 & BCAR-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 BCAR-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 BCAR-OPS 1.550(a).

TYPE OF SURFACE	FACTOR
Grass (on firm soil) of up to 20 cm in length	1.15

NOTE: The soil is firm when there are wheel impressions but no rutting

AMC OPS 1.550(b) (4)

Runway Slope
See BCAR-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 BDCA.

IEM OPS 1.550(c)
Landing – Dry Runway
See BCAR-OPS 1.550(c)

1. BCAR-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 BCAR-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 BCAR-OPS 1.555(a)

1. When landing on very short grass which is wet, and with 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.

AMC OPS 1.550 Additional requirements for approved operations by single-engine turbine-powered aeroplanes at night and/or in instrument meteorological conditions (imc)

Airworthiness and operational requirements provided in accordance with BCAR OPS 1.557, shall satisfy the following:

1. Turbine engine reliability

1.1 Turbine engine reliability shall be shown to have a power loss rate of less than 1 per 100 000 engine hours.
1.2 The operator shall be responsible for engine trend monitoring.

1.3 To minimize the probability of in-flight engine failure, the engine shall be equipped with:

a) an ignition system that activates automatically, or is capable of being operated manually, for take-off and landing, and during flight, in visible moisture;

b) 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

c) 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.

2. Systems and equipment
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

a) 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;

b) a radio altimeter;

c) an emergency electrical supply system of sufficient capacity and endurance, following loss of all generated power, to as a minimum:

1) 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;

2) lower the flaps and landing gear, if applicable;

3) provide power to one pitot heater, which must serve an air speed indicator clearly visible to the pilot;

4) provide for operation of the landing light specified in 2 j);

5) provide for one engine restart, if applicable; and

6) provide for the operation of the radio altimeter;

d) two attitude indicators, powered from independent sources;

e) a means to provide for at least one attempt at engine re-start;
f) airborne weather radar;

g) 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;

h) 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;

i) 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;

j) 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

k) an engine fire warning system.

3. Minimum equipment list

The BDCA shall require the minimum equipment list of an operator approved in accordance with BCAR OPS 1,557 to specify the operating equipment required for night and/or IMC operations, and for day/VMC operations.

4. Flight manual information
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.

5. Event reporting

5.1 An 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 BDCA who in turn will notify the State of Design.

5.2 BDCA shall 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 BDCA will notify major events or trends of particular concern to the appropriate Type Certificate Holder and the State of Design.

6. Operator planning

6.1 Operator route planning shall take account of all relevant information in the assessment of intended routes or areas of operations, including the following:

a) 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;

b) weather information, including seasonal and other adverse meteorological influences that may affect the flight; and

c) other criteria and limitations as specified by the BDCA.

6.2 An 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.

7. Flight crew experience, training and checking

7.1 The BDCA shall prescribe the minimum flight crew experience required for night/IMC operations by single-engine turbine-powered aeroplanes.

7.2 An operator's flight crew training and checking shall be appropriate to night and/or IMC operations by singleengine turbine-powered aeroplanes, covering normal, abnormal and emergency procedures and, in particular, engine failure, including descent to a forced landing in night and/or in IMC conditions.

8. Route limitations over water

The BDCA shall apply route limitation criteria for single-engine turbine-powered aeroplanes operating at night and/or in IMC on over water operations if beyond gliding distance from an area suitable for a safe forced landing/ditching having regard to the characteristics of the aeroplane, seasonal weather influences, including likely sea state and temperature, and the availability of search and rescue services.

9. Operator certification or validation

The operator shall demonstrate the ability to conduct operations by single-engine turbine-powered aeroplanes at night and/or in IMC through a certification and approval process specified by the BDCA.

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IEM OPS 1.565(d) (3)

Take-off
See BCAR-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 BCAR-OPS 1.565(d) (6)

Read attachment 1 (to be developed).

AMC OPS 1.565(d) (4)
Runway Slope
See BCAR-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 BDCA.

AMC OPS 1.570(d)
Take-off Flight Path
See BCAR-OPS 1.570(d)

See attachment 2 (to be developed)

AMC OPS 1.570(e) (1) & (f) (1)
Required navigational accuracy
See BCAR-OPS 1.570(e) (1) & (f) (1)

1 Flight-deck systems. The obstacle accountability semi-widths of 300 m (see BCAR-OPS 1.570(e)(1)) and 600 m (see BCAR-OPS 1.570(f)(1)) may be used if the navigation system under oneengine- 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 BCAR-OPS 1.570(e)(1)) and 600 m (see BCAR-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, an operator should ensure that the weather conditions prevailing at the time of operation, including ceiling and visibility, are such that the obstacle and/or ground reference points can be seen and identified. The Operations Manual should specify, for the aerodrome(s) concerned, the minimum weather conditions which enable the flight crew to continuously determine and maintain the correct flight path with respect to ground reference points, so as to provide a safe clearance with respect to obstructions and terrain as follows:

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 BCAR OPS 1.580

The high terrain or obstacle analysis required for showing compliance with BCAR-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, to be developed).

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AMC OPS 1.590 & 1.595

Landing – Destination and Alternate Aerodromes
Landing – Dry Runways
See BCAR-OPS 1.590 & 1.595

In showing compliance with BCAR-OPS 1.590 and BCAR-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 BCAR-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 BCAR-OPS 1.595(a).
See attachment 3. (To be developed.)

AMC OPS 1.595(b) (4)
Runway Slope
See BCAR-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 BCAR-OPS 1.595(c)

1 BCAR-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 BCAR-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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Fuel density
See BCAR-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

ACJ OPS 1.605
Mass values
See BCAR-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 BCAR-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-today handling of aeroplanes, its continued use in operational applications and publications is acceptable.

AMC to Appendix 1 to BCAR-OPS 1.605
Accuracy of weighing equipment
See Appendix 1 to BCAR-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 BCAR-OPS 1.605
Centre of gravity limits

See Appendix 1 to BCAR-OPS 1.605, sub-paragraph (d)

1 In the Certificate Limitations section of the Aeroplane Flight Manual, forward and aft centre of gravity (CG) limits are specified. These limits ensure that the certification stability and control criteria are met throughout the whole flight and allow the proper trim setting for take-off. An operator should ensure that these limits are observed by defining operational procedures or a CG envelope which compensates for deviations and errors as listed below:

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 BCAR-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 BCAR-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, ACSA/BDCA 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 BCAR-OPS 1.620(g)

1 Sample size (see also Appendix 1 to BCAR-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, ó = 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', ó' = 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. 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 x (see also equation in paragraph 3).

NOTE: The allowed relative confidence range specifies the accuracy to be achieved when estimating the true mean. For example, if it is proposed to estimate the true mean to within ± 1%, then e'_r will be 1 in the above formula.

1·96 = value from the Gaussian distribution for 95% significance level of the resulting confidence interval.

2 Calculation of average mass and standard deviation. If the sample of passengers weighed is drawn at random, then the arithmetic mean of the sample (x) is an unbiased estimate of the true average mass (μ) of the population.

2.1 Arithmetic mean of sample

$$\bar{x} = \frac{\sum_{j=1}^{n} x_j}{n}$$

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:

$$e_r = \frac{1.96 * s * 100}{\sqrt{n} * \bar{x}} (\%)$$

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:

$$\bar{x} \pm \frac{1.96 * s}{\sqrt{n}}$$

4. Example of determination of the required sample size and average passenger mass

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.

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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
$\sum_{j=1}^{86}$	6 071·6

$$\mu' = \bar{x} = \frac{\sum x_j}{n} = \frac{6071{\cdot}6}{86}$$

$$= 70{\cdot}6 \text{ kg}$$

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

$$\sigma' = \sqrt{\frac{\sum (x_j - \bar{x})^2}{n-1}}$$

$$\sigma' = \sqrt{\frac{34\,683{\cdot}40}{86-1}}$$

$$\sigma' = 20{\cdot}20 \text{ kg}$$

Step 3: required sample size.
The required number of passengers to be weighed should be such that the confidence range, e'r, does not exceed 1% as specified in paragraph 3.

$$n \geq \frac{(1.96 * \sigma' * 100)^2}{(e'_r * \mu)^2}$$

$$n \geq \frac{(1.96 * 20.20 * 100)^2}{(1 * 70.6)^2}$$

$$n \geq 3145$$

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 BCAR-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

$$\sum_{j=1}^{3180} xj = 231186.2kg$$

$$x = \frac{\sum xj}{n} = \frac{231186.2\,kg}{3180}$$

$$\bar{x} = 72.7kg$$

Step 2: calculation of the standard deviation.
For calculating the standard deviation the method shown in paragraph 4.2 step 2 should be applied.

$$s = \sqrt{\frac{\sum (xj - \bar{x})^2}{n-1}}$$

$$\sum (xj - x)^2 = 745145.20$$

$$s = 15.31kg$$

Step 3: calculation of the accuracy of the sample mean.

$$e_r = \frac{1.96 * s * 100}{\sqrt{n} * x}\%$$

$$e_r = \frac{1.96 * 15.31 * 100}{\sqrt{3180} * 72.7}\%$$

$$e_r = 0.73\%$$

Step 4: calculation of the confidence range of the sample mean.

$$\bar{x} \pm \frac{1.96 * s}{\sqrt{n}}$$

$$\bar{x} \pm \frac{1.96 * 15.31}{\sqrt{3180}}_{kg}$$

$$72.7 \pm 0.5kg$$

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 BCAR-OPS 1.620(h) & (i)

1. When standard mass values are used, BCAR-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 (eg. 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 BCAR-OPS 1.620(g)
Guidance on passenger weighing surveys
See Appendix 1 to BCAR-OPS 1.620(g), sub-paragraph (c) (4)

1 Operators seeking approval to use standard passenger masses differing from those prescribed in BCAR-OPS 1.620, Tables 1 and 2, on similar routes or networks may pool their weighing surveys provided that:

a. The BDCA has given prior approval for a joint survey;

b. The survey procedures and the subsequent statistical analysis meet the criteria of Appendix 1 to BCAR-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 BCAR-OPS 1.620(g)
Guidance on passenger weighing surveys
See Appendix 1 to BCAR-OPS 1.620(g)

1 This IEM summarises several elements of passenger weighing surveys and provides explanatory and interpretative information.

2 Information to the BDCA. An operator should advise the BDCA about the intent of the passenger weighing survey, explain the survey plan in general terms and obtain prior approval to proceed (BCAR–OPS 1.620(g) refers).

3 Detailed survey plan

3.1 An operator should establish and submit for approval to the BDCA 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 (BCAR–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 BCAR-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 BCAR-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 BCAR-OPS 1.620 Tables 1 and 2. As stated in Appendix 1 to BCAR-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 that 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 BCAR-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. An operator may, based on the data from his weighing programme, or by proving a different male/female ratio, apply for approval of a different ratio on specific routes or flights.

7 Weighing survey report

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 BCAR-OPS 1.625
Mass and balance documentation
See Appendix 1 to BCAR-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.

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IEM OPS 1.630
Instruments and Equipment - Approval and Installation
See BCAR-OPS 1.630

1 For Instruments and Equipment required by BCAR-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, have been demonstrated. Where a TSO does not exist, the applicable airworthiness standards apply unless otherwise prescribed in BCAR-OPS 1 or BCAR-26.

2 "Installed" means that the installation of Instruments and Equipment has been demonstrated to comply with the applicable airworthiness requirements of BCAR-23/BCAR-25, or the relevant code used for Type Certification, and any applicable requirement prescribed in BCAR-OPS 1.

3 Instruments and Equipment approved in accordance with design requirements and performance specifications other than TSOs, before the applicability dates prescribed in BCAR-OPS 1.001(b), are acceptable for use or installation on aeroplanes operated for the purpose of commercial air transportation provided that any relevant BCAR-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 BCAR-OPS 1 or BCAR-26.

AMC OPS 1.640
Lights to be displayed by aeroplanes

1. Terminology

When the following terms are used in this Appendix, they have the following meanings:

Angles of coverage.

a) Angle of coverage A is formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left respectively, looking aft along the longitudinal axis to a vertical plane passing through the longitudinal axis.

b) Angle of coverage F is formed by two intersecting vertical planes making angles of 110 degrees to the right and 110 degrees to the left respectively, looking forward along the longitudinal axis to a vertical plane passing through the longitudinal axis.

c) Angle of coverage L is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the left of the first, when looking forward along the longitudinal axis.

d) Angle of coverage R is formed by two intersecting vertical planes, one parallel to the longitudinal axis of the aeroplane, and the other 110 degrees to the right of the first, when looking forward along the longitudinal axis.

Horizontal plane. The plane containing the longitudinal axis and perpendicular to the plane of symmetry of the aeroplane.

Longitudinal axis of the aeroplane. A selected axis parallel to the direction of flight at a normal cruising speed, and passing through the centre of gravity of the aeroplane.

Making way. An aeroplane on the surface of the water is "making way" when it is under way and has a velocity relative to the water.

Under command. An aeroplane on the surface of the water is "under command" when it is able to execute manoeuvres as required by the International Regulations for Preventing Collisions at Sea for the purpose of avoiding other vessels.

Under way. An aeroplane on the surface of the water is "under way" when it is not aground or moored to the ground or to any fixed object on the land or in the water.

Vertical planes. Planes perpendicular to the horizontal plane.

Visible. Visible on a dark night with a clear atmosphere.

2. Navigation lights to be displayed in the air

As illustrated in Figure 1, the following unobstructed navigation lights shall be displayed:

a) a red light projected above and below the horizontal plane through angle of coverage L;

b) a green light projected above and below the horizontal plane through angle of coverage R;

c) a white light projected above and below the horizontal plane rearward through angle of coverage A.

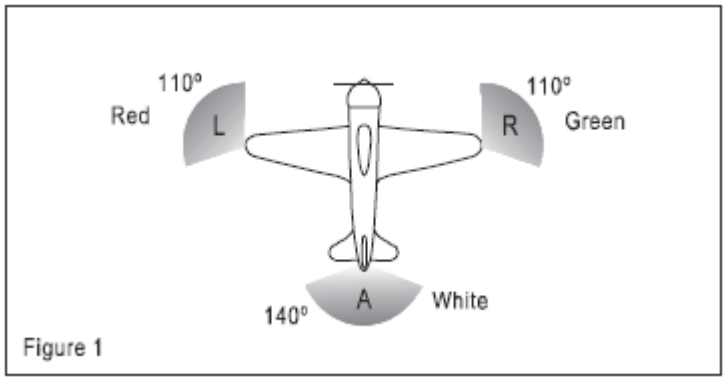


Figure 1

3. Lights to be displayed on the water

3.1 General
The International Regulations for Preventing Collisions at Sea require different lights to be displayed in each of the following circumstances:

a) when under way;

b) when towing another vessel or aeroplane;

c) when being towed;

d) when not under command and not making way;
e) when making way but not under command;

f) when at anchor;

g) when aground.

The lights required by aeroplanes in each case are described below.

3.2 When under way

As illustrated in Figure 2, the following appearing as steady unobstructed lights:

a) a red light projected above and below the horizontal through angle of coverage L;

b) a green light projected above and below the horizontal through angle of coverage R;

c) a white light projected above and below the horizontal through angle of coverage A; and

d) a white light projected through angle of coverage F
.
The lights described in 3.2 a), b) and c) should be visible at a distance of at least 3.7 km (2 NM).

The light described in 3.2

d) should be visible at a distance of 9.3 km (5 NM) when fitted to an aeroplane of 20 m or more in length or visible at a distance of 5.6 km (3 NM) when fitted to an aeroplane of less than 20 m in length.

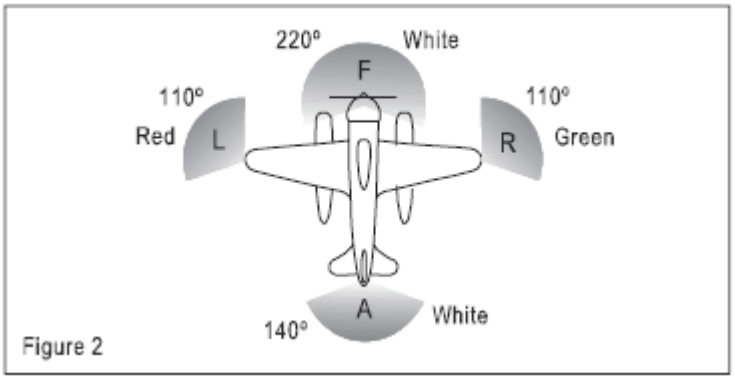


Figure 2

3.3 When towing another vessel or aeroplane

As illustrated in Figure 3, the following appearing as steady, unobstructed lights:

a) the lights described in 3.2;

b) a second light having the same characteristics as the light described in 3.2 d) and mounted in a vertical line at least 2 m above or below it; and
c) a yellow light having otherwise the same characteristics as the light described in 3.2 c) and mounted in a vertical line at least 2 m above it.

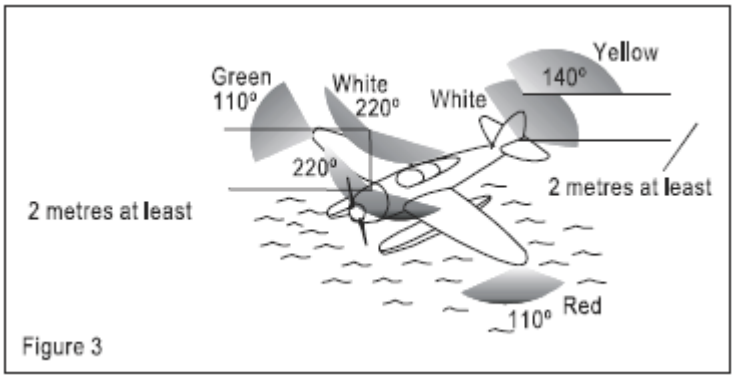


Figure 3

3.4 When being towed

The lights described in 3.2 a), b) and c) appearing as steady, unobstructed lights.
3.5 When not under command and not making way

As illustrated in Figure 4, two steady red lights placed where they can best be seen, one vertically over the other and not less than 1 m apart, and of such a character as to be visible all around the horizon at a distance of at least 3.7 km (2 NM).

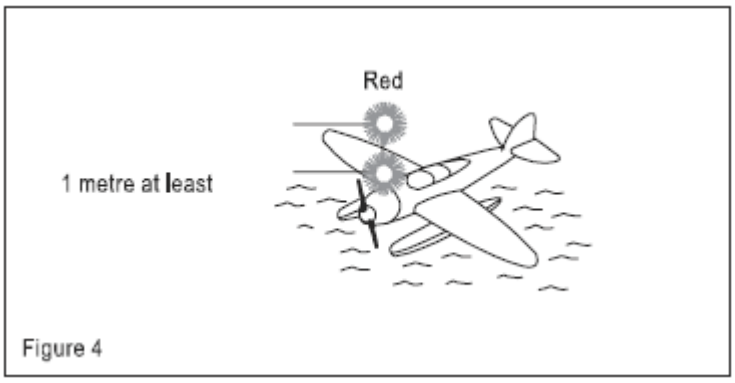


Figure 4

3.6 When making way but not under command

As illustrated in Figure 5, the lights described in 3.5 plus the lights described in 3.2 a), b) and c).

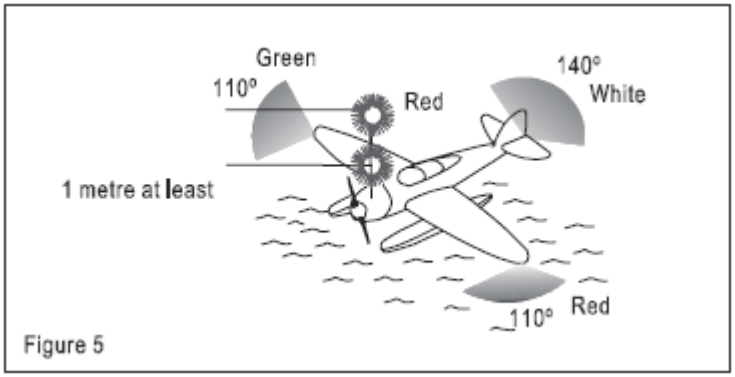


Figure 5

3.7 When at anchor

a) If less than 50 m in length, where it can best be seen, a steady white light (Figure 6), visible all around the horizon at a distance of at least 3.7 km (2 NM).

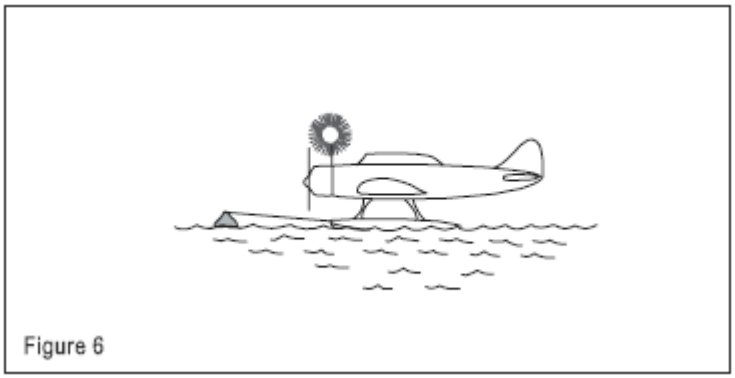
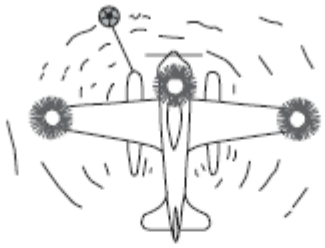


Figure 6

b) If 50 m or more in length, where they can best be seen, a steady white forward light and a steady white rear light (Figure 7) both visible all around the horizon at a distance of at least 5.6 km (3 NM).

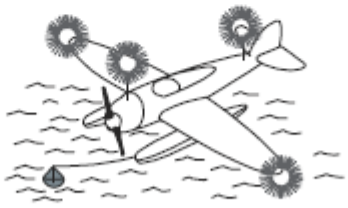
Figure 7

c) If 50 m or more in span a steady white light on each side
(Figures 8 and 9) to indicate the maximum span and visible, so far as practicable, all around the horizon at a distance of at least 1.9 km (1 NM).



Less than 50 metres in length; 50 metres or more in span

Figure 8



50 metres or more in length; 50 metres or more in span

Figure 9

3.8 When aground
The lights prescribed in 3.7 and in addition two steady red lights in vertical line, at least 1 m apart so placed as to be visible all around the horizon.

AMC OPS 1.650/1.652
Flight and Navigational Instruments and Associated Equipment
See BCAR-OPS 1.650/1.652

1 Individual requirement of these paragraphs may be met by combinations of instruments or by integrated flight systems or by a combination of parameters on electronic displays provided that the information so available to each required pilot is not less than that provided by the instruments and associated equipment as specified in this Subpart.

2 The equipment requirements of these paragraphs may be met by alternative means of compliance when equivalent safety of the installation has been shown during type certification approval of the aeroplane for the intended kind of operation.

IEM OPS 1.650/1.652
Flight and Navigational Instruments and Associated Equipment
See BCAR-OPS 1.650/1.652

See charts 1 y 2. (to be developed).

AMC OPS 1.650(i) & 1.652(i)
Flight and Navigational Instruments and Associated Equipment
See BCAR-OPS 1.650(i) & 1.652(i)

A means to indicate outside air temperature indicator may be an air temperature indicator which provides indications that are convertible to outside air temperature.

IEM OPS 1.650(p)/1.652(s)
Headset, boom microphone and associated equipment
See BCAR-OPS 1.650(p)/1.652(s)

A headset, as required by BCAR-OPS 1.650(p) and BCAR-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 BCAR-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 BCAR-OPS 1.668

The minimum performance level for ACAS II is contained in ICAO Annex 10, Volume IV, Chapter 4.

1. Compliance with BCAR-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 BDCA;

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 BDCA under arrangements acceptable to the BDCA.

AMC OPS 1.690(b) (6)
Crew member interphone system
See BCAR-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 BDCA.

IEM OPS 1.690(b) (7)
Crew member interphone system
See BCAR-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.

ACJ OPS 1.700
Cockpit Voice Recorders
See BCAR-OPS 1.700

The operational performance requirements for Cockpit Voice Recorders should be those laid down in EUROCAE Document ED56A (Minimum Operational Performance Requirements For Cockpit Voice Recorder Systems) December 1993.

ACJ OPS 1.705/1.710
Cockpit Voice Recorders
See BCAR-OPS 1.705/1.710

Account should be taken of the operational performance requirements for Cockpit Voice Recorders as laid down in EUROCAE Documents ED56 or ED56A (Minimum Operational Performance Requirements For Cockpit Voice Recorder Systems) dated February 1988 and December 1993 respectively.

ACJ OPS 1.700, 1.705 and 1.710
Cockpit Voice Recorders
See BCAR-OPS 1.705 and 1.710

See chart 3. (to be developed).

ACJ OPS 1.715
Flight Data Recorders
See BCAR-OPS 1.715

1 The operational performance requirements for Flight Data Recorders should be those laid down in EUROCAE Document ED55 (Minimum Operational Performance Specification for Flight Data Recorder Systems) dated May 1990.

2 The parameters to be recorded should meet, as far as practicable, the performance specifications (designated ranges, sampling intervals, accuracy limits and minimum resolution in read-out) defined in the relevant tables of EUROCAE Minimum Operational Performance Specification for Flight Data Recorder Systems, Document ED 55 dated May 1990. The remarks columns of those tables are acceptable means of compliance to the parameter specifications.

3 For aeroplanes with novel or unique design or operational characteristics, the additional parameters should be those required in accordance with BCAR 25.1459(e) during type or supplemental type certification or validation.

4 If recording capacity is available, as many of the additional parameters specified in table A1.5 of Document ED 55 dated May 1990 as possible should be recorded.

ACJ OPS 1.715(g)
Extensive Modifications of Aeroplane Systems
See BCAR-OPS 1.715(g)

The alleviation policy included in BCAR-OPS 1.715(g) affects a small number of aeroplanes first issued with a C of A on or after 1st April 1998 that were either constructed prior to this date or to a specification in force just prior to this date . These aeroplanes may not comply fully with BCAR-OPS 1.715, but are able to comply with BCAR-OPS 1.720. In granting such an alleviation, the BDCA should confirm that the above conditions have been met and that compliance with BCAR-OPS 1.715 would imply significant modifications to the aeroplane with a severe re-certification effort.

ACJ OPS 1.720[ ]/1.725
Flight Data Recorders
See BCAR-OPS 1.720/1.725
See Appendix 1 to ACJ OPS 1.720/1.725

1 The parameters to be recorded should meet the performance specifications (designated ranges, recording intervals and accuracy limits) defined in Table 1 of Appendix 1 to ACJ-OPS 1.720/1.725. Remarks in Table 1 of Appendix 1 to ACJ-OPS 1.720/1.725 are acceptable means of compliance to the parameters requirements.

2 Flight data recorder systems, for which the recorded parameters do not comply with the performance specifications of Table 1 of Appendix 1 to ACJ-OPS 1.720/1.725 (i.e. range, sampling intervals, accuracy limits and recommended resolution readout) may be acceptable to the BDCA.

3 For all aeroplanes, so far as practicable, when further recording capacity is available, the recording of the following additional parameters should be considered:

a. Remaining parameters in Table B of Appendix 1 to BCAR-OPS 1.720 or BCAR-OPS 1.725 as applicable;

b. Any dedicated parameter relating to novel or unique design or operational characteristics of the aeroplane;

c. operational information from electronic display systems, such as EFIS, ECAM or EICAS, with the following order of priority:

i) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and 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) warning and alerts;

iv) the identity of displayed pages from emergency procedures and checklists.

d. retardation information including brake application for use in the investigation of landing overruns or rejected take offs; and

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

4. For the purpose of BCAR-OPS 1.720(d), 1.720(e) and 1.725(c)(2), the alleviation should be acceptable only when adding the recording of missing parameters to the existing flight data recorder system would require a major upgrade of the system itself. Account should be taken of the following:

a. The extent of the modification required

b. The down-time period; and

c. Equipment software development.

5. For the purpose of BCAR-OPS 1.720(d), 1.720(e), 1.725(c) (2) and 1.725(c) (3) "capacity available" refers to the space on both Flight Data Acquisition Unit and the flight data recorder not allocated for recording the required parameters, or the parameters recorded for the purpose of BCAR OPS 1.037 (Accident prevention and flight safety programme) as acceptable to the BDCA.

6. For the purpose of BCAR-OPS 1.720(d)(1), 1.720(e)(1), 1.725(c)(2)(i) and 1.725(c)(3) a sensor is considered "readily available" when it is already available or can be easily incorporated.

ACJ OPS 1.715, 1.720 and 1.725
Flight Data Recorders
See BCAR-OPS 1.715, 1.720 and 1.725

See chart 4. Implemented by ACSA

ACJ OPS 1.727
Combination recorders
(See BCAR-OPS 1.727)

When two combination recorders are installed, one should be located near the cockpit, in order to minimize the risk of a data loss due to the failure of the wiring that gather data to the recorder. The other should be located at the rear of the aeroplane in order to minimise the risk of a data loss due to recorder damage in the case of a crash.

AMC OPS 1.745
First-Aid Kits
See BCAR-OPS 1.745

The following should be included in the First-Aid Kits:
Bandages (unspecified)
Burns dressings (unspecified)
Wound dressings, large and small
Adhesive tape, safety pins and scissors
Small adhesive dressings
Antiseptic wound cleaner
Adhesive wound closures
Adhesive tape
Disposable resuscitation aid
Simple analgesic e.g. paracetamol
Antiemetic e.g. cinnarizine
Nasal decongestant
First-Aid handbook
Splints, suitable for upper and lower limbs
Gastrointestinal Antacid +
Anti-diarrhoeal medication e.g. Loperamide +
Ground/Air visual signal code for use by survivors.
Disposable Gloves
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 1.755
First-aid medical supplies
See BCAR-OPS 1.755

TYPES, NUMBER, LOCATION AND CONTENTS OF MEDICAL SUPPLIES

1. Types

Two types of medical supplies should be provided: first-aid kit(s) for carriage in all aeroplanes and a medical kit for carriage where the aeroplane is authorized to carry more than 250 passengers.

2. Number of first-aid kits

The number of first-aid kits should be appropriate to the number of passengers which the aeroplane is authorized to carry:

Passenger	First-aid kits
0 – 50	1
51 – 150	2
151 – 250	3
More than 250	4

3. Location

3.1 It is essential that the required first-aid kits be distributed as evenly as practicable throughout the passenger cabin. They should be readily accessible to cabin crew, and, in view of the possible use of medical supplies outside the aeroplane in an emergency situation, they should be located near an exit.

3.2 The medical kit, when carried, should be stored in an appropriate secure location.

4. Contents

4.1 Different factors must be taken into consideration in deciding the contents of first-aid kits and medical kits. The following are typical contents of first-aid and medical kits for carriage aboard an aeroplane.

4.1.1 First-aid kit:

— a handbook on first aid
— ‘‘ground-air visual signal code for use by survivors’’
as contained in Annex 12
— materials for treating injuries
— ophthalmic ointment
— a decongestant nasal spray
— insect repellant
— emollient eye drops
— sunburn cream
— water-miscible antiseptic/skin cleanser
— materials for treatment of extensive burns
— oral drugs as follows: analgesic, antispasmodic, central nervous system stimulant, circulatory stimulant, coronary vasodilator, antidiarrhoeic and motion sickness medications
— an artificial plastic airway and splints.

4.1.2 Medical kit:

Equipment

— one pair of sterile surgical gloves
— sphygmomanometer
— stethoscope
— sterile scissors

— haemostatic forceps
— haemostatic bandages or tourniquet
— sterile equipment for suturing wounds
— disposable syringes and needles
— disposable scalpel handle and blade

Drugs

— coronary vasodilators
— analgesics
— diuretics
— anti-allergics
— steroids
— sedatives
— ergometrine
— where compatible with regulations of the appropriate authority, a narcotic drug in injectable form
— injectable broncho dilator.

IEM OPS 1.760
First-aid Oxygen
See BCAR-OPS 1.760

1 First–aid oxygen is intended for those passengers who, having been provided with the supplemental oxygen required under BCAR-OPS 1.770, still need to breathe undiluted oxygen when the amount of supplemental oxygen has been exhausted.
2 When calculating the amount of first-aid oxygen, an operator should take into account the fact that, following a cabin depressurisation, supplemental oxygen as calculated in accordance with Appendix 1 to BCAR-OPS 1.770 should be sufficient to cope with hypoxic problems for:

a. all passengers when the cabin altitude is above 15 000 ft; and

b. a proportion of the passengers carried when the cabin altitude is between 10 000 ft and 15 000 ft.

3 For the above reasons, the amount of first-aid oxygen should be calculated for the part of the flight after cabin depressurisation during which the cabin altitude is between 8 000 ft and 15 000 ft, when supplemental oxygen may no longer be available.

4 Moreover, following cabin depressurisation an emergency descent should be carried out to the lowest altitude compatible with the safety of the flight. In addition, in these circumstances, the aeroplane should land at the first available aerodrome at the earliest opportunity.

5 The conditions above should reduce the period of time during which the first-aid oxygen may be required and consequently should limit the amount of first-aid oxygen to be carried on board.

IEM OPS 1.770
Supplemental Oxygen – Pressurised Aeroplanes
See BCAR-OPS 1.770

1 A quick donning mask is the type of mask that:

a. Can be placed on the face from its ready position, properly secured, sealed, and supplying oxygen upon demand, with one hand and within 5 seconds and will thereafter remain in position, both hands being free;

b. Can be put on without disturbing eye glasses and without delaying the flight crew member from proceeding with assigned emergency duties;

c. After being put on, does not prevent immediate communication between the flight crew members and other crew members over the aeroplane intercommunication system;

d. Does not inhibit radio communications.

2 In determining the supplemental oxygen for the routes to be flown, it is assumed that the aeroplane will descend in accordance with the emergency procedures specified in the Operations Manual, without exceeding its operating limitations, to a flight altitude that will allow the flight to be completed safely (ie. flight altitudes ensuring adequate terrain clearance, navigational accuracy, hazardous weather avoidance etc.)

ACJ OPS 1.770(b) (2) (v)
Supplemental Oxygen - Pressurised Aeroplanes (Not certificated to fly above 25 000 ft)
See BCAR-OPS 1.770 (b) (2) (v)

1 With respect to BCAR-OPS 1.770(b)(2)(v) the maximum altitude up to which an aeroplane can operate, without a passenger oxygen system installed and capable of providing oxygen to each cabin occupant, should be established using an emergency descent profile which takes into account the following conditions:

a. 17 seconds time delay for pilot's recognition and reaction including mask donning, for trouble shooting and configuring the aeroplane for the emergency descent;

b. maximum operational speed (VMO) or the airspeed approved in the Aeroplane Flight Manual for emergency descent, whichever is the less;

c. all engines operative;

d. the estimated mass of the aeroplane at the top of climb.

1.1 Emergency descent data (charts) established by the aeroplane manufacturer and published in the Aeroplane Operating Manual and/or Aeroplane Flight Manual should be used to ensure uniform application of the rule.

2 On routes where the oxygen is necessary to be carried for 10% of the passengers for the flight time between 10 000ft and 13 000ft the oxygen may be provided either:

a. by a plug-in or drop-out oxygen system with sufficient outlets and dispensing units uniformly distributed throughout the cabin so as to provide oxygen to each passenger at his own discretion when seated on his assigned seat; or:

b. by portable bottles when a fully trained cabin crew member is carried on board of each such flight.

AMC OPS 1.790
Hand Fire Extinguishers
See BCAR-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 BCAR-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.

IEM OPS 1.820
Automatic Emergency Locator Transmitter
See BCAR-OPS 1.820

1 Types of automatic Emergency Locator Transmitters are defined as follows:

a. Automatic Fixed (ELT (AF)). This type of ELT is intended to be permanently attached to the aeroplane before and after a crash and is designed to aid SAR teams in locating a crash site;

b. Automatic Portable (ELT (AP)). This type of ELT is intended to be rigidly attached to the aeroplane before a crash, but readily removable from the aeroplane after a crash. It functions as an ELT during the crash sequence. If the ELT does not employ an integral antenna, the aircraft-mounted antenna may be disconnected and an auxiliary antenna (stored on the ELT case) attached to the ELT. The ELT can be tethered to a survivor or a life-raft. This type of ELT is intended to aid SAR teams in locating the crash site or survivor(s);

c. Automatic Deployable (ELT (AD)). This type of ELT is intended to be rigidly attached to the aeroplane before the crash and automatically ejected and deployed after the crash sensor has determined that a crash has occurred. This type of ELT should float in water and is intended to aid SAR teams in locating the crash site.

2 To minimise the possibility of damage in the event of crash impact, the Automatic Emergency Locator Transmitter should be rigidly fixed to the aeroplane structure as far aft as practicable with its antenna and connections so arranged as to maximise the probability of the signal being radiated after a crash.

IEM OPS 1.825
Life Jackets
See BCAR-OPS 1.825

For the purpose of BCAR-OPS 1.825, seat cushions are not considered to be flotation devices.

AMC OPS 1.830(b) (2)
Life-rafts and ELT for extended overwater flights
See BCAR-OPS 1.830(b)(2)

1 The following should be readily available with each life-raft:

a. Means for maintaining buoyancy;

b. A sea anchor:

c. Life-lines, and means of attaching one life-raft to another;

d. Paddles for life-rafts with a capacity of 6 or less;

e. Means of protecting the occupants from the elements;

f. A water resistant torch;

g. Signalling equipment to make the pyrotechnical distress signals described in ICAO Annex 2;

h. 100 g of glucose tablet for each 4, or fraction of 4, persons which the life-raft is designed to carry:

i. At least 2 litres of drinkable water provided in durable containers or means of making sea water drinkable or a combination of both; and

j. First-aid equipment.

2 As far as practicable, items listed above should be contained in a pack.

AMC OPS 1.830(c)
Survival Emergency Locator Transmitter (ELT(S))
See BCAR-OPS 1.830(c) and BCAR-OPS 1.835(c)

1 A survival ELT (ELT(S)) is intended to be removed from the aeroplane and activated by survivors of a crash. An ELT(S) should be stowed so as to facilitate its ready removal and use in an emergency. An ELT(S) may be activated manually or automatically (e.g. by water activation). It should be designed to be tethered to a liferaft or a survivor.

2 An automatic portable ELT, (ELT(AP)), as installed in accordance with BCAR-OPS 1.820, may be used to replace one ELT(S) provided that it meets the ELT(S) requirements**.** A water activated ELT(S) as described above is not an ELT (AP).

IEM OPS 1.835
Survival Equipment
See BCAR-OPS 1.835

1 The expression ‘Areas in which search and rescue would be especially difficult’ should be interpreted in the context of this BCAR 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 BCAR-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.

Appendix 1 to AMC OPS 1.720 (c)/1.725 (c)
See AMC OPS 1.720(c)/1.725 (c)

TABLE (1) – Parameters to be recorded

Serial Nº	Parameter	Range	Sampling interval in seconds	Accuracy limits (sensor input to FDR readout)	Recommended resolution in readout	Remarks
1	Time	24 hours	4	± 0.125% per hour	1 second	UTC time preferred where available, otherwise elapsed time
2	Pressure altitude	-1.000 ft to maximum certificated altitude + 5.000 pies	1	± 100 ft a ± 700 ft	5 ft	For altitude record error see BCAR JTSO C124 (presently in preparation)
3	Indicated airspeed	50 Kt to max V_{SO} Max Vso to 1.2 V_D	1	± 5% ± 3%	1 Kt	V_{SO} = stalling speed or minimum steady flight speed in the landing configuration. V_{DF} = Design diving speed.
4	Heading	360º	1	± 2º	0.5º	
5	Normal acceleration	- 3g a + 6g	± 0.125	0.125 ± 1% of maximum range excluding a datum error of ± 5%	0.004g	
6	Pitch altitude	± 75º	1	± 2º	0.5º	
7	Roll altitude	± 180º	1	± 2º	0.5º	
8	Manual radio transmission keying	Discrete	1	-	-	On-of (one discrete). An FDR/CVR time syncronisation signal complying with EUROCAE Document ED55 dated May 1990 paragraph 4.2.1 is an acceptable alternative jeans of
9	Power on each engine	Full range	Each engine Each second	± 2%	2% of full range	Sufficient parameter e.g. EPR/ N, or Torque/N_p as apropriate to the particular engine should be recorded to determine power

Serial Nº	Parameter	Range	Sampling interval in seconds	Accuracy limits (sensor input to FDR readout)	Recommended resolution in readout	Remarks
10	Training edge flan or cockpit control selection	Full range of each discrete position	2	± 5% or as pilot's indicator	0.5% of full range	
11	Leading edge flan or cockpit control selection	Full range of each discrete position	2		0.5% of full range	
12	Thrust reverser position	Stowed, in transit, and reverse	Each reverser each second	± 2%, unless higher accuracy uniquely required	-	For turbojet aeroplanes only
13	Ground spoiler and/or speed brake selection	Full range of each discrete position	1	± 2%	0.2% of full range	
14	Outside air temperature	Sensor range	2	-	0.3º	
15	Autopilot/authrottle/ AFCs mode and engagement status	A suitable combination of discrete	1	-	-	
16	Longitudinal acceleration	± 1g	.25	± 1.5% of maximum range excluding a datum error of ± 5%	.0004 g	
17	Lateral acceleration	± 1g	.25	± 1.5% of maximum range excluding a datum error of ± 5%	.0004 g	
18	Primary flight controls. Control surface positions and/or pilot input (pitch, roll, yaw)	Full range	1	± 2º unless higher accuracy uniquely required	± 2% of full range	- For aeroplanes with conventional control system 'or' applies For aeroplanes with non-mechanical control system 'and' applies For aeroplanes with split

Serial Nº	Parameter	Range	Sampling interval in seconds	Accuracy limits (sensor input to FDR readout)	Recommended resolution in readout	Remarks
						surfaces a suitable combination of inputs is acceptable in lieu of recording each surface separately.
19	Pitch trim position	Full range	1	± 3% unless higher accuracy uniquely required	0.3% of full range	
20	Radio altitude	-20 to +2500 ft	1	± 2 ft o ± 3% , whichever is greater below 500 ft, and ± 5% above 500 ft.	1 ft below 500 ft; 1 ft ± 5 % of full range above 500 ft.	As installed. Accuracy are recommended
21	Glide path deviation	Signal range	1	± 3%	0.3 % of full range	As installed. Accuracy limits are recommended
22	Localiser deviation	Signal range	1	± 3%	0.3% of full range	As installed. Accuracy limits are recommended
23	Marker beacon passage	Discrete	1	-	-	A single discrete is acceptable for all markers
24	Master Warning	Discrete	1	-	-	
25	NAV 1 and 2 frequency selection	Full range	4	As installed	-	Where practicable
26	DME 1 and 2 distance	0-200 nm	4	As installed	-	Where practicable. Recording of altitude and longitude from INS or other navigation system is a preferred alternative.
27	Landing gear squat switch status	Discrete positions	1	-	-	
28	Ground proximity warning system (GPWS)	Discrete	1	-	-	
29	Angle of attack	Margin total	0.5	As installed	0.3% of full range	
30	Hydraulics	Discrete (s)	2	-	-	
31	Navigation data	As installed	1	As installed	-	
32	Landing gear or gear selector position	Discrete	4	As installed	-	

TABLE B.- Additional information to be considered

(a) Operational information from electronic display systems, such as Electronic Flight Instruments Systems (EFIS), Electronic Centralised Aircraft Monitor (ECAM) and Engine Indications and Crew Alerting Systems (EICAS). Use the following order of priority:

1 Parameters selected by the flight crew relating to the desired flight path, e,g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

2 Display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY;

3 Warning and alerts;

4 The identity of displayed pages for emergency procedures and checklists.

(b) Retardation information including brake application for use in the investigation of landing over-runs and rejected take-off; and

(c) Additional engine parameter (EPR, N1 EGT, fuel flow, etc.).

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IEM OPS 1.845
Communication and Navigation Equipment - Approval and Installation
See BCAR-OPS 1.845

1 For Communication and Navigation Equipment required by BCAR-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, have been demonstrated. Where a TSO does not exist, the applicable airworthiness standards or equivalent apply unless otherwise prescribed in BCAR-OPS 1 or BCAR-26.

2 "Installed" means that the installation of Communication and Navigation Equipment has been demonstrated to comply with the applicable airworthiness requirements of BCAR-23/BCAR-25, or the relevant code used for Type Certification, and any applicable requirement prescribed in BCAR-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 BCAR-OPS 1.001(b), are acceptable for use or installation on aeroplanes operated for the purpose of commercial air transportation provided that any relevant BCAR-OPS requirement is complied with.

4 When a new version of a TSO (or of a specification other than a 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 BCAR-OPS 1 or BCAR-26.

AMC OPS 1.865
Combinations of Instruments and Integrated Flight Systems
See BCAR-OPS 1.865

Individual requirements of BCAR-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.

ACJ OPS 1.865(e)
FM Immunity Equipment Standards
See BCAR-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.

IEM OPS 1.870
Additional Navigation Equipment for operations in MNPS Airspace
See BCAR-OPS 1.870

1 A Long Range Navigation System may be one of the following:

a. One Inertial Navigation System (INS).

b. One Omega Navigation System (ONS).

c. One navigation system using inputs from one or more Inertial Reference Systems (IRS), or Omega Sensor Systems (OSS) or any other MNPS approved sensor system.

2 An integrated navigation system which offers equivalent functional availability, integrity and redundancy, when approved may, for the purpose of this requirement, be considered as two independent Long Range Navigation Systems.

AMC OPS 1.872
Altimetry system performance requirements for operations in RVSM airspace

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 – 0.013z2 for 0 # z # 25 when z is the magnitude of the mean TVE in metres, or 92 – 0.004z2 for 0 # z # 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.

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IEM OPS 1.875
Introduction
See BCAR-OPS 1.875

1. Reference to aeroplanes includes the components fitted to or intended to be fitted to the aeroplane.

2. The performance of de-icing and anti-icing activities does not require a BCAR 145 approval.

IEM OPS 1.885(a)
Application for and approval of the Operator's Maintenance
See BCAR-OPS 1.885(a)

1 The BDCA does not expect the documents listed in BCAR-OPS 1.185(b) to be submitted in a completed state with the initial application for grant or variation since each will require approval in its own right and may be subject to amendment as a result of BDCA assessment during the technical investigations. Draft documents should be submitted at the earliest opportunity so that investigation of the application can begin. Grant or variation cannot be achieved until the BDCA is in possession of completed documents.

2 This information is required to enable the BDCA to conduct its investigation into the application, to assess the volume of maintenance work necessary and the locations at which it will be accomplished.

3 The applicant should inform the BDCA where base and scheduled line maintenance is to take place and give details of any contracted maintenance which is in addition to that provided in response to BCAR-OPS 1.895(a) or (c).

4 At the time of application, the Operator should have arrangements for all base and scheduled line maintenance in place for an appropriate period of time, as acceptable to the BDCA. The operator should establish further arrangements in due course before the maintenance is due.
Base maintenance contracts for high-life time checks may be based on one time contracts, when the BDCA considers that this is compatible with the operator's fleet size.

IEM OPS 1.885(b)
Application for and approval of the Operator's Maintenance System
See BCAR-OPS 1.885(b)

1 The approval of an operator's maintenance system will be indicated by means of a statement containing the following information:

a. Air Operator Certificate number;

b. Name of the Operator;

c. Type(s) of aeroplane for which the maintenance system has been accepted;

d. Reference identification of the operator's approved aeroplane maintenance programme(s) related to (c) above;

e. Reference identification of the operators approved maintenance management exposition; and

f. Any limitations imposed by the BDCA on the grant or variation.

NOTE: Approval may be limited to specified aeroplanes, to specific locations or by other means like operational limitations if considered necessary by the BDCA in the interests of safe operation.

AMC OPS 1.890(a)
Maintenance Responsibility
See BCAR-OPS 1.890(a

1 The requirement means that the operator is responsible for determining what maintenance is required, when it has to be performed and by whom and to what standard, in order to ensure the continued airworthiness of the aircraft being operated.

2 An operator should therefore have adequate knowledge of the design status (type specification, customer options, AD's, modifications, operational equipment) and required and performed maintenance. Status of aeroplane design and maintenance should be adequately documented to support the performance of the quality system (See BCAR-OPS 1.900).

3 An operator should establish adequate co-ordination between flight operations and maintenance to ensure that both will receive all information on the condition of the aircraft necessary to enable both to perform their tasks.

4 The requirement does not mean that an operator himself performs the maintenance (this is to be done by a BCAR-145 Approved Maintenance Organisation (See BCAR-OPS 1.895) but that the operator carries the responsibility for the airworthy condition of aircraft it operates and thus should be satisfied before the intended flight that all required maintenance has been properly carried out.

5 When an operator is not appropriately approved in accordance with BCAR-145, the operator should provide a clear work order to the maintenance contractor. The fact that an operator has contracted a BCAR- 145 Approved Maintenance Organisation should not prevent him from checking at the maintenance facilities on any aspect of the contracted work if he wishes to do so to satisfy his responsibility for the airworthiness of the aircraft.

AMC OPS 1.890(a) (1)
Maintenance Responsibility
See BCAR-OPS 1.890(a) (1)

1 With regard to the pre-flight inspection it is intended to mean all of the actions necessary to ensure that the aeroplane is fit to make the intended flight. These should typically include but are not necessarily limited to:

a. A walk-around type inspection of the aeroplane and its emergency equipment for condition including, in particular, any obvious signs of wear, damage or leakage. In addition, the presence of all required emergency equipment should be established.

b. Inspection of the Technical Log to ensure that the intended flight is not adversely affected by any outstanding deferred defects and that no required maintenance action shown in the maintenance statement is overdue or will become due during the flight.

c. That consumable fluids, gases etc. uplifted prior to flight are of the correct specification, free from contamination, and correctly recorded.

d. That all doors are securely fastened.

e. Control surface and landing gear locks, pitot/static covers, restraint devices and engine/aperture blanks have been removed.

f. That all the aeroplane's external surfaces and engines are free from ice, snow, sand, dust etc.

2 Tasks such as oil and hydraulic fluid uplift and tyre inflation may be considered as part of the preflight inspection, if acceptable to the BDCA. The related pre-flight inspection instructions should address the procedures to determine where the necessary uplift or inflation results from an abnormal consumption and possibly requires additional maintenance action by the BCAR 145 approved/accepted Maintenance Organisation.

3 An operator should publish guidance to maintenance and flight personnel and any other personnel performing pre-flight inspection tasks, as appropriate, defining responsibilities for these actions and, where tasks are contracted to other organisations, how their accomplishment is subject to the quality system of BCAR - OPS 1.900. It should be demonstrated to the BDCA that preflight inspection personnel have received appropriate training for the relevant preflight inspections tasks. The training standard for personnel performing the preflight inspection should be described in the Operator's Maintenance Management Exposition.

IEM OPS 1 890(a) (1)
Maintenance Responsibility
See BCAR-OPS 1.890(a) (1)

The fact that the performance of pre flight inspections is an Operator's maintenance responsibility does not necessarily means that such personnel performing pre-flight inspection tasks report to the Nominated Postholder for Maintenance, but that the Nominated postholder for Maintenance is responsible for determining the content of the pre flight inspection and setting the qualification standard of the involved personnel. In addition, compliance with the qualification standard should be monitored by the Operator's Quality System.

AMC OPS 1.890(a) (2)
Maintenance Responsibility
See BCAR-OPS 1.890(a) (2)

The Operator should have a system to ensure that all defects affecting the safe operation of the aeroplane are rectified within the limits prescribed by the approved MEL or CDL as appropriate and that no postponement of such a defect rectification can be permitted unless with the Operator's agreement and in accordance with a procedure approved by the BDCA.

AMC OPS 1.890(a) (3)
Maintenance Responsibility
See BCAR - OPS 1.890(a) (3)

The Operator should have a system to ensure that all aeroplane maintenance checks are performed within the limits prescribed by the approved aeroplane maintenance programme and that, whenever a maintenance check cannot be performed within the required time limit, its postponement is allowed with the Operator's agreement and in accordance with a procedure approved by the BDCA.

AMC OPS 1.890(a) (4)
Maintenance Responsibility
See BCAR-OPS 1.890(a) (4)

An operator should have a system to analyse the effectiveness of the maintenance programme, with regard to spares, established defects, malfunctions and damage, and to amend the maintenance programme (this amendment will involve the approval of the BDCA unless the operator has been approved to amend the maintenance programme without direct involvement of the BDCA).

IEM OPS 1.890(a) (5)
Maintenance Responsibility
See BCAR - OPS 1.890(a) (5)

"Any other continued airworthiness requirement made mandatory by the BDCA" includes Type Certification related requirements such as: Certification Maintenance Requirements (CMR's), Life Limited Parts, Airworthiness Limitations, etc...

AMC OPS 1.890(a) (6)
Maintenance Responsibility
See BCAR-OPS 1.890(a) (6)

An operator should establish a policy, and work to that policy, to assess non-mandatory information related to the airworthiness of the aircraft, such as Service Bulletins, Service Letters

and other information on the aircraft and its components from the design organisation, the manufacturer or the related airworthiness authorities.

AMC OPS 1.895(a)
Maintenance Management
See BCAR-OPS 1.895(a)

1 The requirement is intended to provide for the possibility of the following three alternative options:

a. An operator to be approved in accordance with BCAR-145 to carry out all maintenance of the aeroplane and aeroplane components;

b. An operator to be approved in accordance with BCAR-145 to carry out some of the maintenance of the aeroplane and aeroplane components. This, at minimum, could be limited line maintenance but may be considerably more but still short of option (a);

c. An operator not approved in accordance with BCAR-145 to carry out any maintenance.

2 An operator or prospective operator may apply for any one of these options but it will be for the BDCA to determine which option may be accepted in each particular case.

2.1 To make this determination the BDCA will apply the primary criteria of relevant operator experience if carrying out some or all maintenance on comparable aeroplanes. Therefore where an operator applies for option (a) – all maintenance – the BDCA will need to be satisfied that the operator has sufficient experience of carrying out all maintenance on a comparable type. For example, assuming that the experience is judged satisfactory, then it is reasonable from the maintenance viewpoint to add a different wide bodied aircraft to an existing wide bodied fleet. If the experience is not satisfactory or too limited the BDCA may choose either to require more experienced management and/or more experienced release to service staff or may refuse to accept the new wide bodied aircraft if extra experienced staff cannot be found.
Option (b) or (c) may be possible alternatives.

2.2 Where an operator applies for option (b) – some maintenance or the BDCA has been unable to accept an application for option (a) – then satisfactory experience is again the key but in this case the satisfactory experience is related to the reduced maintenance of this option. If the experience is not satisfactory or too limited the BDCA may choose to require more experienced staff or may refuse to accept the application if such staff cannot be found. Option (c) may be the possible alternative. Option (c) accepts that the operator either does not have satisfactory experience or has only limited experience of some maintenance.

2.3 The BDCA will require an operator to enter into a contract with an appropriately approved BCAR- 145 organisation except that in some cases where the BDCA believes that it is possible to obtain sufficient satisfactorily experienced staff to provide the minimal maintenance support for option (b), in which case option (b) would apply.

2.4 In respect of this paragraph, 'experience' means staff who have proven evidence that they were directly involved with at least line maintenance of similar aircraft types for not less than 12 months. Such experience should be demonstrated to be satisfactory. An operator is required to have enough personnel meeting the requirement of BCAR-OPS 1.895(b) to manage the maintenance responsibility whichever option is used.

AMC OPS 1.895(b)
Maintenance Management
See BCAR-OPS 1.895(b)

1 The person or group of persons employed should represent the maintenance management structure of the operator (for maintenance) and be responsible for all maintenance functions. Dependent on the size of the operation and the organisational set-up, the maintenance functions may be divided under individual managers or combined in nearly any number of ways. This includes combining the functions of 'accountable manager' (see BCAR-OPS 1.175(h)), the 'nominated postholder' (see BCAR-OPS 1.175(i)) and the quality monitoring function (see BCAR-OPS 1.900) so long as the quality monitoring function remains independent of the functions to be monitored. In the smallest organisation this may lead to the quality monitoring function being performed by the accountable manager if suitably qualified. Consequently the smallest organization consists of at least two persons except that the BDCA may agree to the quality monitoring function being sub-contracted to another operator's quality monitoring department or a suitably qualified independent person acceptable to the BDCA.

2 The actual number of persons to be employed and their necessary qualifications is dependent upon the tasks to be performed and thus dependent on the size and complexity of the operation (route network, line or charter, ETOPS, number of aircraft and the aircraft types, complexity of the aircraft and their age), number and locations of maintenance facilities and the amount and complexity of maintenance contracting. Consequently, the number of persons needed, and their qualifications, may differ greatly from one operator to another and a simple formula covering the whole range of possibilities is not feasible.

3 To enable the BDCA to accept the number of persons and their qualifications, an operator should make an analysis of the tasks to be performed, the way in which he intends to divide and/or combine these tasks, indicate how he intends to assign responsibilities and establish the number of man/hours and the qualifications needed to perform the tasks. With significant changes in the aspects relevant to the number and qualifications of persons needed, this analysis should be updated.

4 The authority does not necessarily expect that the credential of each person of the Maintenance Management Group of Persons are individually submitted to the BDCA for their acceptance. However, the Manager of the Maintenance Management Group of Persons, and any manager reporting directly to him should be individually acceptable to the BDCA**.**

AMC OPS 1.895(c)
Maintenance Management
See BCAR - OPS 1.895(c)
The BDCA should only accept that the proposed person be employed by the BCAR-145 Organisation when it is manifest that he/she is the only available competent person in a position to exercise this function, within a practical working distance from the Operator's offices.

IEM OPS 1.895(c)
Maintenance Management
See BCAR-OPS 1.895(c)

This paragraph only applies to contracted maintenance and therefore does not affect situations where the BCAR 145 approved/accepted Organisation and the Operator are the same organisation.

AMC OPS 1.895(d)
Maintenance Management
See BCAR-OPS 1.895(d)

1 Where an operator is not approved to BCAR-145 or an operator's maintenance organisation is an independent organisation, a contract should be agreed between the operator and the BCAR-145 Approved Maintenance Organisation that specifies, in detail, the work to be performed by the BCAR-145 Approved Maintenance Organisation.

2 Both the specification of work and the assignment of responsibilities should be clear, unambiguous and sufficiently detailed to ensure that no misunderstanding should arise between the parties concerned (operator, maintenance organisation and the BDCA) that could result in a situation where work that has a bearing on the airworthiness or serviceability of aircraft is not or will not be properly performed.

3 Special attention should be paid to procedures and responsibilities to ensure that all maintenance work is performed, service bulletins are analysed and decisions taken on accomplishment, airworthiness directives are completed on time and that all work, including non-mandatory modifications is carried out to approved data and to the latest standards.

4 For the actual lay out of the contract the IATA Standard Ground Handling Agreement [may be used as a basis, but this does not preclude the BDCA from ensuring that the content of the contract is acceptable to them, and especially that the contract allows the Operator to properly exercise its maintenance responsibility. Those parts of a contract that] have no bearing on the technical or operational aspects of airworthiness are outside the scope of this paragraph.

AMC OPS 1.895(e)
Maintenance Management
See BCAR - OPS 1.895(e)

1 In the case of a contract with an organisation that is not BCAR 145 approved/accepted, the Operator's Maintenance Management Exposition should include appropriate procedures to

ensure that all this contracted maintenance is ultimately performed on time by BCAR 145 approved/accepted organisations in accordance with data acceptable to the BDCA. In particular the Quality System procedures should place great emphasis on monitoring compliance with the above. The list of BCAR 145 approved/accepted contractors, or a reference to this list, should be included in the Operator's Maintenance Management Exposition.

2 Such a maintenance arrangement does not absolve the Operator from its overall Maintenance responsibility. Specifically, in order to accept the maintenance arrangement, the BDCA should be satisfied that such an arrangement allows the Operator to ensure full compliance with BCAR-OPS 1.890 Maintenance Responsibility.

IEM OPS 1.895(e)
Maintenance Management
See BCAR - OPS 1.895(e)

The purpose of BCAR-OPS 1.895(e) is to authorise a primary maintenance arrangement with an organization which is not a BCAR 145 approved/accepted Maintenance Organisation, when it proves that such an arrangement is in the interest of the Operator by simplifying the management of its maintenance, and the Operator keeps an appropriate control of it. Such an arrangement should not preclude the Operator from ensuring that all maintenance is performed by a BCAR 145 approved/accepted organisation and complying with the BCAR-OPS 1.890 maintenance responsibility requirements. Typical examples of such arrangements follow:

- Component maintenance:
The Operator may find it more appropriate to have a primary contractor that would despatch the components to appropriately approved organisations, rather than himself sending different types of components to various BCAR 145 approved/accepted maintenance organisations. The benefit for the operator is that the management of maintenance is simplified by having a single contact point for component maintenance. The Operator remains responsible for ensuring that all maintenance is performed by BCAR 145 approved/accepted Organisations and in accordance with the approved standard.

- Aeroplane, engine and component maintenance:
The operator may wish to have a maintenance contract with another non BCAR 145 approved BCAR-OPS operator of the same type of aeroplane. A typical case is that of a dry-leased aeroplane between BCAR-OPS Operators, where the parties, for consistency or continuity reasons (especially for short term lease agreements), find it appropriate to keep the aeroplane under the current maintenance arrangement. Where this arrangement involves various BCAR 145 approved/accepted contractors, it might be more manageable for the lessee Operator to have a single contract with the lessor Operator. Such an arrangement should not be understood as a transfer of responsibility to the lessor Operator: the lessee Operator, being the BCAR-OPS approved Operator of the aeroplane, remains responsible for the maintenance of the aeroplane in performing the BCAR-OPS 1.890 functions, and employing the BCAR-OPS 1.895 Maintenance Management Group of Persons. In essence, BCAR-OPS 1.895(e) does not alter the intent of BCAR-OPS 1.895(a), (b) and (d) in that it also requires that the Operator has to establish a written maintenance contract acceptable to the BDCA and, whatever type of acceptable arrangement is made, the Operator is required to exercise the same level of control on contracted

maintenance, particularly through the BCAR-OPS 1.895(b) Maintenance Management Group of Persons and BCAR-OPS 1.900 Quality System.

IEM - OPS 1.895(f&g)
Maintenance Management
See BCAR - OPS 1.895(f&g)

The intent of this paragraph is that maintenance contracts are not necessary when the Operator's maintenance system, as approved by the BDCA, specifies that the relevant maintenance activity may be ordered through one time work orders. This includes for obvious reasons occasional line maintenance and may also include aeroplane component maintenance up to engines, so long as the BDCA considers that the maintenance is manageable through work orders, both in term of volume and complexity. It should be noted that this paragraph implies that even where base maintenance is ordered on a case by case basis, there must be a written maintenance contract.

AMC OPS 1.895(h)
Maintenance Management
See BCAR - OPS 1.895(h)

Office accommodation in this case means office accommodation such that the incumbents, whether they be maintenance management, planning, technical records or quality staff, can carry out their designated tasks in a manner that contributes to good maintenance standards. In the smaller operators, the BDCA may agree to these tasks being conducted from one office subject to being satisfied that there is sufficient space and that each task can be carried out without undue disturbance. Office accommodation should also include an adequate technical library and room for document consultation.

AMC OPS 1.900
Quality system
See BCAR-OPS 1.900

1 An operator should establish a plan acceptable to the BDCA to show when and how often the activities as required by BCAR-OPS 1.890 will be monitored. In addition, reports should be produced at the completion of each monitoring investigation and include details of discrepancies of non compliance with procedures or requirements.

2 The feedback part of the system should address who is required to rectify discrepancies and non compliance in each particular case and the procedure to be followed if rectification is not completed within appropriate timescales. The procedure should lead to the Accountable Manager specified in BCAR-OPS 1.175(h).

3 To ensure effective compliance with BCAR-OPS 1.900 the following elements have been shown to work well:

a. Product sampling – the part inspection of a representative sample of the aeroplane fleet;

b. Defect sampling – the monitoring of defect rectification performance;

c. Concession sampling – the monitoring of any concession to not carry out maintenance on time;

d. On time maintenance sampling – the monitoring of when (flying hours/calendar time/flight cycles etc) aeroplanes and their components are brought in for maintenance;

e. Sampling reports of unairworthy conditions and maintenance errors. Note that BCAR-OPS 1.900 includes other self-explanatory monitoring elements.

IEM OPS 1.900
Quality system
See BCAR-OPS 1.900

The primary purpose of the Quality System is to monitor compliance with the approved procedures specified in an operator's Maintenance Management Exposition to ensure compliance with Subpart M and thereby ensure the maintenance aspects of the operational safety of the aeroplanes. In particular, this part of the Quality System provides a monitor of the effectiveness of maintenance, reference BCAR-OPS 1.890, and should include a feedback system to ensure that corrective actions are both identified and carried out in a timely manner.

AMC OPS 1.905(a)
Maintenance Management exposition
See BCAR-OPS 1.905(a)

1 The purpose of the Maintenance Management Exposition is to set forth the procedures, means and methods of the operator. Compliance with its contents will assure compliance with BCAR-OPS 1 Subpart M requirements, which in conjunction with an appropriate BCAR-145 Approved Maintenance Organisation Exposition is a pre-requisite for obtaining an acceptance of the operator's maintenance system by the BDCA.

2 Where an operator is appropriately approved as a BCAR-145 Approved Maintenance Organisation the Exposition of the maintenance organisation may form the basis of the Operator's Maintenance Management Exposition in a combined document as follows:

BCAR-145 Exposition

Part 1 Management
Part 2 Maintenance Procedures
Part L2 Additional Line Maintenance Procedures
Part 3 Quality System Procedures
Part 4 Contracted BDCA Operators
Part 5 Appendices (sample of documents)

Part 3 must also cover the functions specified by BCAR-OPS 1.900, Quality System.

Additional parts should be introduced covering the following:

Part 0 General Organisation
Part 6 BCAR-OPS Maintenance Procedures

3 Where an operator is not approved in accordance with BCAR-145 but has a maintenance contract with a BCAR-145 Approved Maintenance Organisation, the Maintenance Management Exposition should comprise:

Part 0 General Organisation
Part 1 BCAR-OPS Maintenance Procedures
Part 2 Quality System
Part 3 Contracted Maintenance

4 Personnel are expected to be familiar with those parts of the Exposition that are relevant to the maintenance and airworthiness co-ordination work they carry out.

5 The operator will need to specify in the Exposition who should amend the document, particularly where there are several parts.

6 The person responsible for the management of the Quality System should be responsible for monitoring and amending the Exposition unless otherwise agreed by the BDCA, including associated procedures manuals, and the submission of proposed amendments to the BDCA for approval. The BDCA may agree a procedure, which will be stated in the amendment control section of the Exposition, defining the class of amendments which can be incorporated without the prior consent of the BDCA.

7 The operator may use Electronic Data Processing (EDP) for publication of the maintenance management exposition. The maintenance management exposition should be made available to the BDCA in a form acceptable to the BDCA. Attention should be paid to the compatibility of EDP publication systems with the necessary dissemination of the maintenance management Exposition, both internally and externally.

8. Part 0 “General Organisation” of the Maintenance Management Exposition should include a corporate commitment by the operator, signed by the Accountable Manager confirming that the Maintenance Management Exposition and any associated manuals define the organisation compliance with BCAR-OPS 1 Subpart M and will be complied with at all times.

9 The accountable manager's exposition statement should embrace the intent of the following paragraph and in fact this statement may be used without amendment. Any modification to the statement should not alter the intent:

This exposition defines the organisation and procedures upon which the BDCA Approval under BCAR-OPS 1 Subpart M is based. These procedures are approved by the undersigned and must be complied with, as applicable, in order to ensure that all maintenance of..... (quote Operator’s name)..... fleet of aircraft is carried out on time to an approved standard.

It is accepted that these procedures do not override the necessity of complying with any new or amended regulation published by the BDCA* from time to time where these new or amended regulations are in conflict with these procedures.
It is understood that the BDCA* will approve this organisation whilst the BDCA is satisfied that the procedures are being followed and the work standard maintained. It is understood that the BDCA* reserves the right to suspend, vary or revoke the BCAR-OPS Subpart M maintenance system approval of the organisation, as applicable, if the BDCA has evidence that the procedures are not followed and the standards not upheld.
It is further understood that suspension or revocation of the approval of the maintenance system would invalidate the AOC.

Signed.....

Dated.....

Accountable Manager and ... (quote position).....

For and on behalf of..... (quote organisation's name)..... "

10 Whenever the accountable manager is changed it is important to ensure that the new accountable manager signs the paragraph 9. statement at the earliest opportunity as part of the acceptance by the BDCA. Failure to carry out this action invalidates the BCAR-OPS M approval.

Appendices 1. and 2. contain examples of Exposition lay-outs.

AMC OPS 1.910(a)
Operator's Aeroplane Maintenance
See BCAR-OPS 1.910(a)

1 The aeroplane maintenance programme should be managed and presented by the operator to the BDCA.

2 Where implementation of the content of an approved operator's aeroplane maintenance programme is accomplished by an appropriately approved BCAR - 145 Approved Maintenance Organisation, it therefore follows that the BCAR - 145 Approved Maintenance Organisation should have access to the relevant parts of the approved operator's aeroplane maintenance programme when the organisation is not the author. Implementation means preparation and planning of the maintenance tasks in accordance with the approved maintenance programme.

3 The aeroplane should only be maintained to one approved operator's aeroplane maintenance programme at a given point in time. Where an operator wishes to change from one approved operator's aeroplane maintenance programme to another such approved programme, a transfer Check/Inspection may need to be performed, as agreed with the BDCA, in order to implement the change.

4 The operator's aeroplane maintenance programme should contain a preface which will define the maintenance programme contents, the inspection standards to be applied, permitted

variations to task frequencies and, where applicable, any procedure to escalate established check/inspection intervals. Appendix 1 to AMC OPS 1.910 (a) & (b) provides detailed guidance on the content of an approved operator's aeroplane maintenance programme.

5 Where an operator wishes to use an aeroplane with the initial operator's aeroplane maintenance programme based upon the Maintenance Review Board Report (MRBR) process, any associated programme for the continuous surveillance of the reliability, or health monitoring of the aeroplane should be considered as part of the aeroplane maintenance programme.

6 Where an aeroplane type has been subjected to the MRBR process, an operator should normally develop the initial operator's aeroplane maintenance programme based upon the MRBR.

7 The documentation supporting the development of operator's aeroplane maintenance programmes for aeroplane types subjected to the MRBR process should contain identification cross reference to the MRBR tasks such that it is always possible to relate such tasks to the current approved operator's aeroplane maintenance programme. This does not prevent the approved operator's aeroplane maintenance programme from being developed in the light of service experience to beyond the MRBR recommendations but will show the relationship to such recommendations.

8 Some approved operator's aeroplane maintenance programmes, not developed from the MRB Process, utilise reliability programmes. Such reliability programmes should be considered as a part of the approved maintenance programme.

9 Reliability programmes should be developed for aeroplane maintenance programmes based upon MSG logic or those that include condition monitored components or that do not contain overhaul time periods for all significant system components.

10 Reliability programmes need not be developed for aeroplane maintenance programmes of aeroplanes of 5700 kg and below or that do contain overhaul time periods for all significant system components.

11. The purpose of a reliability programme is to ensure that the aeroplane maintenance programme tasks are effective and their periodicity is adequate. It therefore follows that the actions resulting from the reliability programme may be not only to escalate or delete maintenance task, but also to de-escalate or add maintenance tasks, as necessary.

12. A reliability programme provides an appropriate means of monitoring the effectiveness of the maintenance programme.

AMC OPS 1.910(b)
Operator's Aeroplane Maintenance
See BCAR-OPS 1.910(b)

1 The documentation issued by the BDCA to approve the operator's aeroplane maintenance programme may include details of who may issue certificates of release to service in a particular

situation and may define which tasks are considered as base maintenance activity. Development of the approved operator's aeroplane maintenance programme is dependent upon sufficient satisfactory in-service experience which has been properly processed. In general, the task being considered for escalation beyond the MRB limits should have been satisfactorily repeated at the existing frequency several times before being proposed for escalation. For foreign registered aircraft, the maintenance program must be approved by the State of registry. Appendix 1 to AMC OPS 1.910 (a) & (b) gives further guidance.

2 The BDCA may approve a part of or an incomplete operator's aeroplane maintenance programme at the start of operation of a new aeroplane type or a new operator, subject to the limitation that the approved operator's aeroplane maintenance programme is only valid for a period that does not exceed any required maintenance not yet approved. The following examples illustrate just two possibilities:

2.1 A new aeroplane type may not have completed the acceptance process for structural inspection or corrosion control. It therefore follows that the operator's aeroplane maintenance programme cannot be approved as a complete programme but it is reasonable to approve for a limited period, say, 3000 hrs or 1 year;

2.2 A new operator may not have established suitable maintenance arrangements for the high-life time checks. It therefore follows that the BDCA may be unable to approve the complete operator's aeroplane maintenance programme, preferring to opt for a limited period.

3 If the BDCA is no longer satisfied that a safe operation can be maintained, the approval of an operator's aeroplane maintenance programme or part of it may be suspended or revoked. Events giving rise to such action include:

3.1 An operator suspending the operation of that aeroplane type for at least one year;

3.2 Periodic review of the approved operator's aeroplane maintenance programme by the BDCA shows that the operator has failed to ensure that the programme reflects the maintenance needs of the aeroplane such that safe operation can be assured.

AMC OPS 1.915
Operator's aeroplane technical log
See BCAR-OPS 1.915

1 The operator's aeroplane technical log is a system for recording defects and malfunctions discovered during the operation and for recording details of all maintenance carried out on the particular aeroplane to which the operator's aeroplane technical log applies whilst that aeroplane is operating between scheduled visits to the base maintenance facility. In addition, it is used for recording operating information relevant to flight safety and should contain maintenance data that the operating crew needs to know. Where a means of recording defects or malfunctions in the cabin or galleys that affect the safe operation of the aeroplane or the safety of its occupants, separate from the aeroplane technical log, is used, this should be regarded as forming part of the aeroplane technical log system.

2 The operator's aeroplane technical log system may range from a simple single section document to a complex system containing many sections but in all cases it should include the information specified for the example used here which happens to use a 5 section document / computer system:

Section 1 should contain details of the registered name and address of the operator, the aeroplane type and the complete international registration marks of the aeroplane.

Section 2 should contain details of when the next scheduled maintenance is due, including, if relevant any out of phase component changes due before the next maintenance check. In addition this Section should contain the current Certificate of Release to Service, for the complete aeroplane, issued normally at the end of the last maintenance check.

NOTE: The flight crew does not need to receive such details if the next scheduled maintenance is controlled by other means acceptable to the BDCA.

Section 3 should contain details of all information considered necessary to ensure continued flight safety. Such information includes:

i. The aeroplane type and registration mark.

ii. The date and place of take-off and landing.

iii. The times at which the aeroplane took off and landed.

iv. The running total of flying hours, such that the hours to the next schedule maintenance can be determined. The flight crew does not need to receive such details if the next scheduled maintenance is controlled by other means acceptable to the BDCA.

v. Details of any failure, defect or malfunction to the aeroplane affecting airworthiness or safe operation of the aeroplane including emergency systems, and any failure, defect or malfunctions in the cabin or galleys that affect the safe operation of the aeroplane or the safety of its occupants that are known to the commander. Provision should be made for the commander to date and sign such entries, including, where appropriate, the nil defect state for continuity of the record. Provision should be made for a Certificate of Release to Service or, if agreed by the BDCA, the alternate abbreviated Certificate of Release to Service following rectification of a defect or any deferred defect or maintenance check carried out. Such a certificate appearing on each page of this section should readily identify the defect(s) to which it relates or the particular maintenance checks as appropriate. The alternate abbreviated certificate of release to service consists of the following statement "BCAR 145.50 release to service" in place of the full certification statement specified in AMC 145.50(b) paragraph 1.
When the BDCA agrees to the use of the alternate abbreviated certificate of release to service, the introductory section of the technical log should include an example of the full certification statement from AMC 145.50(b) paragraph 1 together with a note stating; "The alternate abbreviated certificate of release to service used in this technical log satisfies the intent of BCAR 145.50(a) only. All other aspects of BCAR 145.50(b) shall be complied with".
vi. The quantity of fuel and oil uplifted and the quantity of fuel available in each tank, or combination of tanks, at the beginning and end of each flight; provision to show, in the same units

of quantity, both the amount of fuel planned to be uplifted and the amount of fuel actually uplifted; provision for the time when ground de-icing and/or anti-icing was started and the type of fluid applied, including mixture ratio fluid/water.

vii. The pre-flight inspection signature.
In addition to the above it may be necessary to record the following supplementary information:
The time spent in particular engine power ranges where use of such engine power affects the life of the engine or engine module. Maximum or Inter Contingency Power are two examples.
The number of landings where landings affect the life of an aeroplane or aeroplane component.
Flight cycles or flight pressure cycles where such cycles affect the life of an aeroplane or aeroplane component.

NOTE 1: Where Section 3 is of the multisector 'part removable' type then such 'part removable' sections should contain all of the foregoing information where appropriate.

NOTE 2: Section 3 should be designed such that one copy of each page may remain on the aeroplane and one other copy may be retained on the ground until completion of the flight to which it relates. See also BCAR - OPS 1.140 Information retained on the ground (Subpart B).

NOTE 3: Section 3 lay-out should be divided to show clearly what is required to be completed after flight and what is required to be completed in preparation for the next flight.

Section 4 should contain details of all deferred defects that affect or may affect the safe operation of the aeroplane and should therefore be known to the aeroplane commander. Each page of this section should be pre-printed with the operator's name and page serial number and make provision for recording the following:

i. A cross reference for each deferred defect such that the original defect can be identified in the particular Section 3 Sector Record Page.

ii. The original date of occurrence of the defect deferred.

iii. Brief details of the defect.

iv. Details of the eventual rectification carried out and its Certificate of Release to Service or a clear cross-reference back to the document that contains details of the eventual rectification.

Section 5 should contain any necessary maintenance support information that the aeroplane commander needs to know. Such information would include data on how to contact maintenance engineering if problems arise whilst operating the routes etc.

The Aeroplane Technical Log System can be either a paper or computer system or any combination of both methods.

AMC OPS 1.920
Maintenance Records
See BCAR-OPS 1.920

1 The operator should ensure that he always receives a complete BCAR-145 Certificate of Release to Service such that the required records can be retained. The system to keep the maintenance records should be described in the operator's maintenance management exposition or in the relevant BCAR-145 exposition.

2 When an operator arranges for the relevant maintenance organisation to retain copies of the maintenance records on his behalf, he will nevertheless continue to be responsible for the records under BCAR-OPS 1.920(b) relating to the preservation of records. If he ceases to be the operator of the aeroplane, he also remains responsible for transferring the records to any other person who becomes the operator of the aeroplane.

3 Keeping maintenance records in a form acceptable to the BDCA normally means in paper form or on a computer database or a combination of both methods. Records stored in microfilm or optical disc form are also acceptable.

4 Paper systems should use robust material which can withstand normal handling and filing. The record should remain legible throughout the required retention period.

5 Computer systems should have at least one backup system which should be updated at least within 24 hours of any maintenance. Each terminal is required to contain programme safeguards against the ability of unauthorised personnel to alter the database.

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

7 Information on times, dates, cycles etc. as required by BCAR-OPS 1.920 hereafter referred to as 'summary maintenance records' are those records that give an overall picture on the state of maintenance of the aeroplane and any life-limited aeroplane component. The current status of all life-limited aeroplane components should indicate the component life limitation, total number of hours, accumulated cycles or calendar time and the number of hours/cycles/time remaining before the required retirement time of the component is reached.

8 The current status of Airworthiness Directives (AD) should identify the applicable AD's including revision or amendment numbers. Where an AD is generally applicable to the aeroplane or component type but is not applicable to the particular aeroplane or component, then this should be identified. The AD status includes the date when the AD was accomplished, and where the AD is controlled by flight hours or flight cycles it should include the aeroplane or engine or component total flight hours or cycles, as appropriate. For repetitive AD's, only the last application should be recorded in the AD status. The status should also specify which part of a multi-part directive has been accomplished and the method, where a choice is available in the AD.

9 Details of current modification and repairs means the substantiating data supporting compliance with the airworthiness requirements. This can be in the form of a Supplemental Type Certificate,

Service Bulletin, Structural Repair Manual or similar approved document. If the airworthiness data for modification and repair is produced by the BCAR-145 organisation in accordance with existing national regulations all detailed documentation necessary to define the change and its approval should be retained.

10 The substantiating data may include:
a. Compliance programme;

b. Master drawing or drawing list, production drawings, and installation instructions;

c. Engineering reports (static strength, fatigue, damage tolerance, fault analysis, etc.);

d. Ground and flight test programme and results;

e. Mass and balance change data;

f. Maintenance and repair manual supplements;

g. Maintenance programme changes and instructions for continuing airworthiness; and

h. Aeroplane flight manual supplement.

11 Maintenance records should be stored in a safe way with regard to fire, flood, theft and alteration.

12 Computer backup discs, tapes etc., should be stored in a different location from that containing the current working discs, tapes, etc. and in a safe environment.

IEM OPS 1.920(b) (6)
Maintenance Records
See BCAR-OPS 1.920(b) (6)

For the purpose of this paragraph, a “component vital to flight safety” means a component that includes Life Limited Parts or is subject to Airworthiness Limitations or a major component such as, undercarriage and flight controls.

AMC OPS 1.920(c)
Maintenance Records
See BCAR-OPS 1.920(c)

1 Where an operator terminates his operation, all retained maintenance records should be passed on to the new operator or, if there is no operator, stored as required by the BDCA.

2 A “permanent transfer“ does not generally include the dry lease-out of an aeroplane when the duration of the lease agreement is less than 6 months. However the BDCA should be satisfied that all maintenance records necessary for the duration of the lease agreement are transferred to the lessee or made accessible to them.

IEM OPS 1.930
Continued validity of the Air Operator Certificate in respect of the maintenance system
See BCAR-OPS 1.930

This paragraph covers scheduled changes to the maintenance system. Whilst the requirements relating to Air Operator Certificates, including their issue, variation and continued validity, are prescribed in Subpart C, this paragraph is included in Subpart M to ensure that operators remain aware that there is a requirement elsewhere which may affect continued acceptance of the maintenance arrangement.

IEM OPS 1.935
Equivalent Safety Case
See BCAR-OPS 1.935

1 This paragraph is intended to provide the necessary flexibility to the BDCA such that it may accept alternate means of compliance with any Subpart M requirement, particularly in the case of advancement of technology.

2 Once agreed by the JAA, the alternative means of compliance will be proposed for inclusion in BCAR-OPS 1 Subpart M following NPA consultation but, in the meantime, may be published as a Maintenance Temporary Guidance Leaflet.

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Appendix 1 to AMC OPS 1.905(a)
Maintenance Management Exposition for an Operator who is also approved in accordance with BCAR-145

The Exposition may be put together in any subject order and subjects combined so long as all applicable subjects are covered.

PART 0 GENERAL ORGANISATION

0.1 Corporate commitment by the Operator;

0.2 General information:
– Brief description of organisation
– Relationship with other organisations
– Fleet composition – Type of operation
– Line station locations;

0.3 Maintenance Management personnel:
– Accountable Manager
– Nominated postholder
– Maintenance co-ordination
– Duties and responsibilities
– Organisation chart(s)
– Manpower resources and training policy;

0.4 Notification procedure to the JAA regarding changes to the Operator's maintenance arrangements/locations/ personnel/activities/approval

0.5 Exposition amendment procedures.

*PART 1 MANAGEMENT

*PART 2 MAINTENANCE PROCEDURES

*PART L2 ADDITIONAL LINE MAINTENANCE PROCEDURES

*PART 3 QUALITY SYSTEM PROCEDURES
Qualifying operator's maintenance personnel not covered by BCAR-145.

NOTE: The Quality System procedures shown in Appendix 2 to AMC OPS 1.905(a) (Part 2 Quality System) must also be taken into account.

*PART 4 CONTRACTED JAA OPERATORS

*PART 5 APPENDICES (Sample of Documents)

(*) These Parts comprise the Exposition of the BCAR-145 approved maintenance organisation.

PART 6 BCAR-OPS MAINTENANCE PROCEDURES

6.1 Aircraft technical log utilisation and MEL application;

6.2 Aircraft maintenance programme – Development and amendment;

6.3 Time and maintenance records, Responsibilities, Retention, Access;

6.4 Accomplishment and control of Airworthiness Directives;

6.5 Analysis of the effectiveness of the maintenance programme;

6.6 Non-mandatory modification embodiment policy;

6.7 Major modification standards;

6.8 Defect reports:
– Analysis
– Liaison with manufacturers and Regulatory Authorities
– Deferred defect policy;

6.9 Engineering activity;

6.10 Reliability programmes
– Airframe
– Propulsion
– Components;

6.11 Pre-flight Inspection:
– Preparation of aircraft for flight
– Sub-contracted Ground Handling functions
– Security of Cargo and Baggage loading
– Control of refuelling, Quantity/Quality
– Control of snow, ice, dust and sand contamination to an approved standard;

6.12 Aircraft weighing;

6.13 Flight test procedures; **

6.14 Sample of documents, Tags and Forms used;

(**) could be covered in Part 2, Maintenance Procedures.

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Appendix 2 to AMC OPS 1.905(a)
Maintenance Management Exposition for an Operator who is NOT approved in accordance with BCAR-145

The Exposition may be put together in any subject order so long as all applicable subjects are covered.

PART 0 GENERAL ORGANISATION
(as shown in Appendix 1 to IEM OPS 1.905(a))

PART 1 BCAR-OPS MAINTENANCE PROCEDURES
(as shown in Appendix 1, Part 6 entitled – BCAR-OPS Maintenance procedures)

PART 2 QUALITY SYSTEM

2.1 Maintenance quality policy, plan and audit procedures;

2.2 Monitoring of maintenance management activities;

2.3 Monitoring the effectiveness of the maintenance programme;

2.4 Monitoring that all maintenance is carried out by an appropriate BCAR-145 organisation:
– Aeroplane maintenance
– Engines
– Components;

2.5 Monitoring that all contracted maintenance is carried out in accordance with the contract, including sub-contractors used by the maintenance contractor;

2.6 Quality audit personnel.

PART 3 CONTRACTED MAINTENANCE

3.1 Maintenance contractor selection procedure;

3.2 Detailed list of maintenance contractors;

3.3 Relevant technical procedures identified in the maintenance contract(s).

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Appendix 1 to AMC OPS 1.910(a) & (b)
General requirements

1.1 The maintenance programme should contain the following basic information.

1.1.1 The type/model and registration number of the aeroplane, engines and, where applicable, auxiliary power units and propellers.

1.1.2 The name and address of the operator.

1.1.3 The operator's reference identification of the programme document; the date of issue and issue number.

1.1.4 A statement signed by the operator to the effect that the specified aeroplanes will be maintained to the programme and that the programme will be reviewed and updated as required by paragraph 5.

1.1.5 Contents/list of effective pages of the document.

1.1.6 Check periods which reflect the anticipated utilisation of the aeroplane. Such utilisation should be stated and include a tolerance of not more than 25%. Where utilisation cannot be anticipated, calendar time limits should also be included.

1.1.7 Procedures for the escalation of established check periods, where applicable and acceptable to the BDCA.

1.1.8 Provision to record date and reference to approved amendments incorporated in the programme.

1.1.9 Details of pre-flight maintenance tasks which are accomplished by maintenance staff and not included in the Operations Manual for action by flight crew.

1.1.10 The tasks and the periods (intervals/frequencies) at which each part of the aeroplane, engines, APU's, propellers, components, accessories, equipment, instruments, electrical and radio apparatus, and associated systems and installations should be inspected, together with the type and degree of inspection.

1.1.11 The periods at which items as appropriate, should be checked, cleaned, lubricated, replenished, adjusted and tested.

1.1.12 Details of specific structural inspections or sampling programmes.

1.1.13 Details of the corrosion control programme, when applicable.

1.1.14 The periods and procedures for the collection of engine health monitoring data.

1.1.15 The periods at which overhauls and/or replacements by new or overhauled parts should be made.

1.1.16 A cross-reference to other documents approved by the BDCA which contain the details of maintenance tasks related to mandatory life limitations, Certification Maintenance Requirements (CMR's) and Airworthiness Directives (AD's).

Note: To prevent inadvertent variations to such tasks or intervals these items should not be included in the main portion of the maintenance programme document, or any planning control system, without specific identification of their mandatory status.

1.1.17 Details of, or cross-reference to, any required Reliability Programme or statistical methods of continuous Surveillance.

1.1.18 A statement that practices and procedures to satisfy the Programme should be to the standards specified in the Type Certificate Holder's Maintenance Instructions. When practices and procedures are included in a customised Operator's Maintenance Manual approved by the BDCA, the statement should refer to this Manual.

1.1.19 Each maintenance task quoted should be defined in a definition section of the Programme.

2 Programme basis

2.1 Operator's Aeroplane Maintenance programmes should normally be based upon the Maintenance Review Board Report, where available, and the Type Certificate holder's Maintenance Planning Document or Chapter 5 of the Maintenance Manual, (i.e. the Manufacturer's recommended Maintenance Programme). The structure and format of these maintenance recommendations may be re-written by the operator to better suit his operation and control of the particular maintenance programme.

2.2 For a newly type-certificated aeroplane, where no previously approved Maintenance Programme exists, it will be necessary for the operator to comprehensively appraise the manufacturer's recommendations (and the MRB Report where applicable), together with other airworthiness information, in order to produce a realistic Programme for approval.

2.3 For existing aeroplane types it is permissible for the operator to make comparisons with maintenance programmes previously approved. It should not be assumed that a Programme approved for another operator will automatically be approved for the operator. Evaluation is to be made of aircraft/fleet utilisation, landing rate, equipment fit and, in particular, the experience of the maintenance organisation must be assessed. Where the BDCA is not satisfied that the proposed maintenance programme can be used as is by the Operator, the BDCA should request the Operator to introduce appropriate changes to it, such as additional maintenance tasks or de-escalation of check frequencies, or to develop the aeroplane initial maintenance programme based upon the Manufacturer's recommendations.

3 Amendments

3.1 Amendments (revisions) to the approved Programme should be raised by the operator, to reflect changes in the type certificate holder's recommendations, modifications, service experience, or as required by the BDCA. Reliability programmes form one important method of updating approved programmes.

4 Permitted variations to maintenance periods

4.1 The Operator may only vary the periods prescribed by the Programme with the approval of the BDCA.

5 Periodic review of maintenance programme contents

5.1 Operator's approved aeroplane Maintenance Programmes should be subject to periodic review to ensure that they reflect current Type Certificate holder's recommendations, revisions to the Maintenance Review Board Report, mandatory requirements and maintenance needs of the aircraft.

5.2 The Operator should review the detailed requirements at least annually for continued validity in the light of operating experience.

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AMC OPS 1.940(a) (4)
Crewing of inexperienced flight crew members
See BCAR-OPS 1.940(a) (4)

1. An operator should consider that a flight crew member is inexperienced, following completion of a Type Rating or command course, and the associated line flying under supervision, until he has achieved on the Type either:

a. 100 flying hours and flown 10 sectors within a consolidation period of 120 consecutive days; or

b. 150 flying hours and flown 20 sectors (no time limit).

2. A lesser number of flying hours or sectors, subject to any other conditions which the BDCA may impose, may be acceptable to the BDCA when:

a. A new operator is commencing operations; or

b. An operator introduces a new aeroplane type; or

c. Flight crew members have previously completed a type conversion course with the same operator; or

d. The aeroplane has a Maximum Take-off Mass below 10 tonnes or a Maximum Approved Passenger Seating Configuration of less than 20.

AMC OPS 1.945
Conversion Course Syllabus
See BCAR-OPS 1.945 and Appendix 1 to BCAR-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 BCAR–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/STD 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, ETOPS or All Weather Operations, additional training should be carried out.

4.2 In planning aeroplane/STD training on aeroplanes with a flight crew of two or more, particular emphasis should be placed on the practice of Line Orientated Flying Training (LOFT) with emphasis on Crew Resource Management (CRM).

4.3 Normally, the same training and practice in the flying of the aeroplane should be given to copilots as well as commanders. The 'flight handling' sections of the syllabus for commanders and copilots alike should include all the requirements of the operator proficiency check required by BCAR-OPS 1.965.

4.4 Unless the type rating training programme has been carried out in 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/STD training and checking as part of the operator's conversion course, each flight crew member should operate a minimum number of sectors and/or flying hours under the supervision of a flight crew member nominated by the operator and acceptable to the BDCA.

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 BCAR-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 BCAR-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 ember 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.

AMC OPS 1.943/1.945 (a) (9)/1.955(b) (6)/1.965(e)
Crew Resource Management (CRM)
See BCAR-OPS 1.943/1.945 (a) (9)/1.955(b) (6)/1.965(e)/1.965(a) (3) (iv)
See IEM-OPS 1.943/1.945 (a) (9)/1.955(b) (6)/1.965(e)

1 General

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 BCAR-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 BDCA;
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 An 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 BDCA. 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 an operator's conversion course.

4 Command course CRM training

4.1 An operator should ensure that all elements in Table 1, column (a) are integrated into the command course and covered to the level required by column (e) (command course).

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 An 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.

See table 1

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 others training.

8 Assessment of CRM Skills (See IEM OPS 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; 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 BDCA, should be published in the Operations Manual.

8.3 Operators should establish procedures 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.

IEM OPS 1.943/1.945 (a) (9)/1.955(b) (6)/1.965(e)
Crew Resource Management (CRM)
See BCAR-OPS 1.943/1.945 (a) (9)/1.955(b) (6)/1.965(e)
See AMC-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 is the process of observing, recording, interpreting and evaluating, where appropriate, pilot performance and knowledge against a required standard 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.

4.2 CRM skills assessment should be included in an overall assessment of the flight crew member's performance and be in accordance with approved standards. Suitable methods of assessment should be established, together with the selection criteria and training requirements of the assessors and their relevant qualifications, knowledge and skills.

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:

a. An 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. For a transition period, the evaluation system should be crew rather than individually based.

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 BCAR-OPS 1.945(a) (9)

1 The conversion course should include training in the use and knowledge of automation and in the recognition of systems and human limitations associated with the use of automation. An operator should therefore ensure that a flight crew member receives training on:

a. The application of the operations policy concerning the use of automation as stated in the Operations Manual; and

b. System and human limitations associated with the use of automation.

2 The objective of this training should be to provide appropriate knowledge, skills and 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 BCAR-OPS [1.965 (c)]

1 Where a pilot is required to operate as pilot flying and pilot non-flying, he should be checked on one sector as pilot flying and on another sector as pilot non-flying.

2 However, where an operator's procedures require integrated flight preparation, integrated cockpit initialisation and that each pilot performs both flying and non-flying duties on the same sector, then the line check may be performed on a single sector.

AMC OPS 1.965(d)
Emergency and Safety Equipment Training
See BCAR-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 BCAR-OPS 1.965

1 Line checks, route and aerodrome competency and recent experience requirements are intended to ensure the crew member's ability to operate efficiently under normal conditions, whereas other checks and emergency and safety equipment training are primarily intended to prepare the crew member for abnormal/emergency procedures.

2 The line check is performed in the aeroplane. All other training and checking should be performed in the aeroplane of the same type or an STD or, an approved flight simulator or, in the case of emergency and safety equipment training, in a representative training device. The type of equipment used for training and checking should be representative of the instrumentation, equipment and layout of the aeroplane type operated by the flight crew member.

3 Line Checks

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 preflight and postflight 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 an STD 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 BCAR-OPS 1.965
Pilot incapacitation training
See Appendix 1 to BCAR-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 BCAR-OPS 1.970

When using a Flight Simulator for meeting the landing requirements in BCAR-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 BCAR-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 BCAR-FCL type-rating proficiency checks.

AMC OPS 1.975
Route and aerodrome competence qualification
See BCAR-OPS 1.975

1 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.

f. 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.

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 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:

a) 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

b) the descent from the initial approach altitude can be made by day in visual meteorological conditions; or

c) the operator qualifies the pilot-in-command to land at the aerodrome concerned by means of an adequate pictorial presentation; or

d) the aerodrome concerned is adjacent to another aerodrome at which the pilot-in-command is currently qualified to land.

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 an operator operates should be categorised in one of these three categories. The operator's categorisation should be acceptable to the BDCA.

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.

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 should certify that he has carried out these instructions.

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. This instruction should be certified by the operator.

AMC OPS 1.980
Operation on more than one type or variant
See BCAR-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 an operator and used as a reference to compare differences with other aeroplane types/variants within an 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 BCAR-OPS 1.950(a) (1).

e. Familiarisation training. See BCAR-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” STDs qualified according to BCAR-STD 2A, 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. An STD used for training level C or higher is used for a check of conversion and recurrent training. The check should utilise a “real time” flight environment such as the demonstration of the use of a flight management system. Manoeuvres not related to the specific task do not need to be tested.

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 BCAR-STD 2A, Level 1 would not suffice, but for which motion and visual clues are not required. Such training would typically involve an STD as defined in BCARSTD 2A, 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 STDs qualified according to BCAR-STD 2A, 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 BCAR-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 BDCA 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
See table 2, 3 and 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 (eg. 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 an operator's proposal to operate more than one type or variant is to establish crew training, checking and currency requirements. This may be established by applying the coded difference levels from Table 4 to the Compliance Method column of the ODR Tables.

5 Differences items identified in the ODR systems as impacting flight characteristics, and/or procedures, should be analysed in the corresponding ATA section of the ODR manoeuvres. Normal, abnormal and emergency situations should be addressed accordingly.

See table 5

IEM OPS 1.980(b)
Operation on more than one type or variant - Philosophy and Criteria
See BCAR-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 an operator's proposal for flight crews to operate more than one type or variant may appear as follows:

See table 6, 7 and 8

IEM OPS 1.985
Training records
See BCAR-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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IEM OPS 1.988
Additional crew members assigned to specialist duties
See BCAR-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; and

vii. Security staff.

IEM OPS 1.990
Number and Composition of Cabin Crew
See BCAR-OPS 1.990

1 The demonstration or analysis referred to in BCAR-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 BCAR-OPS 1.990(b), the BBDCA may require an increased number of cabin crew members in excess of the requirements of BCAR-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 ditching, 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 BCAR-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, an 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(a) (2)
Minimum requirements
See BCAR-OPS 1.995(a) (2)

1 The initial medical examination or assessment and any re-assessment of cabin crew members should be conducted by, or under the supervision of, a medical practitioner acceptable to the BBDCA.

2 An 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 BCAR-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 ETOPS; 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.

AMC OPS 1.1012
Familiarisation
See BCAR-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 BCAR-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. Exit location and its environment.

4.2 An aeroplane familiarisation visit may be combined with the conversion training required by BCAR-OPS 1.1010(c) (3).

IEM OPS 1.1005/1.1010/1.1015/1.1020
Representative Training Devices
See BCAR-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); and

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).

IEM OPS 1.1015
Recurrent training
BCAR-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 BCAR-OPS 1.1020

In developing the content of any refresher training programme prescribed in BCAR-OPS 1.1020, operators should consider (in consultation with the BBDCA) 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 BCAR-OPS 1.1020(a).

IEM OPS 1.1020(a)
Refresher training
See BCAR-OPS 1.1020(a)
See AMC OPS 1.1020

An 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 BCAR-OPS 1.1025

1 Elements of training which require individual practical participation should be combined with practical checks.

2 The checks required by BCAR-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.

ACJ OPS 1.1030
Operation on more than one type or variant
See BCAR-OPS 1.1030

1 For the purposes of BCAR-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 BCAR-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 BCAR-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 BCAR-OPS 1.1035

An operator should maintain a summary of training to show a trainee's completion of every stage of training and checking.

AMC to Appendix 1 to BCAR-OPS 1.1005 and Appendix 1 to BCAR-OPS 1.1015
Crew Resource Management (CRM) Training
See Appendix 1 to BCAR-OPS 1.1005 and Appendix 1 to BCAR-OPS 1.1015

1 An operator should provide initial and recurrent CRM training for each cabin crew member. The cabin crew member should not be assessed.

2 CRM training should utilise all available resources (e.g. crew members, aeroplane systems and supporting facilities) to achieve safe and efficient operations.

3 Emphasis should be placed on the importance of effective co-ordination and two-way communication between flight crew and cabin crew in various abnormal and emergency situations.

4 Emphasis should be placed on co-ordination and communication within the crew in normal operational situations including the use of correct terminology, common language, and effective use of communications equipment.

5 Initial and recurrent CRM training should, wherever practicable, include combined flight crew and cabin crew in practice in aeroplane evacuations.

6 Combined flight crew and cabin crew training should, wherever practicable, include joint discussion of emergency scenarios.

7 Cabin crew should be trained to identify unusual situations that might occur inside the passenger compartment, as well as an activity outside the aeroplane that could affect the safety of the aeroplane or passengers.

8 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.

9 Recurrent CRM training can be part of, and included in, other recurrent training.

IEM to Appendix 1 to BCAR-OPS 1.1005/1.1015
Crew Resource Management Training
See Appendix 1 to BCAR-OPS 1.1005/1.1015

1 Crew Resource Management training should include:

a. The nature of operations as well as the associated crew operating procedures and areas of operations which produce particular difficulties. Adverse climatological conditions and unusual hazards should also be addressed;

b. Awareness of flight crew management of various emergency situations and consequential effects on the operation of the aeroplanes; and

c. Where practicable, the participation of the senior cabin crew member in flight simulator Line Orientated Flying Training exercises.

IEM to Appendix 1 to BCAR-OPS 1.1005/1.1015/1.1020
First Aid Training
See Appendix 1 to BCAR-OPS 1.1005/1.1015/1.1020

1 First aid training should include the following subjects:

a. Physiology of flight including oxygen requirements, and hypoxia;

b. Medical emergencies in aviation including:

i. Choking;

ii. Stress reactions and allergic reactions;

iii. Hyperventilation;

iv. Gastro-intestinal disturbance;

v. Air sickness;

vi. Epilepsy;

vii. Heart attacks;

viii. Stroke;

ix. Shock;

x. Diabetes;

xi. Emergency childbirth; and

xii. Asthma;

c. Basic first aid and survival training including care of:

i. The unconscious;

ii. Burns;

iii. Wounds; and

iv. Fractures and soft tissue injuries;

d. Practical cardio-pulmonary resuscitation by each cabin crew member having regard to the aeroplane environment and using a specifically designed dummy;

e. The use of appropriate aeroplane equipment including first-aid kits and first-aid oxygen.

IEM to Appendix 1 to BCAR-OPS 1.1005/1.1010/1.1015/1.1020
Crowd Control
See Appendix 1 to BCAR-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. BBDCA and leadership.

IEM to Appendix 1 to BCAR-OPS 1.1005/1.1010/1.1015/1.1020
Training Methods
See Appendix 1 to BCAR-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 BCAR-OPS 1.1010/1.1015
Conversion and recurrent training
See Appendix 1 to BCAR-OPS 1.1010/1.1015

1 A review should be carried out of previous initial training given in accordance with BCAR-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.

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2 Fire and smoke training requirements

Training requirement/interval	Required activity		
First convertion to aeroplane type (eg. New entrant)	Actual fire fighting and handling equipment		(Note 1)
Every year during recurrent training		Handling equipment	
Every 3 year during recurrent training	Actual fire fighting and handling equipment		(Note 1)
Subsequent a/c convertion	(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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IEM OPS 1.1040(b)
Elements of the Operations Manual subject to approval
See BCAR-OPS 1.1040(b)

1 A number of the provisions of BCAR-OPS require the prior approval of the BDCA. 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 BDCA 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 BDCA merely checks that the Operations Manual accurately reflects the content of the approval. In other words, such text has to be acceptable to the BDCA; or

b. An operator's application for an approval includes the related, proposed, Operations Manual text in which case, the BDCA'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 BDCA. (A full list of every approval required by BCAR-OPS in its entirety may be found in Appendix 6 of the Operations Joint Implementation Procedures (JAA Administration & Guidance Material Section 4, Part 2.)

See table 1

IEM OPS 1.1040(c)
Operations Manual - Language
See BCAR-OPS 1.1040(c)

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See table 1

IEM OPS 1.1040(c)
Operations Manual - Language
See BCAR-OPS 1.1040(c)

1 BCAR-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 BCAR-OPS 1.1045

1 Appendix 1 to BCAR-OPS 1.1045 prescribes in detail the operational policies, instructions, procedures and other information to be contained in the Operations Manual in order that operations personnel can satisfactorily perform their duties. When compiling an Operations Manual, an operator may take advantage of the contents of other relevant documents. Material produced by the operator for Part B of the Operations Manual may be supplemented with or substituted by applicable parts of the Aeroplane Flight Manual required by BCAR-OPS 1.1050 or, where such a document exists, by an Aeroplane Operating Manual produced by the manufacturer of the aeroplane. In the case of performance class B aeroplanes. It is acceptable that a “Pilot Operating Handbook” (POH) or equivalent document is used as Part B of the Operations Manual, provided that the POH covers the necessary items. For Part C of the Operations Manual, material produced by the operator may be supplemented with or substituted by applicable Route Guide material produced by a specialised professional company.

2 If an operator chooses to use material from another source in his Operations Manual he should either copy the applicable material and include it directly in the relevant part of the Operations Manual, or the Operations Manual should contain a statement to the effect that a specific manual(s) (or parts thereof) may be used instead of the specified part(s) of the Operations Manual.

3 If an operator chooses to make use of material from an alternative source (e.g. a Route Manual producer, an aeroplane manufacturer or a training organisation) as explained above, this does not absolve the operator from the responsibility of verifying the applicability and suitability of this

material. (See BCAR-OPS 1.1040(k)). Any material received form an external source should be given its status by a statement in the Operations Manual.

An operations manual, which may be issued in separate parts corresponding to specific aspects of operations, provided in accordance with BCAR OPS 1.1045 should be organized with the following structure:

1. Organization

1.1 Structure
a) General;
b) Aircraft operating information;
c) Areas, routes and aerodromes; and
d) Training.

2. Contents
The operations manual referred to in 1.1 shall contain at the least the following:

2.1 General

2.1.1 Instructions outlining the responsibilities of operations personnel pertaining to the conduct of flight operations.

2.1.2 Rules limiting the flight time and flight duty periods and providing for adequate rest periods for flight crew members and cabin crew as required by Subpart Q.

2.1.3 A list of the navigational equipment to be carried including any requirements relating to operations where performance- based navigation is prescribed.

2.1.4 Where relevant to the operations, the long-range navigation procedures, engine failure procedure for ETOPS and the nomination and utilization of diversion aerodromes.

2.1.5 The circumstances in which a radio listening watch is to be maintained.

2.1.6 The method for determining minimum flight altitudes.

2.1.7 The methods for determining aerodrome operating minima.

2.1.8 Safety precautions during refuelling with passengers on board.

2.1.9 Ground handling arrangements and procedures.

2.1.10 Procedures, as prescribed in Annex 12, for pilots-in-command observing an accident.

2.1.11 The flight crew for each type of operation including the designation of the succession of command.

2.1.12 Specific instructions for the computation of the quantities of fuel and oil to be carried, having regard to all circumstances of the operation including the possibility of loss of pressurization and the failure of one or more power-units while en route.

2.1.13 The conditions under which oxygen shall be used and the amount of oxygen determined in accordance with BCAR OPS 1.770.

2.1.14 Instructions for mass and balance control.

2.1.15 Instructions for the conduct and control of ground de-icing/anti-icing operations.

2.1.16 The specifications for the operational flight plan.

2.1.17 Standard operating procedures (SOP) for each phase of flight.

2.1.18 Instructions on the use of normal checklists and the timing of their use.

2.1.19 Departure contingency procedures.

2.1.20 Instructions on the maintenance of altitude awareness and the use of automated or flight crew altitude call-out.

2.1.21 Instructions on the use of autopilots and auto throttles in IMC.

2.1.22 Instructions on the clarification and acceptance of ATC clearances, particularly where terrain clearance is involved.

2.1.23 Departure and approach briefings.

2.1.24 Procedures for familiarization with areas, routes and aerodromes.

2.1.25 Stabilized approach procedure.

2.1.26 Limitation on high rates of descent near the surface.

2.1.27 Conditions required to commence or to continue an instrument approach.

2.1.28 Instructions for the conduct of precision and no precision instrument approach procedures.

2.1.29 Allocation of flight crew duties and procedures for the management of crew workload during night and IMC instrument approach and landing operations.

2.1.30 Instructions and training requirements for the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system (GPWS).

2.1.31 Policy, instructions, procedures and training requirements for the avoidance of collisions and the use of the airborne collision avoidance system (ACAS).

2.1.32 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 Annex 2.

2.1.33 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.

2.1.34 Details of the accident prevention and flight safety programme provided in accordance with BCAR OPS 1.037, including a statement of safety policy and the responsibility of personnel.

2.1.35 Information and instructions on the carriage of dangerous goods, including action to be taken in the event of an emergency.

2.1.36 Security instructions and guidance.

2.1.37 The search procedure checklist provided in accordance with BCAR OPS 1.1250.

2.2 Aircraft operating information

2.2.1 Certification limitations and operating limitations.

2.2.2 The normal, abnormal and emergency procedures to be used by the flight crew and the checklists relating thereto as required by BCAR OPS 1.1050.

2.2.3 Operating instructions and information on climb performance with all engines operating, if provided in accordance with BCAR OPS 1.475.

2.2.4 Flight planning data for pre-flight and in-flight planning with different thrust/power and speed settings.

2.2.5 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.

2.2.6 Instructions and data for mass and balance calculations.

2.2.7 Instructions for aircraft loading and securing of load.

2.2.8 Aircraft systems, associated controls and instructions for their use, as required by BCAR OPS 1.1050.

2.2.9 The minimum equipment list and configuration deviation list for the aeroplane types operated and specific operations authorized, including any requirements relating to operations where performance-based navigation is prescribed.

2.2.10 Checklist of emergency and safety equipment and instructions for its use.

2.2.11 Emergency evacuation procedures, including type specific procedures, crew coordination, assignment of crew's emergency positions and the emergency duties assigned to each crew member.

2.2.12 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.

2.2.13 Survival and emergency equipment for different routes and the necessary procedures to verify its normal functioning before take-off, including procedures to determine the required amount of oxygen and the quantity available.

2.2.14 The ground-air visual signal code for use by survivors, as contained in Annex 12.

2.3 Routes and aerodromes

2.3.1 A route guide to ensure that the flight crew will have, for each flight, information relating to communication facilities, navigation aids, aerodromes, instrument approaches, instrument arrivals and instrument departures as applicable for the operation, and such other information as the operator may deem necessary for the proper conduct of flight operations.

2.3.2 The minimum flight altitudes for each route to be flown.

2.3.3 Aerodrome operating minima for each of the aerodromes that are likely to be used as aerodromes of intended landing or as alternate aerodromes.

2.3.4 The increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities.

2.3.5 The necessary information for compliance with all flight profiles required by regulations, including but not limited to, the determination of:

a) take-off runway length requirements for dry, wet and contaminated conditions, including those dictated by system failures which affect the take-off distance;
b) take-off climb limitations;
c) en-route climb limitations;

d) approach climb limitations and landing climb limitations;
e) landing runway length requirements for dry, wet and contaminated conditions, including systems failures which affect the landing distance; and
f) supplementary information, such as tire speed limitations.

2.4 Training

2.4.1 Details of the flight crew training programme, as required by BCAR OPS 1.941.

2.4.2 Details of the cabin crew duties training programme as required by BCAR OPS 1.1005.

2.4.3 Details of the flight operations officer/flight dispatcher training programme when employed in conjunction with a method of flight supervision in accordance with BCAR OPS 1.175.

IEM OPS 1.1045(c)
Operations Manual Structure
See BCAR-OPS 1.1045(c) & Appendix 1 to BCAR-OPS 1.1045

1 BCAR-OPS 1.1045(a) prescribes the main structure of the Operations Manual as follows:

Part A – General/Basic;

Part B – Aeroplane Operating Matters – Type related;

Part C – Route and Aerodrome Instructions and Information;

Part D – Training.

2 BCAR-OPS 1.1045 (c) requires the operator to ensure that the detailed structure of the Operations Manual is acceptable to the BDCA.

3 Appendix 1 to BCAR-OPS 1.1045 contains a comprehensively detailed and structured list of all items to be covered in the Operations Manual. Since it is believed that a high degree of standardisation of Operations Manuals within the JAA will lead to improved overall flight safety, it is strongly recommended that the structure described in this IEM should be used by operators as far as possible. A List of Contents based upon Appendix 1 to BCAR-OPS 1.1045 is given below.

4 Manuals which do not comply with the recommended structure may require a longer time to be accepted/approved by the BDCA.

5 To facilitate comparability and usability of Operations Manuals by new personnel, formerly employed by another operator, operators are recommended not to deviate from the numbering system used in Appendix 1 to BCAR-OPS 1.1045. If there are sections which, because of the nature of the operation, do not apply, it is recommended that operators maintain the numbering system described below and insert ‘Not applicable’ or ‘Intentionally blank’ where appropriate.

Operations Manual Structure

(List of Contents)

7.1 Flight and Duty Time limitations and Rest requirements
7.2 Exceedances of flight and duty time limitations and/or reduction of rest periods

8 OPERATING PROCEDURES

8.1 Flight Preparation Instructions
8.1.1 Minimum Flight Altitudes
8.1.2 Criteria for determining the usability of aerodromes
8.1.3 Methods for the determination of Aerodrome Operating Minima

8.1.4 En-route Operating Minima for VFR flights or VFR portions of a flight
8.1.5 Presentation and Application of Aerodrome and En Route Operating Minima
8.1.6 Interpretation of meteorological information
8.1.7 Determination of the quantities of fuel, oil and water methanol carried
8.1.8 Mass and Centre of Gravity
8.1.9 ATS Flight Plan
8.1.10 Operational Flight Plan
8.1.11 Operator's Aeroplane Technical Log
8.1.12 List of documents, forms and additional information to be carried
8.2 Ground Handling Instructions
8.2.1 Fuelling procedures
8.2.2 Aeroplane, passengers and cargo handling procedures related to safety
8.2.3 Procedures for the refusal of embarkation
8.2.4 De-icing and Anti-icing on the Ground
8.3 Flight Procedures
8.3.1 VFR/IFR policy
8.3.2 Navigation Procedures
8.3.3 Altimeter setting procedures
8.3.4 Altitude alerting system procedures
8.3.5 Ground Proximity Warning System procedures
8.3.6 Policy and procedures for the use of TCAS/ACAS
8.3.7 Policy and procedures for in-flight fuel management
8.3.8 Adverse and potentially hazardous atmospheric conditions
8.3.9 Wake Turbulence
8.3.10 Crew members at their stations
8.3.11 Use of safety belts for crew and passengers
8.3.12 Admission to Flight Deck
8.3.13 Use of vacant crew seats
8.3.14 Incapacitation of crew members
8.3.15 Cabin Safety Requirements
8.3.16 Passenger briefing procedures
8.3.17 Procedures for aeroplanes operated whenever required cosmic or solar radiation detection equipment is carried
8.4 All Weather Operations
8.5 ETOPS
8.6 Use of the Minimum Equipment and Configuration Deviation List(s)
8.7 Non revenue flights

8.8 Oxygen Requirements

9 DANGEROUS GOODS AND WEAPONS

10 SECURITY

11 HANDLING OF ACCIDENTS AND OCCURRENCES

12 RULES OF THE AIR

Part B AEROPLANE OPERATING MATTERS TYPE RELATED

0 GENERAL INFORMATION AND UNITS OF MEASUREMENT

1 LIMITATIONS

2 NORMAL PROCEDURES

3 ABNORMAL AND EMERGENCY PROCEDURES

4 PERFORMANCE

4.1 Performance data
4.2 Additional performance data

5 FLIGHT PLANNING

6 MASS AND BALANCE

7 LOADING

8 CONFIGURATION DEVIATION LIST

9 MINIMUM EQUIPMENT LIST

10 SURVIVAL AND EMERGENCY EQUIPMENT INCLUDING OXIGEN

11 EMERGENCY EVACUATION

11.1 Instruction for preparation for emergency evacuation
11.2 Emergency evacuation procedures

12 AEROPLANE SYSTEMS

PART C ROUTE AND AERODROME INSTRUCTIONS AND INFORMATION

PART D TRAINING

1 TRAINING SYLLABI AND CHECKING PROGRAMMES- GENERAL

2 TRAINING SYLLABI AND CHECKING

2.1 Flight Crew
2.2 Cabin Crew
2.3 Operations Personnel including Crew Members
2.4. Operations Personnel other than Crew Members

3 PROCEDURES

3.1 Procedures for training and checking
3.2 Procedures to be applied in the event that personnel do not achieve or maintain required standards
3.3 Procedures to ensure that abnormal or emergency situations are not simulated during commercial air transportation flights

4 DOCUMENTATION AND STORAGE

IEM OPS 1.1055(a) (12)
Signature or equivalent
See BCAR-OPS 1.1055(a) (12)

1 BCAR-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 BCAR-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.

IEM to Appendix 1 to BCAR-OPS 1.1045
Operations Manual Contents

1 With reference to Operations Manual Section A, paragraph 8.3.17, on cosmic radiation, limit values should be published in the Operations Manual only after the results of scientific research are available and internationally accepted.

2 With reference to Operations Manual Section B, paragraph 9 (Minimum Equipment List) and 12 (Aeroplane Systems) operators should give consideration to using the ATA number system when allocating chapters and numbers for aeroplane systems.

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ACJ OPS 1.1080
Flight time and flight duty period limitations

1. Purpose and scope

1.1 Flight time and flight duty period limitations are established for the sole purpose of reducing the probability that fatigue of flight crew members may adversely affect the safety of flight.

1.2 In order to guard against this, two types of fatigue must be taken into account, namely, transient fatigue and cumulative fatigue. Transient fatigue may be described as fatigue which is normally experienced by a healthy individual following a period of work, exertion or excitement, and it is normally dispelled by a single sufficient period of sleep. On the other hand cumulative fatigue may occur after delayed or incomplete recovery from transient fatigue or as the aftereffect of more than a normal amount of work, exertion or excitement without sufficient opportunity for recuperation.

1.3 Limitations based on the provisions of this Part will provide safeguards against both kinds of fatigue because they will recognize:

1.3.1 The necessity to limit flight time in such a way as to guard against both kinds of fatigue.

1.3.2 The necessity to limit time spent on duty on the ground immediately prior to a flight or at intermediate points during a series of flights in such a way as to guard particularly against transient fatigue.

1.3.3 The necessity to provide flight crew members with adequate opportunity to recover from fatigue.

1.3.4 The necessity of taking into account other related tasks the flight crew member may be required to perform in order to guard particularly against cumulative fatigue.

2. Definitions

2.1 Flight time
The definition of flight time is of necessity very general but in the context of limitations it is, of course, intended to apply to flight crew members in accordance with the relevant definition of a flight crew member. Pursuant to that latter definition, licensed crew personnel travelling as passengers cannot be considered flight crew members, although this should be taken into account in arranging rest periods.

2.2 Flight duty periods

2.2.1 The definition of flight duty period is intended to cover a continuous period of duty which always includes a flight or a series of flights. It is meant to include all duties flight crew members may be required to carry out from the moment they report at their place of employment on the day of a flight until they are relieved of duties, having completed the flight or series of flights. It is considered necessary that this period should be subject to limitations because a flight crew member's activities within the limits of such period would eventually induce fatigue — transient or

cumulative — which could endanger the safety of a flight. There is on the other hand (from the point of view of flight safety) insufficient reason to establish limitations for any other time during which flight crew members are performing a task assigned to them by the operator. Such a task should, therefore, only be taken into account when making provisions for rest periods as one among many factors which could lead to fatigue.

2.2.2 The definition does not imply the inclusion of such periods as time taken for a flight crew member to travel from home to the place of employment.

2.2.3 An important safeguard may be established if States and operators recognize the right of a crew member to refuse further flight duty when suffering from fatigue of such a nature as to affect adversely the safety of flight.

2.3 Rest periods
The definition of rest period implies an absence of duty and is intended to be for the purpose of recovering from fatigue; the way in which this recovery is achieved is the responsibility of the individual.

3. Types of limitations

3.1 Limitations are broadly divided by time; for example, the majority of States reporting to ICAO prescribe daily, monthly and yearly flight time limitations, and a considerable number also prescribe quarterly flight time limitations. It will probably be sufficient to prescribe flight duty period limitations on a daily basis. It must be understood, however, that these limitations will vary considerably taking into account a variety of situations.

3.2 In formulating regulations or rules governing flight time limitations, the size of the crew complement and the extent to which the various tasks to be performed can be divided among the crew members should be taken into account; and in the case where adequate facilities for relief are provided in the aircraft in such a way that a crew member may have horizontal rest and a degree of privacy, flight duty periods could be extended. Adequate rest facilities on the ground are required at places where relief periods are to be given. Also, States or operators should give due weight to the following factors: traffic density; navigational and communication facilities; rhythm of work/sleep cycle; number of landings and take-offs; aircraft handling and performance characteristics and weather conditions.

IEM OPS 1.1150(a) (3) & (a) (4)
Terminology - Dangerous Goods Accident and Dangerous Goods Incident
See BCAR-OPS 1.1150(a) (3) & (a) (4)

As a dangerous goods accident (See BCAR-OPS 1.1150(a) (3)) and dangerous goods incident (See BCAR-OPS 1.1150(a) (4)) may also constitute an aircraft accident or incident the criteria for the reporting both types of occurrence should be satisfied.

IEM OPS 1.1155
Approval to transport dangerous goods
See BCAR-OPS 1.1155

1 Permanent approval for the transport of dangerous goods will be reflected on the Air Operator Certificate. In other circumstances an approval may be issued separately.

2 Before the issue of an approval for the transport of dangerous goods, the operator should satisfy the BDCA that adequate training has been given, that all relevant documents (e.g. for ground handling, aeroplane handling, training) contain information and instructions on dangerous goods, and that there are procedures in place to ensure the safe handling of dangerous goods at all stages of air transport.

3 The exemption or approval indicated in BCAR-OPS 1.1165(b) (1) or (2) is in addition to that indicated by BCAR-OPS 1.1155.

IEM OPS 1.1160(b) (1)
Dangerous goods on an aeroplane in accordance with the relevant regulations or for operating reasons
See BCAR-OPS 1.1160(b) (1)

1 Dangerous goods required to be on board an aeroplane in accordance with the relevant BCARs 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.

IEM OPS 1.1160(b) (3)
Veterinary aid or a humane killer for an animal
See BCAR-OPS 1.1160(b) (3)

The dangerous goods referred to in BCAR-OPS 1.1160(b) (3) may also be carried on a flight made by the same aeroplane or preceding the flight on which the animal is carried and/or on a flight made by the same aeroplane after that animal has been carried when it is impracticable to load or unload the goods at the time of the flight on which the animal is carried.

IEM OPS 1.1160(b) (4)
Medical Aid for a Patient
See BCAR-OPS 1.1160(b) (4)

1 Gas cylinders, drugs, medicines, 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.

2 The dangerous goods referred to in paragraph 1 above may also be 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.

IEM OPS 1.1160(b) (5)
Scope – Dangerous goods carried by passengers or crew
See BCAR-OPS 1.1160(b) (5)

1 The Technical Instructions exclude some dangerous goods from the requirements normally applicable to them when they are carried by passengers or crew members, subject to certain conditions.

2 For the convenience of operators who may not be familiar with the Technical Instructions, these requirements are repeated below.

3 The dangerous goods which each passenger or crew member can carry are:

a. Alcoholic beverages containing more than 24% but not exceeding 70% alcohol by volume, when in retail packaging not exceeding 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. 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 him. '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 carbon dioxide gas cylinders worn for the operation of mechanical limbs and spare cylinders of 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 carbon dioxide cylinders 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 sporting weapons, providing they are in Division 1.4S (See Note), 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;

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.

IEM OPS 1.1165(b) (1)
States concerned with exemptions
See BCAR-OPS 1.1165(b) (1)

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.

2 The States concerned are those of origin, transit, overflight and destination of the consignment and that of the operator.

3 Where the Technical Instructions indicate that dangerous goods which are normally forbidden may be carried with an approval, the exemption procedure does not apply.

4 The exemption required by BCAR-OPS 1.1165(b) (1) is in addition to the approval required by BCAROPS 1.1155.

AMC OPS 1.1215(b)

Provision of information
See BCAR-OPS 1.1215 (b)

1 Information to Passengers

1.1 Information to passengers should be promulgated in such a manner that passengers are warned as to the types of dangerous goods that must not be carried on board an aeroplane.

1.2 As a minimum, this information should consist of:

a. Warning notices or placards sufficient in number and prominently displayed, at each of the places at an airport where tickets are issued and passengers checked in, in aeroplane boarding areas and at any other place where passengers are checked in; and

b. A warning with the passenger ticket. This may be printed on the ticket or on a ticket wallet or on a leaflet.

1.3 The information to passengers may include reference to those dangerous goods which may be carried.

2 Information to Other Persons

2.1 Information to persons offering cargo for transport by air should be promulgated in such a manner that those persons are warned as to the need to properly identify and declare dangerous goods.

2.2 As a minimum this information should consist of warning notices or placards sufficient in number and prominently displayed at any location where cargo is accepted.

3 General

3.1 Information should be easily understood and identify that there are various classes of dangerous goods.

3.2 Pictographs may be used as an alternative to providing written information or to supplement such information.

AMC OPS 1.1215(e)
Information in the Event of an Aeroplane Incident or Accident
See BCAR-OPS 1.1215(e)

The information to be provided should include the proper shipping name, UN/ID number, class, subsidiary risk(s) for which labels are required, the compatibility group for Class 1 and the quantity and location on board the aeroplane.

AMC OPS 1.1220
Training
See BCAR-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 Areas of training. The areas of training given in Tables 1 and 2 of BCAR-OPS 1.1220 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 area of training should be covered is dependent upon whether it is for general information or to give in-depth appreciation. Additional areas not identified in Tables 1 and 2 may be needed, or some areas omitted, depending on the responsibilities of the individual.

4 Levels of Training

4.1 There are two 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.

4.2 In the absence of other guidance, the staff referred to in BCAR-OPS 1.1220(c) (1) should receive training to the extent identified in sub-paragraph 4.1.a above; all other staff referred to in BCAR-OPS 1.1220(b) and (c) should receive training to the extent identified in sub-paragraph 4.1.b above. However, where flight crew or other crew members, such as loadmasters, are responsible for checking the dangerous goods to be loaded, their training should also be to the extent identified in paragraph 4.1.a above.

5 Training in Emergency Procedures. The training in emergency procedures should include as a minimum:

a. For those personnel covered by BCAR-OPS 1.1220(b) and (c), except for crew members whose emergency procedures training is covered in sub-paragraphs 5b or 5c (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 BCAR-OPS 1.420(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.

6 Recurrent training. Recurrent training should cover the areas in Table 1 or Table 2 relevant to initial Dangerous Goods training unless the responsibility of the individual has changed.

7 Test to verify understanding. It is necessary to have some means of establishing that a person has gained in 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.

IEM OPS 1.1220
Training
See BCAR-OPS 1.1220

1 Areas of Training. The areas of training identified in Tables 1 and 2 of BCAR-OPS 1.1220 are applicable whether the training is:

a. For general information and guidance; or

b. To give an in-depth and detailed appreciation of the subject.

1.1 The extent to which the training should be covered and whether areas not identified in Table 1 or Table 2 need to be added or the identified areas varied, is dependent on the responsibilities of the person being trained. In particular, if a crew member is a loadmaster the appropriate areas of training required may be those in column 4 of Table 2 and not those in column 5. Also, if an operator carries only cargo, those areas relating to passengers and their baggage may be omitted from the training.

2 How to Achieve Training

2.1 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'.

2.2 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 selfstudy 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).

AMC OPS 1.1225
Dangerous Goods Incident and Accident Reports
See BCAR-OPS 1.1225

1 Any type of dangerous goods incident or accident should be 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 should also be reported.

2 Initial reports may be made by any means, but in all cases a written report should be made as soon as possible.

3 The report should be as precise as possible and contain all data known at the time the report is made, for example:

a. Date of the incident or accident, or the finding of undeclared or misdeclared dangerous goods;

b. Location, the flight number and flight date, if applicable;

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, where known;

e. Class or division and any subsidiary risk;

f. Type of packaging, if applicable, and the packaging specification marking on it;

g. Quantity involved;

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 contact number of the person making the report.

4 Copies of the relevant documents and any photographs taken should be attached to the report.

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ACJ OPS 1.1240
Training Programmes
See MRAC-OPS 1.1240

This ACJ is interpretative explanatory material that provides additional information on security training.

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"

ACJ-OPS 1.1255 Security considerations related to the flight crew compartment door
See MRAC-OPS 1.1255

This ACJ is an acceptable means of compliance onthe flight crew compartment door. According to MRAC-OPS 1.1255 (b), from 1 November 2003, all passenger carrying aeroplanes of a maximum certificated take-off weight in excess of 45 000 kg or with an approved passenger seating capacity greater than 60, and having a lockable door installed between the pilot compartment and the passenger compartment, shall meet the following requirements:

(a) Protection of flight deck. If a flight deck door is required by operating rules, the door installation must be designed to:

(1) Resist forcible intrusion by unauthorised persons and be capable of withstanding impacts of 300 Joules (221.3 foot-pounds) at the critical locations on the door, as well as a 1 113 Newton (250 pound) constant tensile load on the knob or handle, and

(2) Resist penetration by small arms fire and fragmentation devices by meeting the following projectile definitions and projectile speeds

i. Demonstration Projectile #1.- A 9 mm full metal jacket, round nose (FMJ RN) bullet with nominal mass of 8•0 g (124 grain) and reference velocity 436 m/s (1 430 ft/s).

ii. Demonstration Projectile #2.- A .44 Magnum, jacketed hollow point (JHP) bullet with nominal mass of 15·6 g (240 grain) and reference velocity 436 m/s (1 430 ft/s).

(b) Flight crew incapacitation

Each operator must establish means to enable a cabin crew member to enter the pilot compartment in the event that a flight crew member becomes incapacitated. Any associated system must be operable from each pilots' station.