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 JAR–OPS 1.

1.2 Where a particular JAR 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 JAR paragraph to which it refers. The number is introduced by the letters AMC or IEM to distinguish the material from the JAR 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 New AMC or IEM material may, in the first place, be made available rapidly by being published as a Temporary Guidance Leaflet (TGL). Operations TGLs can be found in the Joint Aviation Authorities Administrative & Guidance Material, Section 4 – Operations, Part Three: Temporary Guidance. The procedures associated with Temporary Guidance Leaflets are included in the Operations Joint Implementation Procedures, Section 4 – Operations, Part 2 Chapter 10.

Note: Any person who considers that there may be alternative AMCs or IEMs to those published should submit details to the Operations Director, with a copy to the Regulation Director, for alternatives to be properly considered by the JAA. Possible alternative AMCs or IEMs may not be used until published by the JAA as AMCs, IEMs or TGLs.

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.
ACJ to Appendix 1 to JAR-OPS 1.005 (a)

Operations of performance class B aeroplanes
See Appendix 1 to JAR-OPS 1.005(a)

1 JAR-OPS 1.037; Accident prevention and flight safety programme

For operations of performance class B aeroplanes, a simplified programme is sufficient which may consist of the following.

Collecting case based material (such as accident reports relating to the type of operation) and submit/distribute that information material to the crew members concerned; or

Collection and use of information from flight safety seminars (such as AOPA flight safety seminars etc.)

2 Appendix 2 to JAR-OPS 1.175; The management and organisation of an AOC holder

Supervision - The supervision of personnel may be undertaken by the appropriate nominated postholder(s) subject to time available.

3 JAR-OPS 1.915; Technical Log

Two examples of acceptable ways to fulfil the requirement for a Technical Log are given in attachments 1 and 2 to this ACJ, where a so called Flight Log is presented. (See attachments)

4 JAR-OPS 1.1070; MME – Maintenance Management Exposition:

The MME can be simplified as relevant to the operation to be conducted.

5 Subpart R; Transport of Dangerous goods by air

JAR-OPS 1.1155, 1.1160, 1.1165, 1.1215, 1.1220 and 1.1225 are applicable to all operators.

The requirement in JAR-OPS 1.1165 may be fulfilled by the use of information pamphlets.

The remainder of this Subpart applies only when the operator seeks or holds an approval to carry dangerous goods.

6 Subpart S; Security

JAR-OPS 1.1235 - Security requirements are applicable when operating in states where the national security programme applies to the operations covered in this Appendix.

JAR-OPS 1.1240 - Training programmes shall be adapted to the kind of operations performed. A self-study training programme may be acceptable for VFR operations.

7 Appendix 1 to JAR-OPS 1.005(a), subparagraph (a)(3)

Civil twilight ends in the evening when the centre of the sun’s disc is 6 degrees below the horizon and begins in the morning when the centre of the sun’s disc is 6 degrees below the horizon.

8 JAR-OPS 1.290(b)(2)

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

[Amdt. 5, 01.03.03]
### Attachment 1 to ACJ to Appendix 1 to JAR-OPS 1.005(a)

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| FLIGHT DATA FLIGHT TIME REPORT | CERTIFICATE OF RELEASE TO SERVICE | ACTIONS TAKEN 13 |
| Flight Time: | Next Maintenance due: | Name of certifying staff & JAR 145 approval reference (if applicable) |
| Total this sheet: | Hours | Certifies that the work specified except as otherwise specified was carried out in accordance with JAR-145 and in respect to that work the aeroplane/aeroplane component is considered ready for release to service. |
| Total from previous sheet: | Landings | Signature |
| Total to Report: | Date: | |

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1. Operator’s name and address pre-printed or filled in by hand
2. Must be filled for
   - each day; and
   - each flight crew
3. Sheet number (e.g. yy-nn) must be pre-printed or printed by hand. All sheets must be identifiable and numbered according to a continuous system that offers the same security when hand printed as when pre-printed.
4. The commander’s signature states that everything on this sheet is correct
5. For flights from A to A, a summary entry may be made. All other flights such as A to B etc., for each flight an entry must be made.
6. Such as Private, Commercial, Technical, Training, Sailplane towing etc.
7. Number of landings if summary entry
8. Flight Preparation according the Operations Manual (commanders initials) state that:
   1. Weight and Balance is within Limit
   2. Pre-flight check is done
   3. Technical status is checked and aeroplane accepted by the commander
   4. Passengers manifest/documentation performed
9. Total Fuel on board (state the units unless pre-printed)
    - if no report needs to be made state "- NIL -"
    - if a report must be made state (mark) the type of report
11. Number each observation sequentially for each log sheet.
12. If de- or anti-icing has been applied, state time and amount and kind of fluid applied or other action taken, e.g. mechanical removal of snow or ice, if oil has been filled, state the time and amount
13. Use the same number as the corresponding observation to link report and response.

[Amndt. 5, 01.03.03]
### Address of operator

**Date:**

**Address of operator**

**Date:**

### CREW

**Name of commander:**

**Nb of Pax:**

**Mass:**

**Cargo:**

**Take off:**

**Name and duty of crew member:**

**Engine 1** / **Engine 2**

**Refilled:**

**Type of fluid:**

**Mixture:**

**Time of de-icing:**

**Commenced:**

**Finished:**

**Total:**

**Last release:**

**Total aeroplane hours:**

**Total aeroplane landing:**

**Next maintenance due:**

**In hours:**

**In landing:**

### LOAD

**Load:**

**Nb of Pax:**

**Mass (kg/lb):**

**Cargo:**

**Take off:**

**Total:**

**Flight Nb:**

**From:**

**To:**

**Nb. of Ldg:**

**Name / Signature**

**Off:**

**On:**

**Time:**

**Time:**

**Take-off:**

**Ldg:**

**Time:**

**Take-off:**

**Ldg:**

**Defects**

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### GROUND DE-ICING

**Sheet number 00000001**

**Address of operator:**

**Date:**

**Aeroplane Type:**

**Registration:**

**Name of commander:**

**Name and duty of crew member:**

**Engine 1** / **Engine 2**

**Refilled:**

**Type of fluid:**

**Mixture:**

**Time of de-icing:**

**Commenced:**

**Finished:**

**Total:**

**Last release:**

**Total aeroplane hours:**

**Total aeroplane landing:**

**Next maintenance due:**

**In hours:**

**In landing:**

### LOAD

**Load:**

**Nb of Pax:**

**Mass (kg/lb):**

**Cargo:**

**Take off:**

**Total:**

**Flight Nb:**

**From:**

**To:**

**Nb. of Ldg:**

**Name / Signature**

**Off:**

**On:**

**Time:**

**Time:**

**Take-off:**

**Ldg:**

**Time:**

**Take-off:**

**Ldg:**

**Defects**

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### GROUND DE-ICING

**Sheet number 00000001**

**Address of operator:**

**Date:**

**Aeroplane Type:**

**Registration:**

**Name of commander:**

**Name and duty of crew member:**

**Engine 1** / **Engine 2**

**Refilled:**

**Type of fluid:**

**Mixture:**

**Time of de-icing:**

**Commenced:**

**Finished:**

**Total:**

**Last release:**

**Total aeroplane hours:**

**Total aeroplane landing:**

**Next maintenance due:**

**In hours:**

**In landing:**

### LOAD

**Load:**

**Nb of Pax:**

**Mass (kg/lb):**

**Cargo:**

**Take off:**

**Total:**

**Flight Nb:**

**From:**

**To:**

**Nb. of Ldg:**

**Name / Signature**

**Off:**

**On:**

**Time:**

**Time:**

**Take-off:**

**Ldg:**

**Time:**

**Take-off:**

**Ldg:**

**Defects**

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**Amdt. 5, 01.03.03**
AMC OPS 1.035
Quality System
See JAR-OPS 1.035

1 Introduction

1.1 In order to show compliance with JAR-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 Authority who has corporate authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority, and any additional requirements defined by the operator.

ii. Quality Assurance. All those planned and systematic actions necessary to provide adequate confidence that operational and maintenance practices satisfy given requirements.

iii. Quality Manager. The manager, acceptable to the Authority, responsible for the management of the Quality System, monitoring function and requesting corrective actions.

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 JAR-OPS 1 together with any additional standards specified by the operator.

2.2.2 The Accountable Manager is an essential part of the AOC holder’s management organisation. With regard to the text in JAR-OPS 1.175 (h) and the above terminology, the term ‘Accountable Manager’ is intended to mean the Chief Executive / President / Managing Director / Director General / General Manager etc. of the operator’s organisation, who by virtue of his position has overall responsibility (including financial) for managing the organisation.

2.2.3 The Accountable Manager will have overall responsibility for the AOC 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 JAR-OPS 1, the Operations Manual, the Operator's Maintenance Management Exposition, and any other standards specified by that operator, or the Authority, to ensure safe operations and airworthy aircraft.

2.4 Quality Manager

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

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

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

2.4.4 The Quality Manager should:

a. Have direct access to the Accountable Manager;

b. Not be one of the nominated post holders; and
AMC OPS 1.035 (continued)

c. Have access to all parts of the operator's and, as necessary, any sub-contractor's organisation.

2.4.5 In the case of small/very small operators (see paragraph 7.3 below), the posts of the Accountable Manager and the Quality Manager may be combined. However, in this event, quality audits should be conducted by independent personnel. In accordance with paragraph 2.4.4.b above, it will not be possible for the Accountable Manager to be one of the nominated postholders.

3 Quality System

3.1 Introduction

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

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

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

3.2 Scope

3.2.1 As a minimum, the Quality System should address the following:

a. The provisions of JAR-OPS;

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

c. The operator's Quality Policy;

d. The operator's organisational structure;

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

f. Documentation, including manuals, reports and records;

g. Quality Procedures;

h. Quality Assurance Programme;

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

j. Training requirements.

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

3.3 Relevant Documentation

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

3.3.2 In addition, relevant documentation should also include the following:

a. Quality Policy;

b. Terminology;

c. Specified operational standards;

d. A description of the organisation;

e. The allocation of duties and responsibilities;

f. Operational procedures to ensure regulatory compliance;

g. Accident Prevention and Flight Safety Programme;

h. The Quality Assurance Programme, reflecting;

i. Schedule of the monitoring process;

ii. Audit procedures;
AMC OPS 1.035 (continued)

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 JAR-OPS 1.035(b).)

4.1 Introduction

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

4.1.2 When establishing a Quality Assurance Programme, consideration should, at least, be given to the paragraphs 4.2 to 4.9 below:

4.2 Quality Inspection

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

4.2.2 Typical subject areas for quality inspections are:

a. Actual flight operations;
b. Ground De-icing/Anti-icing;
c. Flight Support Services;
d. Load Control;
e. Maintenance;
f. Technical Standards; and
g. Training Standards.

4.3 Audit

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

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

a. A statement explaining the scope of the audit;
b. Planning and preparation;
c. Gathering and recording evidence; and
d. Analysis of the evidence.

4.3.3 Techniques which contribute to an effective audit are:

a. Interviews or discussions with personnel;
b. A review of published documents;
c. The examination of an adequate sample of records;
d. The witnessing of the activities which make up the operation; and
e. The preservation of documents and the recording of observations.

4.4 Auditors

4.4.1 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 organisation or from an external source under the terms of an agreement acceptable to the Authority. In all cases the operator should develop suitable procedures to ensure that persons directly responsible for the activities to be audited are not selected as part of the auditing team. Where external auditors are used, it is essential that any external specialist is familiar with the type of operation and/or maintenance conducted by the operator.

4.5.2 The operator’s Quality Assurance Programme should identify the persons within the company who have the experience, responsibility and authority to:

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

4.6 Audit Scope

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

a. Organisation;
b. Plans and Company objectives;
c. Operational Procedures;
d. Flight Safety;
e. Operator certification (AOC/Operations specification);
f. Supervision;
g. Aircraft Performance;
h. All Weather Operations;
i. Communications and Navigational Equipment and Practices;
j. Mass, Balance and Aircraft Loading;
k. Instruments and Safety Equipment;
l. Manuals, Logs, and Records;
m. Flight and Duty Time Limitations, Rest Requirements, and Scheduling;
n. Aircraft Maintenance/Operations interface;
o. Use of the MEL;
p. Maintenance Programmes and Continued Airworthiness;
q. Airworthiness Directives management;
r. Maintenance Accomplishment;
s. Defect Deferral;
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 programme unless an extension to the audit period is accepted as explained below. An operator may increase the frequency of audits at his discretion but should not decrease the frequency without the agreement of the Authority. It is considered unlikely that an interval between audits greater than 24 months would be acceptable for any audit topic.

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

4.8 Monitoring and Corrective Action

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

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

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

4.8.4 Corrective action

a. Subsequent to the quality inspection/audit, the operator should establish:
   i. The seriousness of any findings and any need for immediate corrective action;
   ii. The origin of the finding;
   iii. What corrective actions are required to ensure that the non-compliance does not recur;
   iv. A schedule for corrective action;
   v. The identification of individuals or departments responsible for implementing corrective action;
   vi. Allocation of resources by the Accountable Manager, where appropriate.
4.8.5 The Quality Manager should:

a. Verify that corrective action is taken by the manager responsible in response to any finding of non-compliance;

b. Verify that corrective action includes the elements outlined in paragraph 4.8.4 above;

c. Monitor the implementation and completion of corrective action;

d. Provide management with an independent assessment of corrective action, implementation and completion;

e. Evaluate the effectiveness of corrective action through the follow-up process.

4.9 Management Evaluation

4.9.1 A management evaluation is a comprehensive, systematic, documented review by the management of the quality system, operational policies and procedures, and should consider:

a. The results of quality inspections, audits and any other indicators;

b. The overall effectiveness of the management organisation in achieving stated objectives.

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

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

4.10 Recording

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

4.10.2 The following records should be retained for a period of 5 years:

a. Audit Schedules;

b. Quality inspection and Audit reports;

c. Responses to findings;

d. Corrective action reports;

e. Follow-up and closure reports; and

f. Management Evaluation reports.

5 Quality Assurance Responsibility for Sub-Contractors

5.1 Sub-Contractors

5.1.1 Operators may decide to sub-contract out certain activities to external agencies for the provision of services related to areas such as:

a. Ground De-icing/Anti-icing;

b. Maintenance;

c. Ground handling;

d. Flight Support (including Performance calculations, flight planning, navigation database and despatch);

e. Training;

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

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

6 Quality System Training

6.1 General

6.1.1 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 Organisations with 20 or less full time employees

7.1 Introduction

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

7.2 Scale of Operation

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

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

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

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

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

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

IEM OPS 1.035
Quality System – Organisation examples
See JAR–OPS 1.035

The following diagrams illustrate two typical examples of Quality organisations.

1. Quality System within the AOC holder’s organisation when the AOC holder also holds a JAR–145 approval.
2. Quality Systems related to an AOC holder’s organisation where aircraft maintenance is contracted out to a JAR-145 approved organisation which is not integrated with the AOC holder:

**JAR-145 Approved Maintenance Organisation**
- Accountable Manager
- Quality System
- Quality Manager
- Quality Assurance
- JAR-145 Approved Maintenance Organisation
- Maintenance

**AOC Holder Organisation**
- Accountable Manager
- Quality System
- Quality Manager
- Quality Assurance
- Operations
- Quality Assurance

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

[Ch. 1, 01.03.98]

**ACJ OPS 1.037**

**Accident prevention and flight safety programme**

See JAR-OPS 1.037

1. Guidance material for the establishment of a safety programme [and Flight Data Monitoring] can be found in:
   a. ICAO Doc 9422 (Accident Prevention Manual); and
   b. ICAO Doc 9376 (Preparation of an Operational Manual).
   c. CAP 739

[Ch. 1, 01.03.98, Amdt. 7, 01.09.04]

**ACJ OPS 1.037(a)(2)**

**Occurrence Reporting Scheme**

See JAR-OPS 1.037(a)(2)

1. The overall objective of the scheme described in JAR-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 organisations may learn from them.

3. The scheme is an essential part of the overall monitoring function; it is complementary to the normal day to day procedures and ‘control’ systems and is not intended to duplicate or supersede any of them. The scheme is a tool to identify those occasions where routine procedures have failed. (Occurrences that have to be reported and responsibilities for submitting reports are described in JAR-OPS 1.420.)
SECTION 2 JAR-OPS 1 Subpart B

ACJ OPS 1.037(a)(2) (continued)

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.

[Amdt. 3, 01.12.01]

[ACJ OPS 1.037(a)(4)
Flight Data Monitoring Programme
See JAR-OPS 1.037(a)(4)

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

2. The manager of the accident prevention and flight safety programme, which includes the FDM programme, is accountable for the discovery of issues and the transmission of these to the relevant manager(s) responsible for the process(es) concerned. The latter are accountable for taking appropriate and practicable safety action within a reasonable period of time that reflects the severity of the issue.

Note: While an operator may contract the operation of a flight data analysis programme to another party the overall responsibility remains with the operator’s accident prevention and flight safety programme manager.

3. An FDM programme will allow an operator to:

3.1 Identify areas of operational risk and quantify current safety margins.

3.2 Identify and quantify operational risks by highlighting when non-standard, unusual or unsafe circumstances occur.

3.3 Use the FDM information on the frequency of occurrence, combined with an estimation of the level of severity, to assess the safety risks and to determine which may become unacceptable if the discovered trend continues.

3.4 Put in place appropriate procedures for remedial action once an unacceptable risk, either actually present or predicted by trending, has been identified.

3.5 Confirm the effectiveness of any remedial action by continued monitoring.

4. Flight Data Monitoring Analysis Techniques:

4.1 Exceedence Detection: This looks for deviations from flight manual limits, and standard operating procedures. A set of core events should be selected to cover the main areas of interest to the operator. A sample list is in the Appendix. The event detection limits should be continuously reviewed to reflect the operator’s current operating procedures.

4.2 All Flights Measurement: A system that defines what is normal practice. This may be accomplished by retaining various snapshots of information from each flight.

4.3 Statistics: A series of measures collected to support the analysis process. These would be expected to include the numbers of flights flown and analysed, aircraft and sector details sufficient to generate rate and trend information.

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

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

7. Accident and incident data requirements specified in JAR-OPS 1.160 take precedence over the requirements of an FDM programme. In these cases the FDR data should be retained as part of the investigation data and may fall outside the de-identification agreements. ]
ACJ OPS 1.037(a)(4) (continued)

[8.] Every crew member has a responsibility to report events described in JAR-OPS 1.085(b) using the company occurrence reporting scheme detailed in JAR-OPS 1.037(a)(2). Mandatory Occurrence Reporting is a requirement under JAR-OPS 1.420. Significant risk-bearing incidents detected by FDM will therefore normally be the subject of mandatory occurrence reporting by the crew. If this is not the case then they should submit a retrospective report that will be included under the normal accident prevention and flight safety process without prejudice.

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

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

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

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

a) The aim of the FDM programme.

b) A data access and security policy that should restrict access to information to specifically authorised persons identified by their position.

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

d) The data retention policy and accountability including the measures taken to ensure the security of the data.

e) The conditions under which, on rare occasions, advisory briefing or remedial training should take place; this should always be carried out in a constructive and non-punitive manner.

f) The conditions under which the confidentiality may be withdrawn for reasons of gross negligence or significant continuing safety concern.

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

h) The policy for publishing the findings resulting from FDM.

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

[Amndt. 7, 01.09.04]
IEM OPS 1.065
Carriage of weapons of war and munitions of war
See JAR-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.)

[Ch. 1, 01.03.98]

IEM OPS 1.070
Carriage of sporting weapons
See JAR-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 JAR-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 aeroplane.

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

[Ch. 1, 01.03.98]

[ACJ OPS 1.085(e)(3) Crew responsibilities
See JAR-OPS 1.085(e)(3)

Information on the effects of medication, drugs, other treatments and alcohol, is to be found in JAR FCL Part 3 Medical, IEM FCL 3.040.]

[Amdt. 7, 01.09.04]
In JAR-OPS 1.160(a)(1) and (2), the phrase ‘to the extent possible’ means that either:

1. There may be technical reasons why all of the data cannot be preserved; or

2. The aeroplane may have been despatched with unserviceable recording equipment as permitted by the MEL Policy (TGL 26).

[Amdt. 7, 01.09.04]

1 Approval for a JAA operator to wet lease-in a replacement aeroplane from another JAA operator when the need is immediate, unforeseen and urgent may be given in anticipation by the Authority in the State of the lessee in accordance with the method described below. The lessee should maintain a record of occasions when lessors are used, for inspection by the State that issued his AOC.

2. The Authority in the State of the lessee may issue a general approval that allows the lessee to use a replacement aeroplane supplied by another JAA operator holding a JAR-OPS AOC provided that:

   (a) The routes intended to be flown are contained within the authorised areas of operations specified in the AOC of the lessor; and

   (b) The lease period does not exceed five consecutive days; and

   (c) For the duration of the lease, the flight and duty time limitations and rest requirements used by the lessor are not more permissive than apply in the State of the lessee.

[Amdt. 7, 01.09.04]

1 Approval for a JAA operator to wet lease-in a replacement aeroplane from an operator other than a JAA operator to cater for situations in which the need is immediate, unforeseen and urgent may be given in anticipation by the Authority in the State of the lessee in accordance with the method described below. The lessee should maintain a record of occasions when lessors are used, for inspection by the State that issued his AOC.

2. The Authority in the State of the lessee may approve individually non-JAA operators whose names should then be placed in a list maintained by the lessee provided that:

   (a) The lessor is an operator holding an AOC issued by a State which is a signatory to the Convention on International Civil Aviation; and

   (b) Unless otherwise agreed by the Authority of the lessee, the lessee audits the operation of the lessor to confirm compliance with operating and aircrew training standards equivalent to JAR-OPS 1, maintenance standards equivalent to JAR 145, and aircraft certification standards as prescribed in JARs or FARs; and

   (c) The routes intended to be flown are contained within the authorised areas of operations specified in the AOC of the lessor; and

   (d) The lease period does not exceed five consecutive days; and

   (e) For the duration of the lease, the flight and duty time limitations and rest requirements used by the lessor are not more permissive than apply in the State of the lessee.

[Amdt. 7, 01.09.04]
ACJ OPS 1.165(c)(2) (continued)

3. Lessors, when first approved by the State of the lessee, and any revalidations, remain valid for a period not exceeding 12 months.

Note 1. The lessee is responsible for providing information to the State that issued his AOC to support the initial application and any revalidations.

[Amrd. 7, 01.09.04]

[Appendix to ACJ OPS 1.037 (a)(4)]

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

<table>
<thead>
<tr>
<th>Event Group</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rejected take-Off</td>
<td>High Speed Rejected take-off</td>
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<tr>
<td>Take-off Pitch</td>
<td>Pitch rate high on take-off</td>
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<tr>
<td></td>
<td>Pitch attitude high during take-off</td>
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<td>Initial climb height loss 400 ft AAL to 1,500 ft AAL</td>
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<td>Slow Climb-out</td>
<td>Excessive time to 1,000 ft AAL after take-off</td>
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<td>Climb-out Speeds</td>
<td>Climb out speed high below 400 ft AAL</td>
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<tr>
<td></td>
<td>Climb out speed high 400 ft AAL to 1,000 ft AAL</td>
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<tr>
<td></td>
<td>Climb out speed low 35 ft AGL to 400 ft AAL</td>
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<tr>
<td></td>
<td>Climb out speed low 400 ft AAL to 1,500 ft AAL</td>
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<tr>
<td>High Rate of Descent</td>
<td>High rate of descent below 2,000 ft AGL</td>
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<td>Approach Speeds</td>
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<td>Landing Pitch</td>
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<td></td>
<td>Pitch attitude low on landing</td>
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<tr>
<td>Event Group</td>
<td>Description</td>
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<td>Mmo exceedence</td>
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<td>Flap placard speed exceedence</td>
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<td>Gear down speed exceedence</td>
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<td>Gear selection up/down speed exceedence</td>
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<td></td>
<td>Flap/ Slat altitude exceedence</td>
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<td></td>
<td>Maximum operating altitude exceedence</td>
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</tbody>
</table>

[Amendment 7, 01.09.04]
IEM OPS 1.175
The management organisation of an AOC holder
See JAR-OPS 1.175(g)-(o)

1 Function and Purpose

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

2 Responsibilities of Management

2.1 The responsibilities of management related to JAR-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 JAR-OPS 1.175(c)(2)

1 JAR-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.

[Ch. 1, 01.03.98]

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

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

2. Nominated 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. JAR-OPS and any associated requirements and procedures;

b. The AOC holder's Operations Specifications; ]
ACJ OPS 1.175(i) (continued)

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

2.3 Familiarity with Quality Systems;

2.4 Appropriate management experience in a comparable organisation; and

2.5 Five years relevant work experience of which at least two years should be from the aeronautical industry in an appropriate position.

3. Flight Operations. The nominated postholder or his deputy should hold a valid Flight Crew Licence appropriate to the type of operation conducted under the AOC in accordance with the following:

3.1 If the AOC includes aeroplanes certificated for a minimum crew of 2 pilots - An Airline Transport Pilot's Licence issued or validated by a JAA Member State:

3.2 If the AOC is limited to aeroplanes certificated for a minimum crew of 1 pilot - A Commercial Pilot's Licence, and if appropriate to the operation, an Instrument Rating issued or validated by a JAA Member State.

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 Authority. 'Relevant engineering degree' means an engineering degree from Aeronautical, Mechanical, Electrical, Electronic, Avionic or other studies relevant to the maintenance of aircraft/aircraft components.

4.2 Thorough familiarity with the organisation's Maintenance Management Exposition.

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

4.4 Knowledge of maintenance methods.

5. Crew Training. The nominated postholder or his deputy should be a current Type Rating Instructor on a type/class operated under the AOC.

5.1 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.

[Amndt. 3, 01.12.01]

[ACJ OPS 1.175(j)]
Combination of nominated postholder’s responsibilities
See JAR-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 organisation or of the operation may prevent, or limit, combinations of posts which may be acceptable in other circumstances.

4. In most circumstances, the responsibilities of a nominated postholder will rest with a single individual. However, in the area of ground operations, it may be acceptable for these responsibilities to be split, provided that the responsibilities of each individual concerned are clearly defined. ]
SECTION 2

ACJ OPS 1.175(j) (continued)

[ 5. The intent of JAR-OPS 1.175 is neither to prescribe any specific organisational hierarchy within the operator’s organisation on a JAA wide basis nor to prevent an Authority from requiring a certain hierarchy before it is satisfied that the management organisation is suitable. ]

[Amdt. 3, 01.12.01]

[ACJ OPS 1.175(j) & (k) ]
Employment of staff
See JAR-OPS 1.175(j) & (k)

In the context of JAR-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.

[Amdt. 3, 01.12.01]

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

1 The JAR-145 organisation’s Maintenance Management Exposition should reflect the details of any sub-contract(s).

2 A change of aeroplane type or of the JAR-145 approved maintenance organisation may require the submission of an acceptable amendment to the JAR-145 Maintenance Management Exposition.

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ACJ/AMC/IEM D – OPERATIONAL PROCEDURES

ACJ OPS 1.195
Operational Control
See JAR-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 organisation and methods established to exercise operational control should be included in the operations manual and should cover at least a description of responsibilities concerning the initiation, continuation, termination or diversion of each flight.

[ACJ OPS 1.205
Competence of Operations personnel
See JAR-OPS 1.205

If an operator employs Flight Operations Officers in conjunction with a method of Operational Control as defined in JAR-OPS 1.195, training for these personnel should be based on relevant parts of ICAO Doc 7192 D3. This training should be described in Subpart D of the Operations Manual. It is not to be inferred from this that there is a requirement for Licensed Flight Dispatchers or for a flight following system.]

[ACJ OPS 1.205
Competence of Operations personnel
See JAR-OPS 1.205

If an operator employs Flight Operations Officers in conjunction with a method of Operational Control as defined in JAR-OPS 1.195, training for these personnel should be based on relevant parts of ICAO Doc 7192 D3. This training should be described in Subpart D of the Operations Manual. It is not to be inferred from this that there is a requirement for Licensed Flight Dispatchers or for a flight following system.]

AMC OPS 1.210(a)
Establishment of procedures
See JAR-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 JAR-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:
### IEM OPS 1.210(b) (continued)

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PRE-TAKE-OFF</th>
<th>IN-FLIGHT</th>
<th>PRE-LANDING</th>
<th>POST-LANDING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Brief of cabin crew by the senior cabin crew member prior to commencement of a flight or series of flights.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Check of safety equipment in accordance with operator’s policies and procedures.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Supervision of passenger embarkation and disembarkation (JAR-OPS 1.075; JAR-OPS 1.105; JAR-OPS 1.270; JAR-OPS 1.280; JAR-OPS 1.305).</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>5. Securing of passenger cabin (e.g. seat belts, cabin cargo/baggage etc.: JAR-OPS 1.280; JAR-OPS 1.285; JAR-OPS 1.310).</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Arming of door slides.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Safety information to passengers (JAR-OPS 1.285).</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9. ‘Cabin secure’ report to flight crew.</td>
<td>X</td>
<td>if required</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>10. Operation of cabin lights.</td>
<td>X</td>
<td>if required</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>11. Cabin crew at crew stations for take-off and landing (JAR-OPS 1.310; JAR-OPS 1.210(c); IEM OPS 1.210(c)).</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>12. Surveillance of passenger cabin.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>13. Prevention and detection of fire in the cabin (including the combi-cargo area), crew rest areas, galleys and toilets and instructions for actions to be taken.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>14. Action to be taken when turbulence is encountered or in-flight incidents (pressureurisation failure, medical emergency etc.). (See also JAR-OPS 1.320 and JAR-OPS 1.325).</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Disarming of door slides.</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>16. Reporting of any deficiency and/or unserviceability of equipment and/or any incident (See also JAR-OPS 1.420).</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

[Ch. 1, 01.03.98]

### IEM OPS 1.210(c)
**Critical phases of flight**

See JAR-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 JAR-OPS 1.085(c)(8)).

### [ACJ OPS 1.216](#)
**In-flight Operational Instructions**

See JAR-OPS 1.216

When co-ordination with an appropriate Air Traffic Service unit has not been possible, in-flight operational instructions do not relieve a commander of responsibility for obtaining an appropriate clearance from an Air Traffic Service unit, if applicable, before making a change in flight plan.

[Amdt. 7, 01.09.04]

### IEM OPS 1.220
**Authorisation of aerodromes**

See JAR-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
SECTION 2 JAR-OPS 1 Subpart D

IEM OPS 1.220 (continued)

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, nav aids 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 JAR-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.

d. JAA TGL No 2 - Advisory material for the airworthiness approval of navigation systems for use in European Airspace designated for Basic RNAV operations.

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 utilise 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 (e.g. 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.

[Ch. 1, 01.03.98]
IEM OPS 1.245(a)
Maximum distance from an adequate aerodrome
for two-engined aeroplanes without ETOPS Approval
See JAR-OPS 1.245

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

[Ch. 1, 01.03.98; Amdt. 4, 01.07.02]

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

1. As prescribed in JAR-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 45 360 kg beyond 120 minutes from an adequate aerodrome at the one engine inoperative cruise speed calculated in accordance with JAR-OPS 1.245(b) unless approved by the Authority. This 120 minute threshold may be exceeded by no more than 60 minutes. In order for operations between 120 and 180 minutes to be approved, due account should be taken of the aeroplane’s design and capabilities (as outlined below) and an operator’s experience related to such operations. An operator should ensure that the following items are addressed. Where necessary, information should be included in the Operations Manual and the Operator’s Maintenance Management Exposition.

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

2. Systems capability - Aeroplanes should be certificated to JAR-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 JAR 25 and JAR E or equivalents, concerning engine type certification, installation and system operation. In addition to the performance standards established by the Authority at the time of engine certification, the engines should comply with all subsequent mandatory safety standards specified by the Authority, including those necessary to maintain an acceptable level of reliability. In addition, consideration should be given to the effects of extended duration single engine operation (e.g. the effects of higher power demands such as bleed and electrical).

b. Airframe systems - With respect to electrical power, three or more reliable (as defined by JAR-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 JAR-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 Authority in the State of the operator.

b. These events should be evaluated by the operator in consultation with his Authority and with the engine and airframe manufacturers. The National Aviation Authority may consult with the type design authority to ensure that world wide data is evaluated.

c. Where statistical assessment alone may not be applicable eg 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 JAR-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 JAR-145 or by an appropriately trained flight crew member prior to an extended range flight to ensure that all maintenance actions are complete and all fluid levels are at prescribed levels for the flight duration.

b. Engine oil consumption programmes - Such programmes are intended to support engine condition trend monitoring (see below).

c. Engine condition trend monitoring programme - A programme for each powerplant that monitors engine performance parameters and trends of degradation that provides for maintenance actions to be undertaken prior to significant performance loss or mechanical failure.
d. Arrangements to ensure that all corrective actions required by the type design authority are implemented.

5. **Flight Crew Training:** Flight crew training for this type of operation should include, in addition to the requirements of JAR-OPS 1 Sub part N, particular emphasis on the following:

a. Fuel management - Verifying required fuel on board prior to departure and monitoring fuel on board en-route including calculation of fuel remaining. Procedures should provide for an independent cross-check of fuel quantity indicators (e.g. fuel flow used to calculate fuel burned compared to indicated fuel remaining). Confirmation that the fuel remaining is sufficient to satisfy the critical fuel reserves.

b. Procedures for single and multiple failures in flight that may give rise to go/no-go and diversion decisions - Policy and guidelines to aid the flight crew in the diversion decision making process and the need for constant awareness of the closest suitable alternate aerodrome in terms of time.

c. One-engine inoperative performance data - Drift down procedures and one-engine inoperative service ceiling data.

d. Weather reports and flight requirements - METAR and TAF reports and obtaining in flight weather updates on en-route alternate, destination and destination alternate aerodromes. Consideration should also be given to forecast winds (including the accuracy of the forecast compared to actual wind experienced during flight) and meteorological conditions along the expected flight path at the one-engine inoperative cruising altitude and throughout the approach and landing.

e. Pre-departure check - Flight crew members who are responsible for the pre-departure check of an aeroplane (see paragraph 3.a above), should be fully trained and competent to do so. The training programme required, which should be approved by the Authority, should cover all relevant maintenance actions with particular emphasis on checking required fluid levels.

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

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

a. Fuel and oil supply - An aeroplane should not be dispatched on an extended range flight unless it carries sufficient fuel and oil to comply with the applicable operational requirements and any additional reserves determined in accordance with sub-paragraphs (a)(i), (ii) and (iii) below.

   (i) **Critical fuel scenario** - The critical point is the furthest point from an alternate aerodrome assuming a simultaneous failure of an engine and the pressurisation system. For those aeroplanes that are type certificated to operate above Flight Level 450, the critical point is the furthest point from an alternate aerodrome assuming an engine failure. The operator should carry additional fuel for the worst case fuel burn condition (one engine vs two engines operating), if this is greater than the additional fuel calculated in accordance with AMC OPS 1.255 1.6 a and b, as follows:

   A. Fly from the critical point to an alternate aerodrome:

   - At 10 000ft; or

   - At 25 000ft or the single-engine ceiling, whichever is lower, provided that all occupants can be supplied with and use supplemental oxygen for the time required to fly from the critical point to an alternate aerodrome; or

   - At the single-engine ceiling, provided that the aeroplane is type certificated to operate above Flight Level 450.

   B. Descend and hold at 1 500 feet for 15 minutes in ISA conditions;

   C. Descend to the applicable MDA/DH followed by a missed approach (taking into account the complete missed approach procedure); followed by

   D. A normal approach and landing.

   (ii) **Ice protection** - Additional fuel used when operating in icing conditions (e.g. operation of ice protection systems (engine/airframe as applicable)) and, when manufacturer’s data is available, take
account of ice accumulation on unprotected surfaces if icing conditions are likely to be encountered during a diversion;

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

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

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

d. En-route alternate aerodrome(s) - Ensuring that en-route alternate aerodromes are available for the intended route, within 180 minutes based upon the one-engine inoperative cruise speed which is a speed within the certificated limits of the aeroplane, selected by the operator and approved by the regulatory authority, and confirmation that, based on the available meteorological information, the weather conditions at 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 JAR-OPS 1.297).

<table>
<thead>
<tr>
<th>Planning minima</th>
<th>Planning Minima (RVR visibility required &amp; ceiling if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Approach</td>
<td>Aerodrome with</td>
</tr>
<tr>
<td>Precision Approach</td>
<td>at least 2 separate approach procedures based on 2 separate aids serving 2 separate runways (see IEM OPS 1.295(c)(1)(ii))</td>
</tr>
<tr>
<td>Cat II, III (ILS, MLS)</td>
<td>at least 2 separate approach procedures based on 2 separate aids serving 1 runway or 1 approach procedure based on 1 aid serving 1 runway</td>
</tr>
<tr>
<td>Precision Approach</td>
<td>at least precision approach cat I minima</td>
</tr>
<tr>
<td>Cat I (ILS, MLS)</td>
<td>Non-Precision Approach Minima</td>
</tr>
<tr>
<td>Non-Precision Approach</td>
<td>Circling minima or, if not available, non-precision approach minima plus 200 ft / 1 000 m</td>
</tr>
<tr>
<td>Circling Approach</td>
<td>The lower of non-precision approach minima plus 200 ft / 1 000 m or circling minima</td>
</tr>
<tr>
<td>Circling Approach</td>
<td>The higher of circling minima or non-precision approach minima plus 200 ft / 1 000 m</td>
</tr>
</tbody>
</table>

[IEM OPS 1.250]

**Establishment of Minimum Flight Altitudes**

*See JAR-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).

2.1.3 From an NDB, similarly, the corridor width is defined as a borderline starting 5 nm either side of the NDB diverging 7° until a width of 20 nm is reached 40 nm out, thence paralleling the centreline until 80 nm out, thence again diverging 7° until a maximum width of 60 nm is reached 245 nm out. Thereafter the width remains constant (see figure 2).

2.1.4 MOCA does not cover any overlapping of the corridor.

2.2 Minimum off-route altitude (MORA). MORA is calculated for an area bounded by every or every second LAT/LONG square on the Route Facility Chart (RFC)/Terminal Approach Chart (TAC) and is based on a terrain clearance as follows:

i. Terrain with elevation up to 6 000 ft (2 000 m) – 1 000 ft above the highest terrain and obstructions;

ii. Terrain with elevation above 6 000 ft (2 000 m) – 2 000 ft above the highest terrain and obstructions.

3 Jeppesen Formula (see figure 3)

3.1 MORA is a minimum flight altitude computed by Jeppesen from current ONC or WAC charts. Two types of MORAs are charted which are:

i. Route MORAs e.g. 9800a; and

ii. Grid MORAs e.g. 98.

3.2 Route MORA values are computed on the basis of an area extending 10 nm to either side of route centreline and including a 10 nm radius beyond the radio fix/reporting point or mileage break defining the route segment.

3.3 MORA values clear all terrain and man-made obstacles by 1 000 ft in areas where the highest terrain elevation or obstacles are up to 5 000 ft. A clearance of 2 000 ft is provided above all terrain or obstacles which are 5 001 ft and above.

3.4 A Grid MORA is an altitude computed by Jeppesen and the values are shown within each Grid formed by charted lines of latitude and longitude. Figures are shown in thousands and hundreds of feet (omitting the last two digits so as to avoid chart congestion). Values followed by ± are believed not to exceed the altitudes shown. The same clearance criteria as explained in paragraph 3.3 above apply.
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:

<table>
<thead>
<tr>
<th>Elevation of highest point</th>
<th>Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not above 5 000 ft</td>
<td>1 500 ft</td>
</tr>
<tr>
<td>Above 5 000 ft but not above 10 000 ft</td>
<td>2 000 ft</td>
</tr>
<tr>
<td>Above 10 000 ft</td>
<td>10% of elevation plus 1 000 ft</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Elevation of highest point</th>
<th>Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not above 5 000 ft</td>
<td>1 500 ft</td>
</tr>
<tr>
<td>Above 5 000 ft but not above 10 000 ft</td>
<td>2 000 ft</td>
</tr>
<tr>
<td>Above 10 000 ft</td>
<td>10% of elevation plus 1 000 ft</td>
</tr>
</tbody>
</table>

The resulting value is adjusted to the nearest 100 ft.

AMC OPS 1.255
Fuel Policy
See JAR-OPS 1.255

An operator should base the company fuel policy, including calculation of the amount of fuel to be carried, on the following planning criteria:

1. The amount of:
   1.1 Taxi fuel, which should not be less than the amount, expected to be used prior to take-off. Local conditions at the departure aerodrome and APU consumption should be taken into account.
   1.2 Trip fuel, which should include:
      a. Fuel for take-off and climb from aerodrome elevation to initial cruising level/altitude, taking into account the expected departure routing;
      b. Fuel from top of climb to top of descent, including any step climb/descent;
      c. Fuel from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and
      d. Fuel for approach and landing at the destination aerodrome.
   1.3 Contingency fuel, which should be the higher of (a) or (b) below:
      a. Either:
         i. 5% of the planned trip fuel or, in the event of in-flight replanning, 5% of the trip fuel for the remainder of the flight; or
         ii. Not less than 3% of the planned trip fuel or, in the event of in-flight replanning, 3% of the trip fuel for the remainder of the flight, provided that an en-route alternate is available according to ACJ OPS 1.295, or
         iii. An amount of fuel sufficient for 20 minutes flying time based upon the planned trip fuel consumption provided that the operator has established a fuel consumption monitoring programme for individual aeroplanes and uses valid data determined by means of such a programme for fuel calculation; or
      iv. An amount of fuel based on a statistical method approved by the Authority which ensures an appropriate statistical coverage of the deviation from the planned to the actual trip fuel. This method is used to monitor the fuel consumption on each city pair/aeroplane combination and the operator uses this data for a statistical analysis to calculate contingency fuel for that city pair/aeroplane combination.

Note:
1. As an example, the following values of statistical coverage of the deviation from the planned to the actual trip fuel have been agreed:
   a. 99% coverage plus 3% of the trip fuel, if the calculated flight time is less than 2 hours, or more than 2 hours and no suitable en-route alternate is available;
   b. 99% coverage if the calculated flight time is more than 2 hours and a suitable en-route alternate is available;
   c. 90% coverage if:
      i. the calculated flight time is more than 2 hours; and
      ii. a suitable en-route alternate is available; and
iii. at the destination aerodrome 2 separate runways are available and useable, one of which is equipped with an ILS/MLS, and the weather conditions are in compliance with JAR-OPS 1.295(c)(1)(ii); or the ILS/MLS is operational to Cat II/III operating minima and the weather conditions are at or above 500ft/2 500m.

2. The fuel consumption data base used in conjunction with these values is based on fuel consumption monitoring for each route/aeroplane combination over a rolling two year period.

b. An amount to fly for 5 minutes at holding speed at 1 500 ft (450 m), 6 000 ft (1 800m) for Concorde operations, above the destination aerodrome in Standard Conditions.

1.4 Alternate fuel, which should be sufficient for:

a. A missed approach from the applicable MDA/DH at the destination aerodrome to missed approach altitude, taking into account the complete missed approach procedure;

b. A climb from missed approach altitude to cruising level/altitude;

c. The cruise from top of climb to top of descent;

d. Descent from top of descent to the point where the approach is initiated, taking into account the expected arrival procedure; and

e. Executing an approach and landing at the destination alternate aerodrome selected in accordance with JAR-OPS 1.295.

f. If, in accordance with JAR-OPS 1.295(d), two destination alternates are required, alternate fuel should be sufficient to proceed to the alternate which requires the greater amount of alternate fuel.

1.5 Final reserve fuel, which should be:

a. For aeroplanes with reciprocating engines, fuel to fly for 45 minutes; or

b. For aeroplanes with turbine power units, fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above aerodrome elevation in standard conditions, calculated with the estimated mass on arrival at the alternate or the destination, when no alternate is required.

1.6 With the exception of Concorde operations, the minimum additional fuel which should permit:

a. Holding for 15 minutes at 1 500 ft (450 m) above aerodrome elevation in standard conditions, when a flight is operated without a destination alternate; and

b. Following the possible failure of a power unit or loss of pressurisation, based on the assumption that such a failure occurs at the most critical point along the route, the aeroplane to:

i. Descend as necessary and proceed to an adequate aerodrome; and

ii. Hold there for 15 minutes at 1 500 ft (450 m) above aerodrome elevation in standard conditions; and

iii. Make an approach and landing,

except that additional fuel is only required, if the minimum amount of fuel calculated in accordance with sub-paragraphs 1.2 to 1.5 above is not sufficient for such an event.

1.7 Extra fuel, which should be at the discretion of the commander.

2 Decision Point Procedure. If an operator’s fuel policy includes planning to a destination aerodrome via a decision point along the route, the amount of fuel should be the greater of 2.1 or 2.2 below:

2.1 The sum of:

a. Taxi fuel;

b. Trip fuel to the destination aerodrome, via the decision point;

c. Contingency fuel equal to not less than 5% of the estimated fuel consumption from the decision point to the destination aerodrome;

d. Alternate fuel, if a destination alternate is required;

e. Final reserve fuel;

f. Additional fuel; and
Extra fuel if required by the commander; or,

2.2 The sum of:
   a. Taxy fuel;
   b. The estimated fuel consumption from the departure aerodrome to a suitable en-route alternate, via the decision point;
   c. Contingency fuel equal to not less than 3% of the estimated fuel consumption from the departure aerodrome to the en-route alternate;
   d. Final reserve fuel;
   e. Additional fuel; and
   f. Extra fuel if required by the commander.

3 Isolated aerodrome procedure. If an operator’s fuel policy includes planning to an isolated aerodrome for which a destination alternate does not exist, the amount of fuel at departure should include:
   3.1 Taxy fuel;
   3.2 Trip Fuel;
   3.3 Contingency Fuel calculated in accordance with sub-paragraph 1.3 above;
   3.4 Additional Fuel if required, but not less than:
      a. For aeroplanes with reciprocating engines, fuel to fly for 45 minutes plus 15% of the flight time planned to be spent at cruising level, or two hours, whichever is less; or
      b. For aeroplanes with turbine engines, fuel to fly for two hours at normal cruise consumption after arriving overhead the destination aerodrome, including final reserve fuel; and
   3.5 Extra Fuel if required by the commander.

4 Pre-determined point procedure. If an operator’s fuel policy includes planning to a destination alternate where the distance between the destination aerodrome and the destination alternate is such that a flight can only be routed via a predetermined point to one of these aerodromes, the amount of fuel should be the greater of 4.1 or 4.2 below:
   4.1 The sum of:
      a. Taxy Fuel;
      b. Trip Fuel from the departure aerodrome to the destination aerodrome, via the predetermined point;
      c. Contingency Fuel calculated in accordance with sub-paragraph 1.3 above;
      d. Additional Fuel if required, but not less than:
         i. For aeroplanes with reciprocating engines, fuel to fly for 45 minutes plus 15% of the flight time planned to be spent at cruising level or two hours, whichever is less; or
         ii. For aeroplanes with turbine engines, fuel to fly for two hours at normal cruise consumption after arriving overhead the destination aerodrome, including Final Reserve Fuel; and
      e. Extra Fuel if required by the commander; or
   4.2 The sum of:
      a. Taxy Fuel;
      b. Trip Fuel from the departure aerodrome to the alternate aerodrome, via the predetermined point;
      c. Contingency Fuel calculated in accordance with sub-paragraph 1.3 above;
      d. Additional Fuel if required, but not less than:
         i. For aeroplanes with reciprocating engines: fuel to fly for 45 minutes; or
AMC OPS 1.255 (continued)

ii. For aeroplanes with turbine engines: fuel to fly for 30 minutes at holding speed at 1 500 ft (450 m) above aerodrome elevation in standard conditions; including Final Reserve Fuel; and
e. Extra Fuel if required by the commander.

[Ch. 1, 01.03.98; Amdt. 3, 01.12.01]

IEM OPS 1.255(c)(3)(i)
Contingency Fuel
See JAR-OPS 1.255(c)(3)(i)

1 At the planning stage, not all factors which could have an influence on the fuel consumption to the destination aerodrome can be foreseen. Therefore, contingency fuel is carried to compensate for items such as:
i. Deviations of an individual aeroplane from the expected fuel consumption data;
ii. Deviations from forecast meteorological conditions; and
iii. Deviations from planned routings and/or cruising levels/altitudes.

IEM OPS 1.260
Carriage of persons with Reduced Mobility
See JAR-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 JAR-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 JAR-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 JAR 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.

[Ch. 1, 01.03.98]
ACJ OPS 1.280
Passenger Seating
See JAR-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 Authority that the correct seat allocation will, in due course, be made.

[IEM OPS 1.280]

IEM OPS 1.280
Passenger Seating
See JAR-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.

[IEM OPS 1.280]

ACJ OPS 1.295
Location of an En Route Alternate Aerodrome
See JAR-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 1.280]
IEM OPS 1.295(c)(1)(ii)
Separate runways
See JAR-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 JAR-OPS 1.297(b)(2)

‘Non precision minima’ in JAR 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.

[Amdt. 3, 01.12.01]
**APPLICABLE AERODROME FORECASTS (TAF & TREND) TO PRE-FLIGHT PLANNING (ICAO Annex 3 refers)**

1. **APPLICATION OF INITIAL PART OF TAF**
   - **(For aerodrome planning minima see JAR-OPS 1.297)**
     a. Applicable time period:
        From the start of the TAF validity period up to the time of applicability of the first subsequent ‘FM...’ or ‘BECMG’ or, if no ‘FM’ or ‘BECMG’ is given, up to the end of the validity period of the TAF.
     b. Application of forecast:
        The prevailing weather conditions forecast in the initial part of the TAF should be fully applied with the exception of the mean wind and gusts (and crosswind) which should be applied in accordance with the policy in the column ‘BECMG AT’ and ‘FM’ in the table below. This may however be overruled temporarily by a ‘TEMPO’ or ‘PROB***’ if applicable acc. to the table below.

2. **APPLICATION OF FORECAST FOLLOWING CHANGE INDICATORS IN TAF AND TREND**

<table>
<thead>
<tr>
<th>TAF or TREND for AERODROME PLANNED AS:</th>
<th>FM (alone) and BECMG AT: Deterioration and Improvement</th>
<th>BECMG (alone) BECMG FM. BECMG TL. BECMG FM... TL. in case of:</th>
<th>TEMPO (alone)</th>
<th>TEMPO FM. TEMPO TL</th>
<th>TEMPO FM... TL</th>
<th>PROB30/40 (alone)</th>
<th>PROB TEMPO</th>
<th>Deterioration and Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>DESTINATION at ETA ± 1 HR</td>
<td>Applicable from the start of the change.</td>
<td>Applicable from the time of start of the change.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deterioration may be disregarded; Improvement should be disregarded including mean wind and gusts.</td>
</tr>
<tr>
<td>TAKE-OFF ALTERNATE at ETA ± 1 HR</td>
<td>Mean wind: Should be within required limits; Gusts: May be disregarded.</td>
<td>Mean wind: Should be within required limits; Gusts: May be disregarded.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Should be disregarded.</td>
</tr>
<tr>
<td>DEST. ALTERNATE at ETA ± 1 HR</td>
<td>Applicable from the time of start of the change; Mean wind: Should be within required limits; Gusts: May be disregarded.</td>
<td>Applicable from the time of end of the change. Mean wind: Should be within required limits; Gusts: May be disregarded.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Should be disregarded.</td>
</tr>
<tr>
<td>ENROUTE ALTERNATE at ETA ± 1 HR (See JAR-OPS AMC 1.255)</td>
<td>Applicable from the time of start of the change; Mean wind: Should be within required limits; Gusts: May be disregarded.</td>
<td>Applicable from the time of end of the change. Mean wind: Should be within required limits; Gusts: May be disregarded.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Should be disregarded.</td>
</tr>
<tr>
<td>ETOPS ENRT ALTN at earliest/latest ETA ± 1 HR</td>
<td>Applicable from the time of start of the change; Mean wind: Should be within required limits; Gusts exceeding crosswind limits should be fully applied.</td>
<td>Applicable from the time of end of the change. Mean wind: Should be within required limits; Gusts exceeding crosswind limits should be fully applied.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Should be disregarded.</td>
</tr>
</tbody>
</table>

**Note 1:** “Required limits” are those contained in the Operations Manual.

**Note 2:** If promulgated aerodrome forecasts do not comply with the requirements of ICAO Annex 3, operators should ensure that guidance in the application of these reports is provided.

* The space following ‘FM’ should always include a time group e.g. ‘FM1030’.

[Ch. 1, 01.03.98]
AMC OPS 1.300
Submission of ATS Flight plan
See JAR-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 JAR-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 JAR-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.

[Ch. 1, 01.03.98]

[ACJ OPS 1.308
Push Back and Towing
See JAR-OPS 1.308

Towbarless towing should be based on the applicable SAE ARP (Aerospace Recommended Practices), i.e. 4852B/4853B/5283/5284/5285 (as amended).]

[Amtd. 7, 01.09.04]

[ACJ OPS 1.310(a)(3)
Controlled rest on flight deck
See JAR-OPS 1.310(a)(3)

Even though crew members should stay alert at all times during flight, unexpected fatigue can occur as a result of sleep disturbance and circadian disruption. To cover for this unexpected fatigue, and to regain a high level of alertness, a controlled rest procedure on the Flight Deck can be used. Moreover, the use of controlled rest has been shown to increase significantly levels of alertness during the later phases of flight, particularly after the top of descent, and is considered a good use of CRM principles. Controlled rest should be used in conjunction with other on board fatigue management countermeasures such as physical exercise, bright cockpit illumination at appropriate times, balanced eating and drinking, and intellectual activity. The maximum rest time has been chosen to limit deep sleep with consequent long recovery time (sleep inertia).

1 It is the responsibility of all crew members to be properly rested before flight (see JAR-OPS 1.085).

2 This ACJ is concerned with controlled rest taken by the minimum certificated flight crew. It is not concerned with resting by members of an augmented crew.

3 Controlled rest means a period of time ‘off task’ some of which may include actual sleep.

4 Controlled rest may be used at the discretion of the commander to manage both sudden unexpected fatigue and fatigue which is expected to become more severe during higher workload periods later in the flight. It cannot be planned before flight.

5 Controlled rest should only take place during a low workload part of the flight.

6 Controlled rest periods should be agreed according to individual needs and the accepted principles of CRM; where the involvement of the cabin crew is required, consideration should be given to their workload.

7 Only one crew member at a time should take rest, at his station; the harness should be used and the seat positioned to minimise unintentional interference with the controls.

8 The commander should ensure that the other flight crew member(s) is (are) adequately briefed to carry out the duties of the resting crew member. One pilot must be fully able to exercise control of the aeroplane at all times. Any system intervention which would normally require a cross check according to multi crew principles should be avoided until the resting crew member resumes his duties.

9 Controlled rest may be taken according the following conditions:

a) The rest period should be no longer than 45 minutes (in order to limit any actual sleep to approximately 30 minutes).]
ACJ OPS 1.310(a)(3) (continued)

b) After this 45-minute period, there should be a recovery period of 20 minutes during which sole control of the aeroplane should not be entrusted to the pilot who has completed his rest.

c) In the case of 2-crew operations, means should be established to ensure that the non-resting flight crew member remains alert. This may include:

- Appropriate alarm systems
- Onboard systems to monitor crew activity
- Frequent Cabin Crew checks; in this case, the commander should inform the senior cabin crew member of the intention of the flight crew member to take controlled rest, and of the time of the end of that rest; Frequent contact should be established between the flight deck and the cabin crew by means of the interphone, and cabin crew should check that the resting crew member is again alert at the end of the period. The frequency of the contacts should be specified in the Ops Manual.

10 A minimum 20 minute period should be allowed between rest periods to overcome the effects of sleep inertia and allow for adequate briefing.

11 If necessary, a flight crew member may take more than one rest period if time permits on longer sectors, subject to the restrictions above.

12 Controlled rest periods should terminate at least 30 minutes before top of descent.

[IEM OPS 1.310(b)
Cabin crew seating positions
See JAR-OPS 1.310(b)]

1 When determining cabin crew seating positions, the operator should ensure that they are:

i. Close to a floor level exit;

ii. Provided with a good view of the area(s) of the passenger cabin for which the cabin crew member is responsible; and

iii. Evenly distributed throughout the cabin, in the above order of priority.

2 Paragraph 1 above should not be taken as implying that, in the event of there being more such cabin crew stations than required cabin crew, the number of cabin crew members should be increased.

[ACJ OPS 1.345
Ice and other contaminants
Procedures]

1. General

a. Any deposit of frost, ice, snow or slush on the external surfaces of an aeroplane may drastically affect its flying qualities because of reduced aerodynamic lift, increased drag, modified stability and control characteristics. Furthermore, freezing deposits may cause moving parts, such as elevators, ailerons, flap actuating mechanism etc., to jam and create a potentially hazardous condition. Propeller/engine/APU systems performance may deteriorate due to the presence of frozen contaminants to blades, intakes and components. Also, engine operation may be seriously affected by the ingestion of snow or ice, thereby causing engine stall or compressor damage. In addition, ice/frost may form on certain external surfaces (e.g. wing upper and lower surfaces, etc.) due to the effects of cold fuel/structures, even in ambient temperatures well above 0°C.

b. The procedures established by the operator for de-icing and/or anti-icing in accordance with JAR-OPS 1.345 are intended to ensure that the aeroplane is clear of contamination so that degradation of aerodynamic characteristics or mechanical interference will not occur and, following anti-icing, to maintain]
the airframe in that condition during the appropriate holdover time. The de-icing and/or anti-icing procedures should therefore include requirements, including type-specific, taking into account manufacturer’s recommendations and cover:

(i) Contamination checks, including detection of clear ice and under-wing frost.

Note: limits on the thickness/area of contamination published in the AFM or other manufacturers’ documentation should be followed;

(ii) De-icing and/or anti-icing procedures including procedures to be followed if de-icing and/or anti-icing procedures are interrupted or unsuccessful;

(iii) Post treatment checks;

(iv) Pre take-off checks;

(v) Pre take-off contamination checks;

(vi) The recording of any incidents relating to de-icing and/or anti-icing; and

(vii) The responsibilities of all personnel involved in de-icing and/or anti-icing.

c. Under certain meteorological conditions de-icing and/or anti-icing procedures may be ineffective in providing sufficient protection for continued operations. Examples of these conditions are freezing rain, ice pellets and hail, heavy snow, high wind velocity, fast dropping OAT or any time when freezing precipitation with high water content is present. No Holdover Time Guidelines exist for these conditions.

d. Material for establishing operational procedures can be found, for example, in:

- ICAO Annex 3, Meteorological Service for International Air Navigation;
- ICAO Doc 9640-AN/940 "Manual of aircraft ground de-icing/anti-icing operations’’;
- ISO 11075 (*) ISO Type I fluid;
- ISO 11076 (*) Aircraft de-icing/anti-icing methods with fluids;
- ISO 11077 (*) Self propelled de-icing/anti-icing vehicles-functional requirements;
- ISO 11078 (*) ISO Type II fluid;
- AEA "Recommendations for de-icing/anti-icing of aircraft on the ground’’;
- AEA "Training recommendations and background information for de-icing/anti-icing of aircraft on the ground’’;
- EUROCAE ED-104/SAE AS 5116 Minimum operational performance specification for ground ice detection systems;
- SAE ARP 4737 Aircraft de-icing/anti-icing methods;
- SAE AMS 1424 Type I fluids;
- SAE AMS 1428 Type II, III and IV fluids;
- SAE ARP 1971 Aircraft De-icing Vehicle, Self-Propelled, Large and Small Capacity;
- SAE ARD 50102 Forced air or forced air/fluid equipment for removal of frozen contaminants;
- SAE ARP 5149 Training Programme Guidelines for De-icing/Anti-icing of Aircraft on Ground.

(*) The revision cycle of ISO documents is infrequent and therefore the documents quoted may not reflect the latest industry standards.

2. Terminology

Terms used in the context of this ACJ have the following meanings. Explanations of other definitions may be found elsewhere in the documents listed in 1d. In particular, meteorological definitions may be found in ICAO doc. 9640.

a. Anti-icing. The procedure that provides protection against the formation of frost or ice and accumulation of snow on treated surfaces of the aeroplane for a limited period of time (holdover time).
SECTION 2

ACJ OPS 1.345 (continued)

b. Anti-icing fluid. Anti-icing fluid includes but is not limited to the following:

(i) Type I fluid if heated to min 60° C at the nozzle;
(ii) Mixture of water and Type I fluid if heated to min 60°C at the nozzle;
(iii) Type II fluid;
(iv) Mixture of water and Type II fluid;
(v) Type III fluid;
(vi) Mixture of water and Type III fluid;
(vii) Type IV fluid;
(viii) Mixture of water and Type IV fluid.

NOTE: On uncontaminated aeroplane surfaces Type II, III and IV anti-icing fluids are normally applied unheated.

c. Clear ice. A coating of ice, generally clear and smooth, but with some air pockets. It forms on exposed objects, the temperature of which are at, below or slightly above the freezing temperature, by the freezing of super-cooled drizzle, droplets or raindrops.

d. Conditions conducive to aeroplane icing on the ground. Freezing fog, freezing precipitation, frost, rain or high humidity (on cold soaked wings), mixed rain and snow and snow.

e. Contamination. Contamination in this context is understood as all forms of frozen or semi-frozen moisture such as frost, snow, slush, or ice.

f. Contamination check. Check of aeroplane for contamination to establish the need for de-icing.

g. De-icing. The procedure by which frost, ice, snow or slush is removed from an aeroplane in order to provide uncontaminated surfaces.

h. De-icing fluid. Such fluid includes, but is not limited to, the following:

(i) Heated water;
(ii) Type I fluid;
(iii) Mixture of water and Type I fluid;
(iv) Type II fluid;
(v) Mixture of water and Type II fluid;
(vi) Type III fluid;
(vii) Mixture of water and Type III fluid;
(viii) Type IV fluid;
(ix) Mixture of water and Type IV fluid.

NOTE: De-icing fluid is normally applied heated to ensure maximum efficiency.

i. De-icing/anti-icing. This is the combination of de-icing and anti-icing performed in either one or two steps.

j. Ground Ice Detection System (GIDS). System used during aeroplane ground operations to inform the ground crew and/or the flight crew about the presence of frost, ice, snow or slush on the aeroplane surfaces.

k. Holdover time (HOT). The estimated period of time for which an anti-icing fluid is expected to prevent the formation of frost or ice and the accumulation of snow on the treated surfaces of an aeroplane on the ground in the prevailing ambient conditions.

l. Lowest Operational Use Temperature (LOUT). The lowest temperature at which a fluid has been tested and certified as acceptable in accordance with the appropriate aerodynamic acceptance test whilst still maintaining a freezing point buffer of not less than:

10° C for a type I de-icing/anti-icing fluid.
ACJ OPS 1.345 (continued)

m. Post treatment check. An external check of the aeroplane after de-icing and/or anti-icing treatment accomplished from suitably elevated observation points (e.g. from the de-icing equipment itself or other elevated equipment) to ensure that the aeroplane is free from any frost, ice, snow, or slush.

n. Pre-take-off check. An assessment, normally performed from within the flight deck, to validate the applied holdover time.

o. Pre-take-off contamination check. A check of the treated surfaces for contamination, performed when the hold-over-time has been exceeded or if any doubt exists regarding the continued effectiveness of the applied anti-icing treatment. It is normally accomplished externally, just before the commencement of the take-off run.

3. Fluids

a. Type I fluid. Due to its properties, Type I fluid forms a thin, liquid-wetting film on surfaces to which it is applied which, under certain weather conditions, gives a very limited holdover time. With this type of fluid, increasing the concentration of fluid in the fluid/water mix does not provide any extension in holdover time.

b. Type II and type IV fluids contain thickeners which enable the fluid to form a thicker liquid-wetting film on surfaces to which it is applied. Generally, this fluid provides a longer holdover time than Type I fluids in similar conditions. With this type of fluid, the holdover time can be extended by increasing the ratio of fluid in the fluid/water mix.

c. Type III fluid: a thickened fluid intended especially for use on aeroplanes with low rotation speeds.

d. Fluids used for de-icing and/or anti-icing should be acceptable to the operator and the aeroplane manufacturer. These fluids normally conform to specifications such as SAE AMS 1424, 1428 or equivalent. Use of non-conforming fluids is not recommended due to their characteristics not being known.

Note: The anti-icing and aerodynamic properties of thickened fluids may be seriously degraded by, for example, inappropriate storage, treatment, application, application equipment and age.

4. Communications

4.1 Before aeroplane treatment.

When the aeroplane is to be treated with the flight crew on board, the flight and ground crews should confirm the fluid to be used, the extent of treatment required, and any aeroplane type specific procedure(s) to be used. Any other information needed to apply the HOT tables should be exchanged.

4.2 Anti-icing code

a. The operator’s procedures should include an anti-icing code, which indicates the treatment the aeroplane has received. This code provides the flight crew with the minimum details necessary to estimate a holdover time (see para 5 below) and confirms that the aeroplane is free of contamination.

b. The procedures for releasing the aeroplane after the treatment should therefore provide the Commander with the anti-icing code.

c. Anti-icing Codes to be used (examples):

(i) "Type I" at (start time) – To be used if anti-icing treatment has been performed with a Type I fluid;

(ii) "Type II/100" at (start time) – To be used if anti-icing treatment has been performed with undiluted Type II fluid;

(iii) "Type II/75" at (start time) – To be used if anti-icing treatment has been performed with a mixture of 75% Type II fluid and 25% water;

(iv) "Type IV/50" at (start time) – To be used if anti-icing treatment has been performed with a mixture of 50% Type IV fluid and 50% water.

Note 1: When a two-step de-icing/anti-icing operation has been carried out, the Anti-Icing Code is determined by the second step fluid. Fluid brand names may be included, if desired.]
ACJ OPS 1.345 (continued)

[ 4.3 After Treatment

Before reconfiguring or moving the aeroplane, the flight crew should receive a confirmation from the ground crew that all de-icing and/or anti-icing operations are complete and that all personnel and equipment are clear of the aeroplane.

5. Holdover protection

a. Holdover protection is achieved by a layer of anti-icing fluid remaining on and protecting aeroplane surfaces for a period of time. With a one-step de-icing/anti-icing procedure, the holdover time (HOT) begins at the commencement of de-icing/anti-icing. With a two-step procedure, the holdover time begins at the commencement of the second (anti-icing) step. The holdover protection runs out:

(i) At the commencement of take-off roll (due to aerodynamic shedding of fluid) or

(ii) When frozen deposits start to form or accumulate on treated aeroplane surfaces, thereby indicating the loss of effectiveness of the fluid.

b. The duration of holdover protection may vary subject to the influence of factors other than those specified in the holdover time (HOT) tables. Guidance should be provided by the operator to take account of such factors which may include:

(i) Atmospheric conditions, e.g. exact type and rate of precipitation, wind direction and velocity, relative humidity and solar radiation and

(ii) The aeroplane and its surroundings, such as aeroplane component inclination angle, contour and surface roughness, surface temperature, operation in close proximity to other aeroplanes (jet or propeller blast) and ground equipment and structures.

c. Holdover times are not meant to imply that flight is safe in the prevailing conditions if the specified holdover time has not been exceeded. Certain meteorological conditions, such as freezing drizzle or freezing rain, may be beyond the certification envelope of the aeroplane.

d. The operator should publish in the Operations Manual the holdover times in the form of a table or diagram to account for the various types of ground icing conditions and the different types and concentrations of fluids used. However, the times of protection shown in these tables are to be used as guidelines only and are normally used in conjunction with pre-take-off check.

e. References to usable HOT tables may be found in the ‘AEA recommendations for de-/anti-icing aircraft on the ground’.

6. Procedures to be used

Operator’s procedures should ensure that:

a. When aeroplane surfaces are contaminated by ice, frost, slush or snow, they are de-iced prior to take-off; according to the prevailing conditions. Removal of contaminants may be performed with mechanical tools, fluids (including hot water), infra-red heat or forced air, taking account of aeroplane type-specific requirements.

b. Account is taken of the wing skin temperature versus OAT, as this may affect:

(i) The need to carry out aeroplane de-icing and/or anti-icing; and

(ii) The performance of the de-icing/anti-icing fluids.

c. When freezing precipitation occurs or there is a risk of freezing precipitation occurring, which would contaminate the surfaces at the time of take-off, aeroplane surfaces should be anti-iced. If both de-icing and anti-icing are required, the procedure may be performed in a one or two-step process depending upon weather conditions, available equipment, available fluids and the desired holdover time. One-step de-icing/anti-icing means that de-icing and anti-icing are carried out at the same time using a mixture of de-icing/anti-icing fluid and water. Two-step de-icing/anti-icing means that de-icing and anti-icing are carried out in two separate steps. The aeroplane is first de-iced using heated water only or a heated mixture of de-icing/anti-icing fluid and water. After completion of the de-icing operation a layer of a mixture of de-icing/anti-icing fluid and water, or of de-icing/anti-icing fluid only, is to be sprayed over the aeroplane surfaces. The second step will be applied, before the first step fluid freezes, typically within three minutes and, if necessary, area by area. ]
When an aeroplane is anti-iced and a longer holdover time is needed/desired, the use of a less diluted Type II or Type IV fluid should be considered.

All restrictions relative to Outside Air Temperature (OAT) and fluid application (including, but not necessarily limited to temperature and pressure), published by the fluid manufacturer and/or aeroplane manufacturer, are followed. Procedures, limitations and recommendations to prevent the formation of fluid residues are followed.

During conditions conducive to aeroplane icing on the ground or after de-icing and/or anti-icing, an aeroplane is not dispatched for departure unless it has been given a contamination check or a post treatment check by a trained and qualified person. This check should cover all treated surfaces of the aeroplane and be performed from points offering sufficient accessibility to these parts. To ensure that there is no clear ice on suspect areas, it may be necessary to make a physical check (e.g. tactile).

The required entry is made in the Technical Log. (See AMC OPS 1.915, par. 2, Section 3.vi.).

The Commander continually monitors the environmental situation after the performed treatment. Prior to take-off he performs a pre-take-off check, which is an assessment whether the applied HOT is still appropriate. This pre-take-off check includes, but is not limited to, factors such as precipitation, wind and OAT.

If any doubt exists as to whether a deposit may adversely affect the aeroplane’s performance and/or controllability characteristics, the Commander should require a pre-take-off contamination check to be performed in order to verify that the aeroplane’s surfaces are free of contamination. Special methods and/or equipment may be necessary to perform this check, especially at night time or in extremely adverse weather conditions. If this check cannot be performed just prior take-off, re-treatment should be applied.

When re-treatment is necessary, any residue of the previous treatment should be removed and a completely new de-icing/anti-icing treatment applied.

When a Ground Ice Detection System (GIDS) is used to perform an aeroplane surfaces check prior to and/or after a treatment, the use of GIDS by suitably trained personnel should be a part of the procedure.

The operator should consider a two-step de-icing/anti-icing procedure, the first step preferably with hot water and/or non thickened fluids.

The use of de-icing/anti-icing fluids has to be in accordance with the aeroplane manufacturer’s documentation. This is particular true for thickened fluids to assure sufficient flow-off during take-off.

The operator should comply with any type-specific operational requirement(s) such as an aeroplane mass decrease and/or a take-off speed increase associated with a fluid application.

The operator should take into account any flight handling procedures (stick force, rotation speed and rate, take-off speed, aeroplane attitude etc.) laid down by the aeroplane manufacturer when associated with a fluid application.

The limitations or handling procedures resulting from c and/or d above should be part of the flight crew pre take-off briefing.

The operator should take proper account of the possible side-effects of fluid use. Such effects may include, but are not necessarily limited to, dried and/or re-hydrated residues, corrosion and the removal of lubricants.

The operator should establish procedures to prevent or detect and remove residues of dried fluid. If necessary the operator should establish appropriate inspection intervals based on the recommendations of the airframe manufacturers and/or own experience: ]
ACJ OPS 1.345 (continued)

(i) Dried fluid residues.
Dried fluid residue could occur when surfaces has been treated but the aircraft has not subsequently been flown and not been subject to precipitation. The fluid may then have dried on the surfaces;

(ii) Re-hydrated fluid residues.
Repetitive application of thickened de-icing/anti-icing fluids may lead to the subsequent formation/build up of a dried residue in aerodynamically quiet areas, such as cavities and gaps. This residue may re-hydrate if exposed to high humidity conditions, precipitation, washing, etc., and increase to many times its original size/volume. This residue will freeze if exposed to conditions at or below 0°C. This may cause moving parts such as elevators, ailerons, and flap actuating mechanisms to stiffen or jam in flight.

Re-hydrated residues may also form on exterior surfaces, which can reduce lift, increase drag and stall speed.

Re-hydrated residues may also collect inside control surface structures and cause clogging of drain holes or imbalances to flight controls.

Residues may also collect in hidden areas: around flight control hinges, pulleys, grommets, on cables and in gaps;

(iii) Operators are strongly recommended to request information about the fluid dry-out and re-hydration characteristics from the fluid manufacturers and to select products with optimised characteristics;

(iv) Additional information should be obtained from fluid manufacturers for handling, storage, application and testing of their products.

9. Training

a. An operator should establish appropriate initial and recurrent de-icing and/or anti-icing training programmes (including communication training) for flight crew and those of his ground crew who are involved in de-icing and/or anti-icing.

b. These de-icing and/or anti-icing training programmes should include additional training if any of the following will be introduced:

(i) A new method, procedure and/or technique;

(ii) A new type of fluid and/or equipment; and

(iii) A new type(s) of aeroplane.

10. Subcontracting (see AMC OPS 1.035 sections 4 and 5)
The operator should ensure that the subcontractor complies with the operator’s quality and training/qualification requirements together with the special requirements in respect of:

a. De-icing and/or anti-icing methods and procedures;

b. Fluids to be used, including precautions for storage and preparation for use;

c. Specific aeroplane requirements (e.g. no-spray areas, propeller/engine de-icing, APU operation etc.);

d. Checking and communications procedures.

[Amtd.8, 01.01.05]

ACJ OPS 1.346
Flight in expected or actual icing conditions
See JAR-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 JAR-OPS 1.1045, A 8.3.8 and should be cross-referenced, where necessary, to supplementary, type-specific data under B 4.1.1.

3. **Technical content of the Procedures.** The operator should ensure that the procedures take account of the following:
   a. JAR-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.

[Amdt. 3, 01.12.01]

**AMC to Appendix 1 to JAR-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 JAR-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.

[Amdt. 3, 01.12.01]
ACJ OPS 1.390(a)(1)
Assessment of Cosmic Radiation
See JAR-OPS 1.390(a)(1)

1 In order to show compliance with JAR-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 JAR-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 Authority:

Table 1 - Hours exposure for effective dose of 1 millisievert (mSv)

<table>
<thead>
<tr>
<th>Altitude (feet)</th>
<th>Kilometre equivalent</th>
<th>Hours at latitude 60° N</th>
<th>Hours at equator</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 000</td>
<td>8.23</td>
<td>630</td>
<td>1330</td>
</tr>
<tr>
<td>30 000</td>
<td>9.14</td>
<td>440</td>
<td>980</td>
</tr>
<tr>
<td>33 000</td>
<td>10.06</td>
<td>320</td>
<td>750</td>
</tr>
<tr>
<td>36 000</td>
<td>10.97</td>
<td>250</td>
<td>600</td>
</tr>
<tr>
<td>39 000</td>
<td>11.89</td>
<td>200</td>
<td>490</td>
</tr>
<tr>
<td>42 000</td>
<td>12.80</td>
<td>160</td>
<td>420</td>
</tr>
<tr>
<td>45 000</td>
<td>13.72</td>
<td>140</td>
<td>380</td>
</tr>
<tr>
<td>48 000</td>
<td>14.63</td>
<td>120</td>
<td>350</td>
</tr>
</tbody>
</table>

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 60° N and at the equator. Cosmic radiation dose rates change reasonably slowly with time at altitudes used by conventional jet aircraft (i.e. up to about 15 km / 49 000 ft).

c. Table 1 can be used to identify circumstances in which it is unlikely that an annual dosage level of 1 mSv would be exceeded. If flights are limited to heights of less than 8 km (27 000 ft), it is unlikely that annual doses will exceed 1 mSv. No further controls are necessary for crew members whose annual dose can be shown to be less than 1 mSv.

[Amdt. 3, 01.12.01]

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

[Amdt. 3, 01.12.01]
ACJ OPS 1.390(a)(3)
Explanatory Information
See JAR-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.

[Amdt. 3, 01.12.01]

ACJ OPS 1.398
Use of Airborne Collision Avoidance System (ACAS)
See JAR-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 RAC Part X paragraph 3.1.2; and
   d. ICAO guidance material “ACAS Performance - Based Training Objectives” (published under Attachment E to State letter AN 7/1.3.7.2-97/77.)

[Amdt. 3, 01.12.01]

IEM OPS 1.400
Approach and Landing Conditions
See JAR-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 JAR-OPS 1.405(a)

The 'equivalent position' mentioned in JAR-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 JAR-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 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.

[Amdt. 3, 01.12.01]
Appendix 1 to AMC OPS 1.245(a)(2)

Power supply to essential services

1. Any one of the three electrical power sources referred to in sub-paragraph 2.b of AMC OPS 1.245(a)(2) should be capable of providing power for essential services which should normally include:
   a. Sufficient instruments for the flight crew providing, as a minimum, attitude, heading, airspeed and altitude information;
   b. Appropriate pitot heating;
   c. Adequate navigation capability;
   d. Adequate radio communication and intercommunication capability;
   e. Adequate flight deck and instrument lighting and emergency lighting;
   f. Adequate flight controls;
   g. Adequate engine controls and restart capability with critical type fuel (from the stand-point of flame-out) and with the aeroplane initially at the maximum relight altitude;
   h. Adequate engine instrumentation;
   i. Adequate fuel supply system capability including such fuel boost and fuel transfer functions that may be necessary for extended duration single or dual engine operation;
   j. Such warnings, cautions and indications as are required for continued safe flight and landing;
   k. Fire protection (engines and APU);
   l. Adequate ice protection including windshield de-icing; and
   m. Adequate control of the flight deck and cabin environment including heating and pressurisation.

2. The equipment (including avionics) necessary for extended diversion times should have the ability to operate acceptably following failures in the cooling system or electrical power systems.

[Amdt. 3, 01.12.01]
Appendix 1 to ACJ OPS 1.295
Fuel Policy: Location of a Fuel en-route alternate

Radius equal to 20% of the total flight plan distance = 732 NM

Destination

Circle centred on planned route at a distance from the destination equal to 25% of the total flight plan distance, or 20% of the total flight plan distance plus 50 NM, whichever is greater = 915 NM

Halway Point

Airways route, distance 3660 NM
Circle, radius 732 NM, centred on a point 915 NM from the destination.

Shading indicates the areas in which the en-route alternate should be located.

[Ch. 1, 01.03.98; Amdt. 3, 01.12.01]
AMC OPS 1.430(b)(4)
Effect on Landing Minima of temporarily failed or downgraded Ground Equipment
See JAR-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.
### TABLE 1A - Failed or downgraded equipment - effect on landing minima

<table>
<thead>
<tr>
<th>FAILED OR DOWNGRADED EQUIPMENT</th>
<th>EFFECT ON LANDING MINIMA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAT III B (Note 1)</td>
</tr>
<tr>
<td>ILS stand-by transmitter</td>
<td>Not allowed</td>
</tr>
<tr>
<td>Outer Marker</td>
<td>No effect if replaced by published equivalent position</td>
</tr>
<tr>
<td>Middle Marker</td>
<td>No effect</td>
</tr>
<tr>
<td>Touch Down Zone RVR assessment system</td>
<td>May be temporarily replaced with midpoint RVR if approved by the State of the aerodrome. RVR may be reported by human observation</td>
</tr>
<tr>
<td>Midpoint or Stopend RVR</td>
<td>No effect</td>
</tr>
<tr>
<td>Anemometer for R/W in use</td>
<td>No effect</td>
</tr>
<tr>
<td>Celiometer</td>
<td>No effect</td>
</tr>
</tbody>
</table>

Note 1  For Cat III B operations with no DH, see also paragraph 3, above.
### TABLE 1B - Failed or downgraded equipment - effect on landing minima

<table>
<thead>
<tr>
<th>FAILED OR DOWNGRADED EQUIPMENT</th>
<th>EFFECT ON LANDING MINIMA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAT III B (Note 1)</td>
</tr>
<tr>
<td>Approach lights</td>
<td>Not allowed for operations with DH &gt; 50 ft</td>
</tr>
<tr>
<td>Approach lights except the last 210 m</td>
<td>No effect</td>
</tr>
<tr>
<td>Approach lights except the last 420 m</td>
<td>No effect</td>
</tr>
<tr>
<td>Standby power for approach lights</td>
<td>No effect</td>
</tr>
<tr>
<td>Whole runway light system</td>
<td>Not allowed</td>
</tr>
<tr>
<td>Edge lights</td>
<td>Day only; Night - not allowed</td>
</tr>
<tr>
<td>Centreline lights</td>
<td>Day - RVR 300 m</td>
</tr>
<tr>
<td></td>
<td>Night - not allowed</td>
</tr>
<tr>
<td>Centreline lights spacing increased to 30 m</td>
<td>RVR 150 m</td>
</tr>
<tr>
<td>Touch Down Zone lights</td>
<td>Day - RVR 200 m</td>
</tr>
<tr>
<td></td>
<td>Night - 300 m</td>
</tr>
<tr>
<td>Standby power for runway lights</td>
<td>Not allowed</td>
</tr>
<tr>
<td>Taxiway light system</td>
<td>No effect - except delays due to reduced movement rate</td>
</tr>
</tbody>
</table>

Note 1 For Cat III B operations with no DH, see also paragraph 3, above.
IEM OPS 1.430
Documents containing information related to All Weather Operations
See JAR-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 JAR-OPS); and
   k. JAR-AWO (Airworthiness Certification).

[Ch. 1, 01.03.98]

IEM to Appendix 1 to JAR-OPS 1.430
Aerodrome Operating Minima
See Appendix 1 to JAR-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 JAR-OPS 1.430, paragraphs (d) and (e)
Establishment of minimum RVR for Category II and III Operations
See Appendix 1 to JAR-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 pre-stated lateral limits, he should carry out a go-around. He should also check longitudinal progress and sight of the landing threshold is useful for this purpose, as is sight of the touchdown zone lights.

3.3 In the event of a failure of the automatic flight guidance system below decision height, there are two possible courses of action; the first is a procedure which allows the pilot to complete the landing manually if there is adequate visual reference for him to do so, or to initiate a go-around if there is not; the second is to make a go-around mandatory if there is a system disconnect regardless of the pilot’s assessment of the visual reference available.
a. If the first option is selected then the overriding requirement in the determination of a minimum RVR is for sufficient visual cues to be available at and below decision height for the pilot to be able to carry out a manual landing. Data presented in Doc 17 showed that a minimum value of 300 metres would give a high probability that the cues needed by the pilot to assess the aircraft in pitch and roll will be available and this should be the minimum RVR for this procedure.

b. The second option, to require a go-around to be carried out should the automatic flight-guidance system fail below decision height, will permit a lower minimum RVR because the visual reference requirement will be less if there is no need to provide for the possibility of a manual landing. However, this option is only acceptable if it can be shown that the probability of a system failure below decision height is acceptably low. It should be recognised that the inclination of a pilot who experiences such a failure would be to continue the landing manually but the results of flight trials in actual conditions and of simulator experiments show that pilots do not always recognise that the visual cues are inadequate in such situations and present recorded data reveal that pilots’ landing performance reduces progressively as the RVR is reduced below 300 metres. It should further be recognised that there is some risk in carrying out a manual go-around from below 50ft in very low visibility and it should therefore be accepted that if an RVR lower than 300 metres is to be authorised, the flight deck procedure should not normally allow the pilot to continue the landing manually in such conditions and the aeroplane system should be sufficiently reliable for the go-around rate to be low.

3.4 These criteria may be relaxed in the case of an aircraft with a fail-passive automatic landing system which is supplemented by a head-up display which does not qualify as a fail-operational system but which gives guidance which will enable the pilot to complete a landing in the event of a failure of the automatic landing system. In this case it is not necessary to make a go-around mandatory in the event of a failure of the automatic landing system when the RVR is less than 300 metres.

4 Category III fail operational operations - with a Decision Height
4.1 For Category III operations utilising a fail-operational landing system with a Decision Height, a pilot should be able to see at least 1 centre line light.

4.2 For Category III operations utilising a fail-operational hybrid landing system with a Decision Height, a pilot should have a visual reference containing a segment of at least 3 consecutive lights of the runway centre line lights.

5 Category III fail operational operations - with No Decision Height
5.1 For Category III operations with No Decision Height the pilot is not required to see the runway prior to touchdown. The permitted RVR is dependent on the level of aeroplane equipment.

5.2 A CAT III runway may be assumed to support operations with no Decision Height unless specifically restricted as published in the AIP or NOTAM.

[Ch. 1, 01.03.98; Amdt. 3, 01.12.01]

IEM to Appendix 1 to JAR-OPS 1.430, paragraphs (d) and (e) (continued)

For operations to actual RVR values less than 300m, a go-around is assumed in the event of an autopilot failure at or below DH.

This means that a go-around is the normal action. However the wording recognises that there may be circumstances where the safest action is to continue the landing. Such circumstances include the height at which the failure occurs, the actual visual references, and other malfunctions. This would typically apply to the late stages of the flare.

In conclusion it is not forbidden to continue the approach and complete the landing when the commander or the pilot to whom the conduct of the flight has been delegated, determines that this is the safest course of action.

Operational instructions should reflect the information given in this IEM and the operators policy.

[Amdt 2, 01.07.00]
SECTION 2  
IEM to Appendix 1 to JAR-OPS 1.430, paragraph (f) 
Visual Manoeuvring (circling) 
See Appendix 1 to JAR-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.

[Ch. 1, 01.03.98]

[ACJ to Appendix 1 to JAR-OPS 1.440
Operational Demonstrations
See Appendix 1 to JAR-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 required 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 JAR-OPS 1.440, paragraph (b)
Criteria for a successful CAT II/III approach and automatic landing
See Appendix 1 to JAR-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
JAR-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 JAR-AWO 131, JAR-AWO 231 and ACJ-AWO 231.

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

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IEM OPS 1.450(g)(1) (continued)

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 JAR-OPS 1.940 and qualified for the particular category of operation.

[Ch. 1, 01.03.98]
AMC/EM F - PERFORMANCE GENERAL

[AMC OPS 1.475(b)
Landing - Reverse Thrust Credit
See JAR-OPS 1.475(b)

Landing distance data included in the AFM (or POH etc.) with credit for reverse thrust can only be considered to be approved for the purpose of showing compliance with the applicable requirements if it contains a specific statement from the appropriate airworthiness authority that it complies with a recognised airworthiness code (e.g. FAR 23/25, JAR 23/25, BCAR Section ‘D’/‘K’).]

[IEM OPS 1.475(b)
Factoring of Automatic Landing Distance Performance Data (Performance Class A Aeroplanes only)
See JAR-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 JAR-OPS 1.515(a)(1) and JAR-OPS 1.520, the landing mass of the aeroplane should be the lesser of:

a. The landing mass determined in accordance with JAR-OPS 1.515(a)(1) or JAR-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.]
IEM OPS 1.485(b)  
General – Wet and Contaminated Runway data  
See JAR-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 JAR-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 JAR-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 JAR-OPS 1.490(c)(6)  
1 Introduction  
1.1 The length of the runway which is declared for the calculation of TODA, ASDA and TORA, does not account for line-up of the aeroplane in the direction of take-off on the runway in use. This alignment distance depends on the aeroplane geometry and access possibility to the runway in use. Accountability is usually required for a 90° taxiway entry to the runway and 180° turnaround on the runway. There are two distances to be considered:

a. The minimum distance of the mainwheels from the start of the runway for determining TODA and TORA,"L"; and

b. The minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA,"N".
Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in paragraph 2 may be used to determine the alignment distance.

2. Alignment Distance Calculation

The distances mentioned in (a) and (b) of paragraph 1 above are:

<table>
<thead>
<tr>
<th></th>
<th>90° ENTRY</th>
<th>180° TURNAROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>L=</td>
<td>RM + X</td>
<td>RN + Y</td>
</tr>
<tr>
<td>N=</td>
<td>RM + X + WB</td>
<td>RN + Y + WB</td>
</tr>
</tbody>
</table>

where:

\[
R_N = \frac{WB}{\cos(90° - \alpha)} + W_N
\]

and

\[
R_M = B + W_M = WB \tan(90° - \alpha) + W_M
\]

X = Safety distance of outer main wheel during turn to the edge of the runway

Y = Safety distance of outer nose wheel during turn to the edge of the runway

NOTE: Minimum edge safety distances for X and Y are specified in FAA AC 150/5300-13 and ICAO Annex 14 paragraph 3.8.3

R_n = Radius of turn of outer nose wheel

R_m = Radius of turn of outer main wheel

W_n = Distance from aeroplane centre-line to outer nose wheel

W_m = Distance from aeroplane centre-line to outer main wheel

W_B = Wheel base

\[
\alpha
\]

[Ch. 1, 01.03.98]
IEM OPS 1.495(a)
Take-off obstacle clearance
See JAR-OPS 1.495(a)

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

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

b. The take-off distance is the longest of the following distances:

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

ii. The distance from the start of the take-off to the point at which the aeroplane is 35 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed \( V_1 \) for a dry runway; or

iii. If the runway is wet or contaminated, the distance from the start of the take-off to the point at which the aeroplane is 15 ft above the runway or clearway assuming failure of the critical engine occurs at the point corresponding to the decision speed \( V_1 \) for a wet or contaminated runway.

JAR-OPS 1.495(a) specifies that the net take-off flight path, determined from the data provided in the Aeroplane Flight Manual in accordance with sub-paragraphs 1(a) and 1(b) above, must clear all relevant obstacles by a vertical distance of 35 ft. When taking off on a wet or contaminated runway and an engine failure occurs at the point corresponding to the decision speed \( V_1 \) for a wet or contaminated runway, this implies that the aeroplane can initially be as much as 20 ft below the net take-off flight path in accordance with sub-paragraph 1 above and, therefore, may clear close-in obstacles by only 15 ft. When taking off on wet or contaminated runways, the operator should exercise special care with respect to obstacle assessment, especially if a take-off is obstacle limited and the obstacle density is high.

AMC OPS 1.495(c)(4)
Take-off obstacle clearance
See JAR-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:

<table>
<thead>
<tr>
<th>BANK</th>
<th>SPEED</th>
<th>GRADIENT CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>15°</td>
<td>( V_2 )</td>
<td>1 x Aeroplane Flight Manual 15° Gradient Loss</td>
</tr>
<tr>
<td>20°</td>
<td>( V_2 + 5 ) kt</td>
<td>2 x Aeroplane Flight Manual 15° Gradient Loss</td>
</tr>
<tr>
<td>25°</td>
<td>( V_2 + 10 ) kt</td>
<td>3 x Aeroplane Flight Manual 15° Gradient Loss</td>
</tr>
</tbody>
</table>
AMC OPS 1.495(d)(1) & (e)(1)
Required Navigational Accuracy
See JAR-OPS 1.495(d)(1) & (e)(1)

1 Flight-deck systems. The obstacle accountability semi-widths of 300 m (see JAR-OPS 1.495(d)(1)) and 600 m (see JAR-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 JAR-OPS 1.495(d)(1)) and 600 m (see JAR-OPS 1.495(e)(1)) may be used where navigational accuracy is ensured at all relevant points on the flight path by use of external references. These references may be considered visible from the flight deck if they are situated more than 45° either side of the intended track and with a depression of not greater than 20° from the horizontal.

2.2 For visual course guidance navigation, 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.

[Ch. 1, 01.03.98]

IEM OPS 1.495(f)
Engine failure procedures
See JAR-OPS 1.495(f)

If compliance with JAR-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 JAR-OPS 1.500

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

**FIGURE 1**

NOTE: MEA or MORA normally provide the required 2000 ft obstacle clearance for driftdown. However, at and below 6000 ft altitude, MEA and MORA cannot be used directly as only 1000 ft clearance is ensured.

**IEM OPS 1.510(b) [and (c)]**

**Landing – Destination and Alternate Aerodromes**

See JAR-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 JAR-OPS 1.495(f)) providing a safe route and avoiding obstacles, can be approved] [ ].

[Amdt. 3, 01.12.01]

**AMC OPS 1.510 & 1.515**

**Landing – Destination and Alternate Aerodromes**

**Landing – Dry Runways**

See JAR-OPS 1.510 & 1.515

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

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

<table>
<thead>
<tr>
<th>SURFACE TYPE</th>
<th>CONDITION</th>
<th>FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (on firm soil) up to 20 cm long</td>
<td>Dry</td>
<td>1·20</td>
</tr>
<tr>
<td></td>
<td>Wet</td>
<td>1·30</td>
</tr>
<tr>
<td>Paved</td>
<td>Wet</td>
<td>1·00</td>
</tr>
</tbody>
</table>

Notes:
1. The soil is firm when there are wheel impressions but no rutting.
2. When taking off on grass with a single engined aeroplane, care should be taken to assess the rate of acceleration and consequent distance increase.
3. When making a rejected take-off on very short grass which is wet, and with a firm subsoil, the surface may be slippery, in which case the distances may increase significantly.

IEM OPS 1.530(c)(4)
Take-Off Performance Correction Factors
See JAR-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 JAR-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 Authority.

IEM OPS 1.535
Obstacle Clearance in Limited Visibility
See JAR-OPS 1.535
1 The intent of the complementary requirements JAR-OPS 1.535 and Appendix 1 to JAR-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 JAR-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 JAR-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 JAR-OPS 1.430 sub-paragraph (a)(3)(ii) specifies that, if the assumed engine failure height is more than 300 ft, the visibility must be at least 1500 m and, to allow for manoeuvring, the same minimum visibility should apply whenever the obstacle clearance criteria for a continued take-off cannot be met.

**AMC OPS 1.535(a)**

**Take-off Flight Path Construction**

See JAR-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:

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

**NOTE:** The factor of 0.77 as required by JAR-OPS 1.535(a)(4) is already included where:

- \(Y_{300}\) = Average all-engines gradient from 50 ft to 300 ft
- \(Y_{ERC}\) = Scheduled all engines en-route gross climb gradient
- \(V_{ERC}\) = En-route climb speed, all engines, knots TAS
- \(V_2\) = 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:

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

**NOTE:** The factor of 0.77 as required by JAR-OPS 1.535(a)(4) is already included where:

- \(Y_{200}\) = Average all-engines gradient from 50 ft to 200 ft
- \(Y_{ERC}\) = Scheduled all engines en-route gross climb gradient
- \(V_{ERC}\) = En-route climb speed, all engines, knots TAS
- \(V_2\) = 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.

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 JAR-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, $V_2$ = 90 kt
- En-route climb speed, $V_{ERC}$ = 120 kt
- En-route all-engine climb gradient, $Y_{ERC}$ = 0.200
- En-route one engine inoperative climb gradient, $Y_{ERC-1}$ = 0.032

a. Assumed Engine Failure Height 300 ft. The average all-engine gradient from 50 ft to 300 ft may be read from Figure 1a (page 2–H–8) or calculated with the following formula:

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

NOTE: The factor of 0.77 as required by JAR-OPS 1.535(a)(4) is already included where:

- $Y_{300}$ = Average all-engines gradient from 50 ft to 300 ft
- $Y_{ERC}$ = Scheduled all engines en-route gross climb gradient
- $V_{ERC}$ = En-route climb speed, all engines knots TAS
- $V_2$ = Take-off speed at 50 ft, knots TAS
b. Assumed engine failure height 200 ft. The average all-engine gradient from 50 ft to 200 ft may be read from Figure 1b (page 2–H–9) or calculated with the following formula:

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

NOTE: The factor of 0.77 as required by JAR-OPS 1.535(a)(4) is already included where:

- \( Y_{200} \) = Average all-engines gradient from 50 ft to 200 ft
- \( Y_{ERC} \) = Scheduled all engines en-route gross gradient
- \( V_{ERC} \) = En-route climb speed, all engines, knots TAS
- \( V_2 \) = Take-off speed at 50 ft, knots TAS

c. Assumed engine failure height less than 200 ft. Construction of a take-off flight path is only possible if the AFM contains the required flight path data.

d. Assumed engine failure height more than 300 ft. The construction of a take-off flight path for an assumed engine failure height of 400 ft is illustrated below.
IEM OPS 1.540
En-Route
See JAR-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 JAR-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 JAR-OPS 1.542(a)

JAR-OPS 1.542(a) requires an operator to ensure that in the event of an engine failure, the aeroplane should be capable of reaching a point from which a successful forced landing can be made. Unless otherwise specified by the Authority, this point should be 1000ft above the intended landing area.]

AMC OPS 1.545 & 1.550
Landing Destination and Alternate Aerodromes
Landing - Dry runway
See JAR-OPS 1.545 & 1.550

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

<table>
<thead>
<tr>
<th>SURFACE TYPE</th>
<th>FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (on firm soil up to 20 cm long)</td>
<td>1.15</td>
</tr>
</tbody>
</table>

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

AMC OPS 1.550(b)(4)
Runway Slope
See JAR-OPS 1.550(b)(4)

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturer, the landing distances required should be increased by 5% for each 1% of downslope except that correction factors for runways with slopes in excess of 2% need the acceptance of the Authority.

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

1 JAR-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 JAR-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 JAR-OPS 1.555(a)]

1. When landing on very short grass which is wet, and with a firm subsoil, the surface may be slippery, in which case the distances may increase by as much as 60% (1.60 factor).

2. As it may not be possible for a pilot to determine accurately the degree of wetness of the grass, particularly when airborne, in cases of doubt, the use of the wet factor (1.15) is recommended.]
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AMC/IEM I — PERFORMANCE CLASS C

IEM OPS 1.565(d)(3)
Take-off
See JAR-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 JAR-OPS 1.565(d)(6)

1 Introduction

1.1 The length of the runway which is declared for the calculation of TODA, ASDA and TORA, does not account for line-up of the aeroplane in the direction of take-off on the runway in use. This alignment distance depends on the aeroplane geometry and access possibility to the runway in use. Accountability is usually required for a 90° taxiway entry to the runway and 180° turnaround on the runway. There are two distances to be considered:

a. The minimum distance of the mainwheels from the start of the runway for determining TODA and TORA, “L”; and

b. The minimum distance of the most forward wheel(s) from the start of the runway for determining ASDA, “N”.

Where the aeroplane manufacturer does not provide the appropriate data, the calculation method given in paragraph 2 may be used to determine the alignment distance.
2. Alignment Distance Calculation

The distances mentioned in (a) and (b) of paragraph 1 above are:

<table>
<thead>
<tr>
<th></th>
<th>90° ENTRY</th>
<th>180° TURNAROUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>$R_n + X$</td>
<td>$R_n + Y$</td>
</tr>
<tr>
<td>N</td>
<td>$R_m + X + W_b$</td>
<td>$R_n + Y + W_b$</td>
</tr>
</tbody>
</table>

where:

$$R_n = A + W_n = \frac{W_b}{\cos(90° - \alpha)} + W_n$$

and

$$R_m = B + W_m = W_b \tan(90° - \alpha) + W_m$$

$X$ = Safety distance of outer main wheel during turn to the edge of the runway

$Y$ = Safety distance of outer nose wheel during turn to the edge of the runway

NOTE: Minimum edge safety distances for $X$ and $Y$ are specified in FAA AC 150/5300-13 and ICAO Annex 14 paragraph 3.8.3

$R_n$ = Radius of turn of outer nose wheel

$R_m$ = Radius of turn of outer main wheel

$W_n$ = Distance from aeroplane centre-line to outer nose wheel

$W_m$ = Distance from aeroplane centre-line to outer main wheel

$W_b$ = Wheel base

$\alpha$ = Steering angle
AMC OPS 1.565(d)(4)
Runway Slope
See JAR-OPS 1.565(d)(4)

Unless otherwise specified in the Aeroplane Flight Manual, or other performance or operating manuals from the manufacturers, the take-off distance should be increased by 5% for each 1% of upslope except that correction factors for runways with slopes in excess of 2% need the acceptance of the Authority.

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

1 The Aeroplane Flight Manual generally provides a climb gradient decrement for a 15° bank turn. Unless otherwise specified in the Aeroplane Flight Manual or other performance or operating manuals from the manufacturer, acceptable adjustments to assure adequate stall margins and gradient corrections are provided by the following:

<table>
<thead>
<tr>
<th>BANK</th>
<th>SPEED</th>
<th>GRADIENT CORRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>15°</td>
<td>$V_2$</td>
<td>$1 \times$ Aeroplane Flight Manual 15° Gradient Loss</td>
</tr>
<tr>
<td>20°</td>
<td>$V_2 + 5$</td>
<td>$2 \times$ Aeroplane Flight Manual 15° Gradient Loss</td>
</tr>
<tr>
<td>25°</td>
<td>$V_2 + 10$</td>
<td>$3 \times$ Aeroplane Flight Manual 15° Gradient Loss</td>
</tr>
</tbody>
</table>

2 For bank angles of less than 15°, a proportionate amount may be applied, unless the manufacturer or Aeroplane Flight Manual has provided other data.

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

1 Flight-deck systems. The obstacle accountability semi-widths of 300 m (see JAR-OPS 1.570(e)(1)) and 600 m (see JAR-OPS 1.570(f)(1)) may be used if the navigation system under one-engine-inoperative conditions provides a two standard deviation (2 s) accuracy of 150 m and 300 m respectively.

2 Visual Course Guidance

2.1 The obstacle accountability semi-widths of 300 m (see JAR-OPS 1.570(e)(1)) and 600 m (see JAR-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 JAR OPS 1.580

The high terrain or obstacle analysis required for showing compliance with JAR-OPS 1.580 can be carried out by making a detailed analysis of the route using contour maps of the high terrain, and plotting the highest points within the prescribed corridor width along the route. The next step is to determine whether it is possible to maintain level flight with one engine inoperative 1000 ft above the highest point of the crossing. If this is not possible, or if the associated weight penalties are unacceptable, a drift-down procedure must be evaluated, based on engine failure at the most critical point, and must show obstacle clearance during the drift-down by at least 2000 ft. The minimum cruise altitude is determined from the drift-down path, taking into account allowances for decision making, and the reduction in the scheduled rate of climb (See Figure 1).

FIGURE 1

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

In showing compliance with JAR-OPS 1.590 and JAR-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 JAR-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 JAR-OPS 1.595(a).

<table>
<thead>
<tr>
<th>SURFACE TYPE</th>
<th>FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass (on firm soil up to 13 cm long)</td>
<td>1·20</td>
</tr>
</tbody>
</table>

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

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

1 JAR-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 JAR-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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IEM OPS 1.605(e)
Fuel density

See JAR-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 JAR-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 JAR-OPS 1 in units of mass (kg). However, in most approved Flight Manuals and other operational documentation, these quantities are published as weights in accordance with the common language. In the SI system, a weight is a force rather than a mass. Since the use of the term ‘weight’ does not cause any problem in the day-to-day handling of aeroplanes, its continued use in operational applications and publications is acceptable.

[Amdd. 3, 01.12.01]

AMC to Appendix 1 to JAR-OPS 1.605
Accuracy of weighing equipment

See Appendix 1 to JAR-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 %.

[Ch. 1, 01.03.98]

IEM to Appendix 1 to JAR-OPS 1.605
Centre of gravity limits

See Appendix 1 to JAR-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 JAR-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.

[Ch. 1, 01.03.98]

IEM OPS 1.620(d)(2)
**Holiday Charter**

See JAR-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, JAA/Authority officials etc. can be included within the 5% alleviation without negating the use of holiday charter mass values.

[Ch. 1, 01.03.98]

IEM OPS 1.620(g)
**Statistical evaluation of passenger and baggage mass data**

See JAR-OPS 1.620(g)

1. Sample size (see also Appendix 1 to JAR-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. \( \mu, \sigma = \) the true values of the average passenger mass and standard deviation, which are unknown and which are to be estimated by weighing passenger samples.

b. \( \mu', \sigma' = \) the ‘a priori’ estimates of the average passenger mass and the standard deviation, i.e. values resulting from an earlier survey, which are needed to determine the current sample size.

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:

\[
\begin{align*}
n & \geq \frac{(1.96^* \sigma^* 100^2)}{(e^* \mu^*)^2} \\
& \geq \frac{(1.96^* \sigma^* 100^2)}{(e^* \mu^*)^2}
\end{align*}
\]

where:

- \( n = \) number of passengers to be weighed (sample size)
- \( e^* = \) allowed relative confidence range (accuracy) for the estimate of \( \mu \) by \( \bar{x} \) (see also equation in paragraph 3).

NOTE: The allowed relative confidence range specifies the accuracy to be achieved when estimating the true mean. For example, if it is proposed to estimate the true mean to within \( \pm 1\% \), then \( e^* \) 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 \( (\mu) \) of the population.

2.1 Arithmetic mean of sample

\[
\begin{align*}
\bar{x} & = \frac{\sum_{j=1}^{n} x_j}{n} \\
\bar{x} & = \frac{\sum_{j=1}^{n} x_j}{n}
\end{align*}
\]

where:

- \( x_j = \) mass values of individual passengers (sampling units).

2.2 Standard deviation

\[
\begin{align*}
s & = \sqrt{\frac{\sum_{j=1}^{n} (x_j - \bar{x})^2}{n-1}} \\
s & = \sqrt{\frac{\sum_{j=1}^{n} (x_j - \bar{x})^2}{n-1}}
\end{align*}
\]

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 \times s \times 100}{\sqrt{n} \times \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 \( \mu \) at the 95% significance level. This means that with 95% probability, the true average mass \( \mu \) lies within the interval:

\[ \bar{x} \pm \frac{1.96 \times s}{\sqrt{n}} \]

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 wellversed 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.

<table>
<thead>
<tr>
<th>Step 1: estimated average passenger mass</th>
<th>Step 2: estimated standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>( n )</td>
<td>( x_j ) (kg)</td>
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<td>1</td>
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</tr>
<tr>
<td>85</td>
<td>63.2</td>
</tr>
<tr>
<td>86</td>
<td>75.4</td>
</tr>
<tr>
<td>( \sum_{j=1}^{86} )</td>
<td>( 6071.6 )</td>
</tr>
</tbody>
</table>

\[ \bar{x} = \frac{\sum x_j}{n} = \frac{6071.6}{86} = 70.6 \ \text{kg} \]

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

\[ \sigma' = \sqrt{\frac{34683.40}{86-1}} = 20.20 \ \text{kg} \]
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.

$$n \geq \frac{(1.96 \times \sigma \times 100)^2}{(e_r' \times \mu')^2}$$

$$n \geq \frac{(1.96 \times 20 \times 20 \times 100)^2}{(1 \times 70 \cdot 6)^2}$$

$$n \geq 3145$$

The result shows that at least 3 145 passengers have to be weighed to achieve the required accuracy. If $e_r'$ is chosen as 2% the result would be $n \geq 786$.

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 JAR-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.

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

$$\bar{x} = \frac{\sum_{j=1}^{3180} x_j}{n} = \frac{231186.2}{3180} \text{ kg}$$

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

Step 2: calculation of the standard deviation.

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

$$\sum (x_j - \bar{x})^2 = 745145.20$$

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

$$s = \sqrt{\frac{745145.20}{3180 - 1}}$$

$$s = 15.31 \text{ kg}$$

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

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

$$e_r = \frac{1.96 \times 15 \cdot 31 \times 100}{\sqrt{3180 \times 72.7}} \%$$

$$e_r = 0.73\%$$
Step 4: calculation of the confidence range of the sample mean.

\[ \bar{x} \pm \frac{1.96 \cdot s}{\sqrt{n}} \]

\[ \bar{x} \pm \frac{1.96 \cdot 15.31}{\sqrt{3180}} \text{ kg} \]

72.7 ± 0.5 kg

The result of this calculation shows that there is a 95% probability of the actual mean for all passengers lying within the range 72.2 kg to 73.2 kg.

IEM OPS 1.620(h) & (i)

Adjustment of standard masses

See JAR-OPS 1.620(h) & (i)

1. When standard mass values are used, JAR-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 JAR-OPS 1.620(g)

Guidance on passenger weighing surveys

See Appendix 1 to JAR-OPS 1.620(g), sub-paragraph (c)(4)

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

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

b. The survey procedures and the subsequent statistical analysis meet the criteria of Appendix 1 to JAR-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 JAR-OPS 1.620(g)

Guidance on passenger weighing surveys

See Appendix 1 to JAR-OPS 1.620(g)

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

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

3.1 An operator should establish and submit for approval to the Authority a detailed weighing survey plan that is fully representative of the operation, i.e. the network or route under consideration and the survey should involve the weighing of an adequate number of passengers (JAR–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 JAR-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 JAR-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 a 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.

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.

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.

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 JAR-OPS 1.620 Tables 1 and 2. As stated in Appendix 1 to JAR-OPS 1.620(g), sub-paragraph (c), these averages, rounded to the nearest whole number may, in principle, be applied as standard mass values for males and females on aeroplanes with 20 and more passenger seats. Because of variations in actual passenger masses, the total passenger load also varies and statistical analysis indicates that the risk of a significant overload becomes unacceptable for aeroplanes with less than 20 seats. This is the reason for passenger mass increments on small aeroplanes.

6.2 The average masses of males and females differ by some 15 kg or more and because of uncertainties in the male/female ratio the variation of the total passenger load is greater if all adult standard masses are used than when using separate male and female standard masses. Statistical analysis indicates that the use of all adult standard mass values should be limited to aeroplanes with 30 passenger seats or more.
6.3 As indicated in Appendix 1 to JAR-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 JAR-OPS 1.625
Mass and balance documentation
See Appendix 1 to JAR-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.
IEM OPS 1.630
Instruments and Equipment - Approval and Installation
See JAR-OPS 1.630

1 For Instruments and Equipment required by JAR-OPS 1 Subpart K, “Approved” means that compliance with the applicable JTSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a JTSO does not exist, the applicable airworthiness standards apply unless otherwise prescribed in JAR-OPS 1 or JAR-26.

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

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

4 When a new version of a JTSO (or of a specification other than a JTSO) 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 JAR-OPS 1 or JAR-26.

[Ch. 1, 01.03.98]

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

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

2 The equipment requirements of these paragraphs may be met by alternative means of compliance when equivalent safety of the installation has been shown during type certification approval of the aeroplane for the intended kind of operation.
**IEM OPS 1.650/1.652**  
Flight and Navigational Instruments and Associated Equipment  
See JAR-OPS 1.650/1.652

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<th>INSTRUMENT</th>
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<th>TWO PILOTS REQUIRED</th>
<th>MAX T/O MASS AUTH&gt;5700 kg OR MAX PASS&gt;9 Pax</th>
<th>SINGLE PILOT</th>
<th>TWO PILOTS REQUIRED</th>
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<td>Mach Number Indicator</td>
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**NOTES:**

1. For local flights (A to A, 50 Nm radius, not more than 60 minutes duration) the instruments at Serials 9(b) 10(b) and 11(b) may be replaced by EITHER a turn and slip indicator, OR a turn co-ordinator, OR both an attitude indicator and a slip indicator.

2. The substitute instruments permitted by Note (1) shall be provided at each pilot's station.

3. Serial 13 - A Mach number indicator is required for each pilot whenever compressibility limitations are not otherwise indicated by airspeed indicators.

4. For IFR or at night, a Turn and Slip indicator, or a slip indicator and a third (standby) attitude indicator certificated according to JAR 25.1303(b)(4) or equivalent, is required.

5. Neither Three pointers, nor drum pointer altimeters satisfy the requirement.

[Amdt. 3, 01.12.01]
IEM OPS 1.650(p)/1.652(s)
Headset, boom microphone and associated equipment
See JAR-OPS 1.650(p)/1.652(s)

A headset, as required by JAR-OPS 1.650(p) and JAR-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.

[Ch. 1, 01.03.98; Amdt. 3, 01.12.01]

AMC OPS 1.652(d) & (k)(2)
Flight and Navigational Instruments and Associated Equipment
See JAR-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 JAR-OPS 1.668

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

[Ch. 1, 01.03.98]

ACJ OPS 1.680(a)(2)
Quarterly Radiation Sampling
See JAR-OPS 1.680(a)(2)

1. Compliance with JAR-OPS 1.680(a)(2) may be shown by conducting quarterly radiation sampling during aeroplane operation using the following criteria:
   a. The sampling should be carried out in conjunction with a Radiological Agency or similar organisation acceptable to the Authority;
   b. Sixteen route sectors which include flight above 49 000 ft should be sampled every quarter (three months). Where less than sixteen route sectors which include flight above 49 000 ft are achieved each quarter, then all sectors above 49 000 ft should be sampled;
   c. The cosmic radiation recorded should include both the neutron and non-neutron components of the radiation field.
2. The results of the sampling, including a cumulative summary quarter on quarter, should be reported to the Authority under arrangements acceptable to the Authority.

[Amdt. 3, 01.12.01]
AMC OPS 1.690(b)(6)
Crew member interphone system
See JAR-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 Authority.

IEM OPS 1.690(b)(7)
Crew member interphone system
See JAR-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 JAR-OPS 1.700


[Amdt. 4, 01.07.02]

ACJ OPS 1.705/1.710
Cockpit Voice Recorders
See JAR-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.

[Amdt. 4, 01.07.02]
SECTION 2

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

Summary table of applicable requirements

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<td>with a MAPSC of more than 9 (applicability: 1 April 2000)</td>
<td>with a MAPSC of more than 9</td>
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NOTE 1: MCTOM = Maximum Certificated Take Off Mass
MAPSC = Maximum Approved Passenger Seating Configuration

[Ch. 1, 01.03.98; Amdt. 4, 01.07.02]

ACJ OPS 1.715
Flight Data Recorders
See JAR-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 JAR 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.

[Amendment 4, 01.07.02]

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

The alleviation policy included in JAR-OPS 1.715(g) affects a small number of aeroplanes first issued with a C of A on or after 1 April 1998 that were either constructed prior to this date or to a specification in force just prior to this date. These aeroplanes may not comply fully with JAR-OPS 1.715, but are able to comply with JAR-OPS 1.720. In granting such an alleviation, the Authority should confirm that the above conditions
JAR-OPS 1 Subpart K

SECTION 2

ACJ OPS 1.715(g) (continued)

have been met and that compliance with JAR-OPS 1.715 would imply significant modifications to the aeroplane with a severe re-certification effort.

[Amdt. 4, 01.07.02]

ACJ OPS 1.720 /1.725
Flight Data Recorders
See JAR-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 Authority.

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

a. Remaining parameters in Table B of Appendix 1 to JAR-OPS 1.720 or JAR-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 JAR-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 JAR-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 JAR-OPS 1.037 (Accident prevention and flight safety programme) as acceptable to the Authority.

6. For the purpose of JAR-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.

[Amdt. 4, 01.07.02]
## ACJ OPS 1.715, 1.720 and 1.725

### Flight Data Recorders

See JAR-OPS 1.715, 1.720 and 1.725

## Summary table of applicable requirements and parameters recorded

<table>
<thead>
<tr>
<th>MCTOM</th>
<th>TURBINE POWERED AEROPLANES</th>
<th>TURBINE POWERED AEROPLANES</th>
<th>ALL AEROPLANES</th>
<th>ALL AEROPLANES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Table A (1.725) param. 1 - 5; and</td>
<td>Table A (1.725) param. 1 - 5; and</td>
<td>Table A (1.720) param. 1 - 15b; and</td>
<td>Table A (1.715) param. 1 - 17; and</td>
</tr>
<tr>
<td></td>
<td>For aeroplanes of a type first type certificated after 30.09.69 Table B (1.725) param. 6 - 15b; and</td>
<td>If sufficient capacity is available on FDR system remaining Table B (1.725) parameters</td>
<td>Table B (1.720) param. 16 - 32</td>
<td>Table B (1.715) param. 18 - 32; and</td>
</tr>
<tr>
<td>27 000 kg</td>
<td>Table A (1.725) param. 1 - 5</td>
<td>Table A (1.725) param. 1 - 5</td>
<td>Table A (1.720) param. 1 - 15b</td>
<td>Table C (EFIS) param. 33 - 42; and</td>
</tr>
<tr>
<td></td>
<td>No Requirement</td>
<td>No Requirement</td>
<td>No Requirement</td>
<td>Param. relating to novel or unique design features</td>
</tr>
</tbody>
</table>

| 5 700 kg | No Requirement | No Requirement | No Requirement | No Requirement |

### Notes

1. Alleviation not included in this table
2. MCTOM = Maximum Certificated Take Off Mass
3. MAPSC = Maximum Approved Passenger Seating Configuration

[Ch. 1, 01.03.98; Amdt. 4, 01.07.02]
ACJ OPS 1.727
Combination recorders
See JAR-OPS 1.727

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

[Ammdt. 4, 01.07.02]

[ACJ OPS 1.730(a)(3)
Seats, seat safety belts, harnesses and child restraint devices
(See JAR-OPS 1.730(a)(3))

1. General

A child restraint device (CRD) is considered to be acceptable if:

a) It is a ‘supplementary loop belt’ manufactured with the same techniques and the same materials of the approved safety belts; or

b) It complies with paragraph 2.

2. Acceptable CRDs

Provided the CRD can be installed properly on the respective aircraft seat, the following CRDs are considered “acceptable”:

2.1 Types of CRDs

a) CRDs approved for use in aircraft only by any JAA authority, the FAA or Transport Canada (on the basis of a national technical standard) and marked accordingly.

b) CRDs approved for use in motor vehicles according to the UN standard ECE R 44, -03 or later series of Amendments; or

c) CRDs approved for use in motor vehicles and aircraft according to Canadian CMVSS 213/213.1; or

d) CRDs approved for use in motor vehicles and aircraft according to US FMVSS No 213 and are manufactured to these standards on or after February 26, 1985. US approved CRDs manufactured after this date must bear the following labels in red lettering:

1) “THIS CHILD RESTRAINT SYSTEM CONFORMS TO ALL APPLICABLE FEDERAL MOTOR VEHICLE SAFETY STANDARDS” and

2) “THIS RESTRAINT IS CERTIFIED FOR USE IN MOTOR VEHICLES AND AIRCRAFT”.

e) CRDs qualified for use in aircraft according to the German “Qualification Procedure for Child Restraint Systems for Use in Aircraft” (TÜV Doc.: TÜV/958-01/2001).

2.2 Devices approved for use in cars manufactured and tested to standards equivalent to those listed in 2.1 (a) to (e) inclusive, which are acceptable to the NAA. The device must be marked with an associated qualification sign, which shows the name of the qualification organisation and a specific identification number, related to the associated qualification project.

2.3 The qualifying organization shall be a competent and independent organization that is acceptable to the national JAA authority.

3. Location

3.1 Forward facing CRDs may be installed on both forward and rearward facing passenger seats but only when fitted in the same direction as the passenger seat on which it is positioned. Rearward facing CRDs can only be installed on forward facing passenger seats. A CRD may not be installed within the radius of action of an airbag, unless it is obvious that the airbag is de-activated or it can be demonstrated that there is no negative impact from the airbag.

3.2 A child in a restraint device should be located as near to a floor level exit as feasible.
ACJ OPS 1.730(a)(3) (continued)

3.3 A child in a restraint device should be seated in accordance with JAR-OPS 1.280 and IEM OPS 1.280, “Passenger Seating” so as to not hinder evacuation for any passenger.

3.4 A child in a restraint device should neither be located in the row leading to an emergency exit nor located in a row immediately forward or aft of an emergency exit. A window passenger seat is the preferred location. An aisle passenger seat or a cross aisle passenger seat is not recommended. Other locations may be acceptable provided the access of neighbour passengers to the nearest aisle is not obstructed by the CRD.

3.5 In general, only one CRD per row segment is recommended. More than one CRD per row segment is allowed if the children are from the same family or travelling group provided the children are accompanied by a responsible person sitting next to them.

3.6 A Row Segment is the fraction of a row separated by two aisles or by one aisle and the aircraft fuselage.

4. Installation

4.1 CRDs shall only be installed on a suitable aircraft seat with the type of connecting device they are approved or qualified for. E.g., CRDs to be connected by a three point harness only (most rearward facing baby CRDs currently available) shall not be attached to an aircraft seat with a lap belt only, a CRD designed to be attached to a vehicle seat by means of rigid bar lower anchorages (ISO-FIX or US equivalent) only, shall only be used on aircraft seats that are equipped with such connecting devices and shall not be attached by the aircraft seat lap belt. The method of connecting must be clearly shown in the manufacturer’s instructions to be provided with each CRD.

4.2 All safety and installation instructions must be followed carefully by the responsible person accompanying the infant. Cabin crew should prohibit the use of any inadequately installed CRD or not qualified seat.

4.3 If a forward facing CRD with a rigid backrest is to be fastened by a lap belt, the restraint device should be fastened when the backrest of the passenger seat on which it rests is in a reclined position. Thereafter, the backrest is to be positioned upright. This procedure ensures better tightening of the CRD on the aircraft seat if the aircraft seat is reclinable.

4.4 The buckle of the adult safety belt must be easily accessible for both opening and closing, and must be in line with the seat belt halves (not canted) after tightening.

4.5 Forward facing restraint devices with an integral harness must not be installed such that the adult safety belt is secured over the child.

5. Operation

5.1 Each CRD shall remain secured to a passenger seat during all phases of flight, unless it is properly stowed when not in use.

5.2 Where a CRD is adjustable in recline it must be in an upright position for all occasions when passenger restraint devices are required to be used according to JAR-OPS 1.320(b)(1).]

[Amend. 9, 01.09.05]

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

The following should be included in the First-Aid Kits:

Bandages (unspecifed)
Burns dressings (unspecifed)
Wound dressings, large and small
Adhesive tape, safety pins and scissors
Small adhesive dressings
Antiseptic wound cleaner
Adhesive wound closures
AMC OPS 1.745 (continued)

- Adhesive tape
- Disposable resuscitation aid
- Simple analgesic e.g. paracetamol
- Antiemetic e.g. cinnarizine
- Nasal decongestant
- First-Aid handbook
- Gastrointestinal antacid +
- Anti-diarrhoeal medication e.g. Loperamide +

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.

[Amdt. 7, 01.09.04]

AMC OPS 1.755
Emergency Medical Kit
See JAR-OPS 1.755

The following should be included in the emergency medical kit carried in the aeroplane:

- Sphygmomanometer – non mercury
- Stethoscope
- Syringes and needles
- Oropharyngeal airways (2 sizes)
- Tourniquet
- Coronary vasodilator e.g. nitro-glycerine
- Anti-spasmotic e.g. hyoscine
- Epinephrine 1:1 000
- Adrenocortical steroid e.g. hydrocortisone
- Major analgesic e.g. nalbuphine
- Diuretic e.g. furosemide
- Antihistamine e.g. diphenhydramine hydrochloride
- Sedative/anticonvulsant e.g. diazepam
- Medication for Hypoglycaemia hypertonic glucose and/or glucagon
- Antiemetic e.g. metoclopramide
- Atropine
- Digoxin
- Disposable Gloves
- Bronchial Dilator – injectable and inhaled form
- Needle Disposal Box
- Catheter

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.

[Amdt. 7, 01.09.04]

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

1 First aid oxygen is intended for those passengers who, having been provided with the supplemental oxygen required under JAR-OPS 1.770, still need to breathe undiluted oxygen when the amount of supplemental oxygen has been exhausted.
SECTION 2

IEM OPS 1.760 (continued)

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 JAR-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.

[Amend. 3, 01.12.01]

IEM OPS 1.770
Supplemental Oxygen – Pressurised Aeroplanes
See JAR-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 JAR-OPS 1.770 (b)(2)(v)

1 With respect to JAR-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 \(V_{MO}\) 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.
ACJ OPS 1.770(b)(2)(v) (continued)

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.

[Amend. 3, 01.12.01]

AMC OPS 1.790
Hand Fire Extinguishers
See JAR-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 JAR-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.
Emergency Locator Transmitter (ELT)

See JAR-OPS 1.820, JAR-OPS 1.830(c) and JAR-OPS 1.835(b)

1. An Emergency Locator Transmitter (ELT) is a generic term describing equipment which broadcasts distinctive signals on designated frequencies and, depending on application, may be activated by impact or be manually activated. An ELT is one of the following:
   a. Automatic Fixed (ELT(AF)). An automatically activated ELT which is permanently attached to an aircraft;
   b. Automatic Portable (ELT(AP)). An automatically activated ELT which is rigidly attached to an aircraft but readily removable from the aircraft;
   c. Automatic Deployable (ELT(AD)). An ELT which is rigidly attached to the aircraft and which is automatically deployed and activated by impact, and, in some cases, also by hydrostatic sensors. Manual deployment is also provided;
   d. Survival ELT (ELT(S)). An ELT which is removable from an aircraft, stowed so as to facilitate its ready use in an emergency, and manually activated by survivors.

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

[Amendment 9, 01.09.05]

Life Jackets

See JAR-OPS 1.825

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

Life-rafts and ELT for extended overwater flights

See JAR-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.

[Amendment 3, 01.12.01]
JAR-OPS 1 Subpart K

SECTION 2

IEM OPS 1.835
Survival Equipment
See JAR-OPS 1.835

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

[Amdt. 3, 01.12.01]
### TABLE 1 – Parameters Performance Specifications

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Parameter</th>
<th>Range</th>
<th>Sampling Interval in seconds</th>
<th>Accuracy limits (sensor input compared to FDR readout)</th>
<th>Recommended Resolution in readout</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Time or relative time count</td>
<td>24 hours</td>
<td>4</td>
<td>±0-125% per hour</td>
<td>1 second</td>
<td>UTC time preferred where available, otherwise elapsed time</td>
</tr>
<tr>
<td>2</td>
<td>Pressured altitude</td>
<td>-1 000 ft to maximum certificated altitude of aircraft +5000 ft</td>
<td>1</td>
<td>±100 ft to ±700 ft</td>
<td>5 ft</td>
<td>For altitude record error see JAR JTSO C124</td>
</tr>
<tr>
<td>3</td>
<td>Indicated airspeed</td>
<td>50 kt to max VSO; Max VSO to 1-2 VSO</td>
<td>1</td>
<td>±5% to ±3%</td>
<td>1kt</td>
<td>V\text{\textsubscript{SO}} stalling speed or minimum steady flight speed in the landing configuration V\text{\textsubscript{DF}} design diving speed</td>
</tr>
<tr>
<td>4</td>
<td>Heading</td>
<td>360°</td>
<td>1</td>
<td>±2°</td>
<td>0·5°</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Normal acceleration</td>
<td>-3 g to +6 g</td>
<td>0·125 ±</td>
<td>0·125 ±1% of maximum range excluding a datum error of ± 5%</td>
<td>0·004 g</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Pitch attitude</td>
<td>±75°</td>
<td>1</td>
<td>±2°</td>
<td>0·5°</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Roll attitude</td>
<td>±180°</td>
<td>1</td>
<td>±2°</td>
<td>0·5°</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Manual radio transmission keying</td>
<td>Discrete</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Power on each engine</td>
<td>Full range</td>
<td>Each engine each second</td>
<td>±2%</td>
<td>0·2% of full range</td>
<td>Sufficient parameters e.g. EPR/N, or Torque/N\textsubscript{p} as appropriate to the particular engine should be recorded to determine power</td>
</tr>
<tr>
<td>10</td>
<td>Trailing edge flap or cockpit control selection</td>
<td>Full range or each discrete position</td>
<td>2</td>
<td>±5% or as pilot’s indicator</td>
<td>0·5% of full range</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Leading edge flap or cockpit control selection</td>
<td>Full range or each discrete position</td>
<td>2</td>
<td>-</td>
<td>0·5% of full range</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Thrust reverser position</td>
<td>Stowed, in transit, and reverse</td>
<td>Each reverser each second</td>
<td>±2% unless higher accuracy uniquely required</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Ground spoiler and/or speed brake selection</td>
<td>Full range or each discrete position</td>
<td>1</td>
<td>±2°</td>
<td>0·2% of full range</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Outside air temperatures or Total air temperature</td>
<td>Sensor range</td>
<td>2</td>
<td>-</td>
<td>0·3°</td>
<td></td>
</tr>
<tr>
<td>15a</td>
<td>Autopilot engagement status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15b</td>
<td>Autopilot operating modes, autothrottle and AFCS systems engagement status and operating modes</td>
<td>A suitable combination of discreet</td>
<td>1</td>
<td></td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Serial No.</td>
<td>Parameter</td>
<td>Range</td>
<td>Sampling Interval in seconds</td>
<td>Accuracy limits (sensor input compared to FDR readout)</td>
<td>Recommended Resolution in readout</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>----------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>16</td>
<td>Longitudinal acceleration</td>
<td>± 1 g</td>
<td>0.25</td>
<td>±1.5% of maximum range excluding a datum error of ±5%</td>
<td>0.004 g</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Lateral acceleration</td>
<td>± 1 g</td>
<td>0.25</td>
<td>±1-5% of maximum range excluding a datum error of ±5%</td>
<td>0.004 g</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Primary flight controls. Control surface positions and/or pilot input (pitch, roll, yaw)</td>
<td>Full range</td>
<td>1</td>
<td>±2º unless higher accuracy uniquely required</td>
<td>0.2% of full range</td>
<td>For aeroplanes with conventional control systems ‘or’ applies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For aeroplanes with non-mechanical control systems ‘and’ applies</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>For aeroplanes with split surfaces a suitable combination of inputs is acceptable in lieu of recording each surface separately</td>
</tr>
<tr>
<td>19</td>
<td>Pitch trim position</td>
<td>Full range</td>
<td>1</td>
<td>±3% unless higher accuracy uniquely required</td>
<td>0.3% of full range</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Radio altitude</td>
<td>-20 ft to +2500 ft</td>
<td>1</td>
<td>±2 ft or ±3% whichever is greater below 500 ft and ±5% above 500 ft</td>
<td>1 ft below 500 ft, 1 ft +5% of full range above 500 ft</td>
<td>As installed. Accuracy limits are recommended</td>
</tr>
<tr>
<td>21</td>
<td>Glide path deviation</td>
<td>Signal range</td>
<td>1</td>
<td>±3%</td>
<td>0.3% of full range</td>
<td>As installed. Accuracy limits are recommended</td>
</tr>
<tr>
<td>22</td>
<td>Localiser deviation</td>
<td>Signal range</td>
<td>1</td>
<td>±3%</td>
<td>0.3% of full range</td>
<td>As installed. Accuracy limits are recommended</td>
</tr>
<tr>
<td>23</td>
<td>Marker beacon passage</td>
<td>Discrete</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td>A single discrete is acceptable for all markers</td>
</tr>
<tr>
<td>24</td>
<td>Master warning</td>
<td>Discrete</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>NAV 1 and 2 frequency selection</td>
<td>Full range</td>
<td>4</td>
<td>As installed</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>DME 1 and 2 distance</td>
<td>0-200 nm</td>
<td>4</td>
<td>As installed</td>
<td>–</td>
<td>Recording of latitude and longitude from INS or other navigation system is a preferred alternative</td>
</tr>
<tr>
<td>27</td>
<td>Landing gear squat switch status</td>
<td>Discrete</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Ground proximity warning system (GPWS)</td>
<td>Discrete</td>
<td>1</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Angle of attack</td>
<td>Full range</td>
<td>0.5</td>
<td>As installed</td>
<td>0.3% of full range</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Hydraulics</td>
<td>Discrete(s)</td>
<td>2</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Navigation data</td>
<td>As installed</td>
<td>1</td>
<td>As installed</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Landing gear or gear selector position</td>
<td>Discrete</td>
<td>4</td>
<td>As installed</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>
**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 System (EICAS). Use the following order of priority:

1. Parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and 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. Warnings and alerts;

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

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

(c) Additional engine parameters (EPR, N, EGT, fuel flow, etc.).
SECTION 2 JAR-OPS 1 Subpart L

ACJ/AMC/IEM L — COMMUNICATION AND NAVIGATION EQUIPMENT

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

1 For Communication and Navigation Equipment required by JAR-OPS 1 Subpart L, "Approved" means that compliance with the applicable JTSO design requirements and performance specifications, or equivalent, in force at the time of the equipment approval application, has been demonstrated. Where a JTSO does not exist, the applicable airworthiness standards or equivalent apply unless otherwise prescribed in JAR-OPS 1 or JAR-26.

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

3 Communication and Navigation Equipment approved in accordance with design requirements and performance specifications other than JTSOs, before the applicability dates prescribed in JAR-OPS 1.001(b), are acceptable for use or installation on aeroplanes operated for the purpose of commercial air transportation provided that any relevant JAR-OPS requirement is complied with.

4 When a new version of a JTSO (or of a specification other than a JTSO) 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 JAR-OPS 1 or JAR-26.

[Ch. 1, 01.03.98]

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

Individual requirements of JAR-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(c)(1)(i)]
IFR operations without ADF system
See JAR-OPS 1.865(c)(1)(i)

1 To perform IFR operations without an ADF system installed, an operator should consider the following guidelines on equipment carriage, operational procedures and training criteria.

2 The removal/non installation of ADF equipment from an aeroplane may only be done where it is not essential for navigation, provided that alternative equipment giving equivalent or enhanced navigation capability is carried. This may be accomplished by the carriage of an additional VOR receiver or a GNSS receiver approved for IFR operations.

3 For IFR operations without ADF, an operator should ensure that:
   a. route segments that rely solely on ADF for navigation are not flown;
   b. a firm commitment is made not to fly any ADF/NDB procedures;
   c. that the MEL has been amended to take account of the non-carriage of ADF;
   d. that the Operations Manual does not reference any procedures based on NDB signals for the aeroplanes concerned;
   e. that flight planning and dispatch procedures are consistent with the above mentioned criteria.

[Ch. 1, 01.03.98]
ACJ OPS 1.865(c)(1)(i) (continued)

[4] The removal of ADF should be taken into account by the operator in the initial and recurrent training of flight crew.

[Amdt. 7, 01.09.04]

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


[Amdt. 3, 01.12.01]

[ACJ] OPS 1.870
Additional Navigation Equipment for operations in MNPS Airspace
See JAR-OPS 1.870

1 A Long Range Navigation System may be one of the following:
   b. One [Global Navigation Satellite System (GNSS)].
   c. One navigation system using inputs from one or more Inertial Reference Systems (IRS). [ ] or any other MNPS approved sensor system.

2 [To conform to the Long Range Navigation System Specification, a GNSS and its operational use should be approved in accordance with the relevant requirements for MNPS airspace.]

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

[Amdt. 7, 01.09.04]

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IEM OPS 1.875
Introduction
See JAR-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 JAR-145 approval.

[Amdt. 2, 01.07.00]

IEM OPS 1.885(a)
Application for and approval of the Operator’s Maintenance
See JAR-OPS 1.885(a)
1. The Authority does not expect the documents listed in JAR-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 Authority 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 Authority is in possession of completed documents.
2. This information is required to enable the Authority 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 Authority 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 JAR-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 Authority. 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 Authority considers that this is compatible with the operator’s fleet size.

[Amdt. 2, 01.07.00]

IEM OPS 1.885(b)
Application for and approval of the Operator’s Maintenance System
See JAR-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 Authority 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 Authority in the interests of safe operation.
AMC OPS 1.890(a)  
Maintenance Responsibility  
See JAR-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 JAR-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 JAR-145 Approved Maintenance Organisation (See JAR-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 JAR-145, the operator should provide a clear work order to the maintenance contractor. The fact that an operator has contracted a JAR-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 JAR-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 Authority. 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 JAR-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 JAR-OPS 1.900. It should be demonstrated to the Authority that preflight inspection personnel have received
AMC OPS 1.890(a)(1) (continued)

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.

[Amdt. 2, 01.07.00]

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

The fact that the performance of pre flight inspections is an Operator's maintenance responsibility does not necessarily mean 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.

[Amdt. 2, 01.07.00]

AMC OPS 1.890(a)(2)
Maintenance Responsibility
See JAR-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 Authority.

[Amdt. 2, 01.07.00]

AMC OPS 1.890(a)(3)
Maintenance Responsibility
See JAR - 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 Authority.

[Amdt. 2, 01.07.00]

AMC OPS 1.890(a)(4)
Maintenance Responsibility
See JAR-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 Authority unless the operator has been approved to amend the maintenance programme without direct involvement of the Authority).
IEM OPS 1.890(a)(5)
Maintenance Responsibility
See JAR-OPS 1.890(a)(5)

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

[Amdt. 2, 01.07.00]

AMC OPS 1.890(a)(6)
Maintenance Responsibility
See JAR-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 JAR-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 JAR-145 to carry out all maintenance of the aeroplane and aeroplane components;
   b. An operator to be approved in accordance with JAR-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 JAR-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 Authority to determine which option may be accepted in each particular case.

2.1 To make this determination the Authority 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 Authority 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 Authority 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 Authority 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 Authority 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 Authority will require an operator to enter into a contract with an appropriately approved JAR-145 organisation except that in some cases where the Authority 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.
AMC OPS 1.895(a) (continued)

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 JAR-OPS 1.895(b) to manage the maintenance responsibility whichever option is used.

AMC OPS 1.895(b)
Maintenance Management
See JAR-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 JAR-OPS 1.175(h)), the ‘nominated postholder’ (see JAR-OPS 1.175(i)) and the quality monitoring function (see JAR-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 organisation consists of at least two persons except that the Authority 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 Authority.

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 Authority 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 Authority 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 Authority.

[Amdt. 2, 01.07.00]

AMC OPS 1.895(c)
Maintenance Management
See JAR-OPS 1.895(c)

The Authority should only accept that the proposed person be employed by the JAR-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.

[Amdt. 2, 01.07.00]
IEM OPS 1.895(c)
Maintenance Management
See JAR-OPS 1.895(c)

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

[Amdt. 2, 01.07.00]

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

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

[Amdt. 2, 01.07.00]

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

1 In the case of a contract with an organisation that is not JAR-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 JAR-145 approved/accepted organisations in accordance with data acceptable to the Authority. In particular the Quality System procedures should place great emphasis on monitoring compliance with the above. The list of JAR-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 Authority should be satisfied that such an arrangement allows the Operator to ensure full compliance with JAR-OPS 1.890 Maintenance Responsibility.

[Amdt. 2, 01.07.00]
IEM OPS 1.895(e)
Maintenance Management
See JAR-OPS 1.895(e)

The purpose of JAR-OPS 1.895(e) is to authorise a primary maintenance arrangement with an organisation which is not a JAR-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 JAR-145 approved/accepted organisation and complying with the JAR-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 JAR-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 JAR-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 JAR-145 approved JAR-OPS operator of the same type of aeroplane. A typical case is that of a dry-leased aeroplane between JAR-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 JAR-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 JAR-OPS approved Operator of the aeroplane, remains responsible for the maintenance of the aeroplane in performing the JAR-OPS 1.890 functions, and employing the JAR-OPS 1.895 Maintenance Management Group of Persons.

In essence, JAR-OPS 1.895(e) does not alter the intent of JAR-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 Authority 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 JAR-OPS 1.895(b) Maintenance Management Group of Persons and JAR-OPS 1.900 Quality System.

[I amd. 2, 01.07.00]

IEM - OPS 1.895(f&g)
Maintenance Management
See JAR-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 Authority, 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 Authority 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.

[I amd. 2, 01.07.00]
AMC OPS 1.895(h)  
**Maintenance Management**  
See JAR-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 Authority 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.

[Amdt. 2, 01.07.00]

AMC OPS 1.900  
**Quality system**  
See JAR-OPS 1.900

1. An operator should establish a plan acceptable to the Authority to show when and how often the activities as required by JAR-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 JAR-OPS 1.175(h).

3. To ensure effective compliance with JAR-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 JAR-OPS 1.900 includes other self-explanatory monitoring elements.

IEM OPS 1.900  
**Quality system**  
See JAR-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 JAR-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 JAR-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 JAR-OPS 1 Subpart M
AMC OPS 1.905(a) (continued)

requirements, which in conjunction with an appropriate JAR-145 Approved Maintenance Organisation Exposition, is a pre-requisite for obtaining an acceptance of the operator’s maintenance system by the Authority.

2 Where an operator is appropriately approved as a JAR-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:

**JAR-145 Exposition**

Part 1 Management

Part 2 Maintenance Procedures

Part L2 Additional Line Maintenance Procedures

Part 3 Quality System Procedures

Part 4 Contracted JAA Operators

Part 5 Appendices (sample of documents)

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

Additional parts should be introduced covering the following:

Part 0 General Organisation

Part 6 JAR-OPS Maintenance Procedures

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

Part 0 General Organisation

Part 1 JAR-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 Authority, including associated procedures manuals, and the submission of proposed amendments to the Authority for approval. The Authority 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 Authority.

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 Authority in a form acceptable to the Authority. 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 JAR-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 Authority* Approval under JAR-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 Authority* from time to time where these new or amended regulations are in conflict with these procedures.

It is understood that the Authority* will approve this organisation whilst the Authority* is satisfied that the procedures are being followed and the work standard maintained. It is understood that the Authority* reserves the right to suspend, vary or revoke the JAR-OPS Subpart M maintenance system approval of the organisation, as applicable, if the Authority* 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)...... "  

* Where it states Authority please insert the actual name of the JAA-NAA, for example, RLD, RAI, LBA, DGAC, CAA, etc. etc.

10 Whenever the accountable manager is changed it is important to ensure that the new accountable manager signs the para 9. statement at the earliest opportunity as part of the acceptance by the JAA-NAA.

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

[Amnd. 2, 01.07.00]

AMC OPS 1.910(a)  
Operator’s Aeroplane Maintenance  
See JAR-OPS 1.910(a)

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

2 Where implementation of the content of an approved operator’s aeroplane maintenance programme is accomplished by an appropriately approved JAR-145 Approved Maintenance Organisation, it therefore follows that the JAR-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 Authority, 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.
AMC OPS 1.910(a) (continued)

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 5,700 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.

[Amendment 2, 01.07.00]

[AMC OPS 1.910(b)]
Operator’s Aeroplane Maintenance Programme
See JAR-OPS 1.910(b)

1 The Operator should review the detailed requirements at least annually.

[Amendment 7, 01.09.04]

[AMC OPS 1.910(c)]
Operator’s Aeroplane Maintenance Programme
See JAR-OPS 1.910(c)

1 Not withstanding AMC OPS 1.910(b) the Operator is to review mandatory information before compliance is required. Such information includes but is not limited to:

i. Airworthiness Limitations such as those required by JAR 23.1529 Appendix G and JAR 25.1529 Appendix H. Include where applicable mandatory replacement times of life limited parts, structural inspection intervals together with related structural inspection procedures.

ii. Maintenance considerations such as Certification Maintenance Requirements/Certification Check Requirements) and those addressed by AMJ 25.1309 and AMJ 25-19 including where applicable mandatory tasks intended to detect latent safety-significant failures.

[Amendment 7, 01.09.04]
AMC OPS 1.910([d])
Operator’s Aeroplane Maintenance
See JAR-OPS 1.910(b)

1 The documentation issued by the Authority 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. Appendix 1 to AMC OPS 1.910(a) & (b) gives further guidance.

2 The Authority 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, 3,000 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 Authority may be unable to approve the complete operator’s aeroplane maintenance programme, preferring to opt for a limited period.

3 If the Authority 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 Authority 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.

[Amndt. 7, 01.09.04]

AMC OPS 1.915
Operator’s aeroplane technical log
See JAR-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 need 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.
SECTION 2  JAR-OPS 1 Subpart M

AMC OPS 1.915 (continued)

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

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 Authority.

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 Authority, 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 check as appropriate.

The alternate abbreviated certificate of release to service consists of the following statement “JAR 145.50 release to service” in place of the full certification statement specified in AMC 145.50(b) para 1.

When the JAA-NAA 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) para 1 together with a note stating; “The alternate abbreviated certificate of release to service used in this technical log satisfies the intent of JAR 145.50(a) only. All other aspects of JAR 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 JAR-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.
AMC OPS 1.915 (continued)

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.

[Amendment 2, 01.07.00; Amendment 3, 01.12.01]

**AMC OPS 1.920 Maintenance Records**

See JAR-OPS 1.920

1 The operator should ensure that he always receives a complete JAR-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 JAR-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 JAR-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 Authority 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 JAR-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 JAR-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, 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.

[Amdt. 2, 01.07.00]

IEM OPS 1.920(b)(6)

Maintenance Records
See JAR-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.

[Amdt. 2, 01.07.00]

AMC OPS 1.920(c)

Maintenance Records
See JAR-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 Authority.

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 Authority 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.

[Amdt. 2, 01.07.00]

IEM OPS 1.930

Continued validity of the Air Operator Certificate in respect of the maintenance system
See JAR-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 JAR-OPS 1.935

1 This paragraph is intended to provide the necessary flexibility to the Authority 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 JAR-OPS 1 Subpart M following NPA consultation but, in the meantime, may be published as a Maintenance Temporary Guidance Leaflet.
Appendix 1 to AMC OPS 1.905(a)
Maintenance Management Exposition for an Operator who is also approved in accordance with JAR-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 JAR-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 JAR-145 approved maintenance organisation.

PART 6 JAR-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.

[Amdt. 2, 01.07.00]
Appendix 2 to AMC OPS 1.905(a)

Maintenance Management Exposition for an Operator who is NOT approved in accordance with JAR-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 JAR-OPS MAINTENANCE PROCEDURES

(as shown in Appendix 1, Part 6 entitled – JAR-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 JAR-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), (c) and (d)
[Operator’s Aeroplane Maintenance Programme
See JAR-OPS 1.910(a), (b), (c), and (d)]

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 Authority.

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 [applicable ageing aeroplane systems requirements together with any specified sampling programmes.]

1.1.13 Details of [specific structural maintenance programmes where issued by the Type Certificate Holder including but not limited to:

- Maintenance of Structural Integrity by Damage Tolerance and Supplemental Structural Inspection Programmes (SSID)
- Structural maintenance programmes resulting from the Service Bulletin review performed by the Type Certificate holder
- Corrosion Prevention and Control
- Repair Assessment
- Widespread Fatigue Damage]

1.1.14 A statement of the limit of validity in terms of total flight cycles/calendar data/flight hours for the structural programme in 1.1.13.

Note: Further detailed guidance material on programmes for ageing aircraft structures can be found in TGL 11 which is published in JAA Administration and Guidance material Section One Part Three.]

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

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

1.1.17 A cross-reference to other documents approved by the Authority which contain the details of maintenance tasks related to mandatory life limitations, Certification Maintenance Requirements (CMR’s) and Airworthiness Directives (AD’s).
Appendix 1 to AMC OPS 1.910(a), (b), (c), and (d) (continued)

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.

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

1.1.19 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 Authority, the statement should refer to this Manual.

1.1.20 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 Authority is not satisfied that the proposed maintenance programme can be used as is by the Operator, the Authority 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 Authority. 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 Authority.

[[Amendment 7 2-M-21 01.09.04]]
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ACJ/AMC/IEM N — FLIGHT CREW

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

See JAR-OPS 1.940(a)(4)

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

a. 100 flying hours and flown 10 sectors within a consolidation period of 120 consecutive days; or
b. 150 flying hours and flown 20 sectors (no time limit).

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

a. A new operator is commencing operations; or
b. An operator introduces a new aeroplane type; or
c. Flight crew members have previously completed a type conversion course with the same operator; or
d. The aeroplane has a Maximum Take-off Mass below 10 tonnes or a Maximum Approved Passenger Seating Configuration of less than 20.

[Ch. 1, 01.03.98]

AMC OPS 1.945
Conversion Course Syllabus

See JAR-OPS 1.945 and Appendix 1 to JAR-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 JAR-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;

[Ch. 1, 01.03.98]
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, [ ] All Weather Operations, or [QFE 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 JAR-OPS 1.965.

4.4 Unless the type rating training programme has been carried out in a Flight Simulator usable for zero flight-time (ZFT) conversion, the training should include at least 3 takeoffs and landings in the aeroplane.

5 Line flying under supervision

5.1 Following completion of aeroplane/STD training and checking as part of the operator’s conversion course, each flight crew member should operate a minimum number of sectors and/or flying hours under the supervision of a flight crew member nominated by the operator and acceptable to the Authority.

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 JAR-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
IEM OPS 1.945
Line Flying under Supervision
See JAR-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 JAR-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 JAR-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 Authority;

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 Authority. In this event the operator should ensure that the content of the course meets his operational requirements. When crew members from several companies follow the same course, CRM core elements should be specific to the nature of operations of the companies and the trainees concerned.

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:

Table 1

<table>
<thead>
<tr>
<th>Core Elements</th>
<th>Initial CRM Training</th>
<th>Operator’s conversion course when changing type</th>
<th>Operator’s conversion course when changing operator</th>
<th>Command course</th>
<th>Recurrent training</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(b)</td>
<td>(c)</td>
<td>(d)</td>
<td>(e)</td>
<td>(f)</td>
</tr>
<tr>
<td>Human error and reliability, error chain, error prevention and detection</td>
<td>In depth</td>
<td>In depth</td>
<td>Overview</td>
<td>Overview</td>
<td></td>
</tr>
<tr>
<td>Company safety culture, SOPs, organisational factors</td>
<td>Not required</td>
<td>Not required</td>
<td>In depth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress, stress management, fatigue &amp; vigilance</td>
<td>In depth</td>
<td></td>
<td></td>
<td>Overview</td>
<td></td>
</tr>
<tr>
<td>Information acquisition and processing situation awareness, workload management</td>
<td>In depth</td>
<td>In depth</td>
<td>In depth</td>
<td>Indepth</td>
<td>Overview</td>
</tr>
<tr>
<td>Decision making</td>
<td>In depth</td>
<td>Overview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication and co-ordination inside and outside the cockpit</td>
<td>In depth</td>
<td>Overview</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership and team behaviour synergy</td>
<td>In depth</td>
<td>In depth</td>
<td>In depth</td>
<td>Overview</td>
<td></td>
</tr>
<tr>
<td>Automation, philosophy of the use of automation (if relevant to the type)</td>
<td>As required</td>
<td>As required</td>
<td>As required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific type-related differences</td>
<td>As required</td>
<td>As required</td>
<td>As required</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case based studies</td>
<td>In depth</td>
<td>In depth</td>
<td>In depth</td>
<td>In depth</td>
<td>As appropriate</td>
</tr>
</tbody>
</table>

7  Co-ordination between flight crew and cabin crew training

7.1  Operators should, as far as is practicable, provide combined training for flight crew and cabin crew including briefing and debriefing.

7.2  There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew instructors to observe and comment on each 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 Authority, 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.

[Amrd. 3. 01.12.01]
Crew Resource Management (CRM)

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 members 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.

[Amendt. 3. 01.12.01]

AMC OPS 1.945(a)(9)
Crew Resource Management - Use of Automation
See JAR-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.
AMC OPS 1.945(a)(9) (continued)

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.

[Amdt. 3. 01.12.01]

AMC OPS 1.965(c)
Line checks
See JAR-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.

[Amdt. 3. 01.12.01]

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

[Amdt. 3. 01.12.01]

IEM OPS 1.965
Recurrent training and checking
See JAR-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
IEM OPS 1.965 (continued)

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.

[Amdt. 3. 01.12.01]

AMC to Appendix 1 to JAR-OPS 1.965
Pilot incapacity training
See Appendix 1 to JAR-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.

[Ch. 1, 01.03.98; Amdt. 3. 01.12.01]

AMC OPS 1.970
Recency
See JAR-OPS 1.970

When using a Flight Simulator for meeting the landing requirements in JAR-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.

[Ch. 1, 01.03.98; Amdt. 3. 01.12.01]

IEM OPS 1.970(a)(2)
Co-pilot proficiency
See JAR-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 JAR-FCL type-rating proficiency checks.

[Ch. 1, 01.03.98]

AMC OPS 1.975
Route and aerodrome competence qualification
See JAR-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.

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 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.

2.2 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 Authority.

3 Category A. An aerodrome which satisfies all of the following requirements:

a. An approved instrument approach procedure;

b. At least one runway with no performance limited procedure for take-off and/or landing;

c. Published circling minima not higher than 1 000 feet above aerodrome level; and

d. Night operations capability.

4 Category B. An aerodrome which does not satisfy the Category A requirements or which requires extra considerations such as:

a. Non-standard approach aids and/or approach patterns; or

b. Unusual local weather conditions; or

c. Unusual characteristics or performance limitations; or

d. Any other relevant considerations including obstructions, physical layout, lighting etc.

4.1 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.

5 Category C. An aerodrome which requires additional considerations to a Category B aerodrome.

5.1 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.

[Ch. 1, 01.03.98; Amdt. 3, 01.12.01]
AMC OPS 1.980
Operation on more than one type or variant
See JAR-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 JAR-OPS 1.950(a)(1).

e. Familiarisation training. See JAR-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 JAR-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 JAR-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 JAR-STD 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 JAR-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.

[Ch. 1, 01.03.98; Amdt. 3, 01.12.01]

AMC OPS 1.980(b)
Methodology - Use of Operator Difference Requirement (ODR) Tables
See JAR-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 Authority as a means of evaluating aeroplane differences and similarities to justify the operation of more than one type or variant, and when credit is sought.

2 ODR Tables

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

<table>
<thead>
<tr>
<th>BASE AEROPLANE: DIFFERENCE AEROPLANE:</th>
<th>COMPLIANCE METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL</td>
<td>DIFFERENCES</td>
</tr>
<tr>
<td>General description of aircraft (dimensions, weight, limitations, etc.)</td>
<td>Identification of the relevant differences between the base aeroplane and the difference aeroplane.</td>
</tr>
</tbody>
</table>
JAR-OPS 1 Subpart N

AMC OPS 1.980(b) (continued)

3.2 Table 2 - ODR 2 - systems

<table>
<thead>
<tr>
<th>BASE AEROPLANE: DIFFERENCE AEROPLANE:</th>
<th>COMPLIANCE METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTEM</td>
<td>DIFFERENCES</td>
</tr>
<tr>
<td>Brief description of systems and subsystems classified according to the ATA 100 index.</td>
<td>list of differences for each relevant subsystem between the base aeroplane and the difference aeroplane.</td>
</tr>
</tbody>
</table>

3.3 Table 3 - ODR 3 - manoeuvres

<table>
<thead>
<tr>
<th>BASE AEROPLANE: DIFFERENCE AEROPLANE:</th>
<th>COMPLIANCE METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANOEUVRES</td>
<td>DIFFERENCES</td>
</tr>
<tr>
<td>Described according to phase of flight (gate, taxi, flight, taxi, gate)</td>
<td>List of relevant differences for each manoeuvre between the base aeroplane and the difference aeroplane.</td>
</tr>
</tbody>
</table>

4 Compilation of ODR Tables

4.1 ODR 1 - Aeroplane general

a. The general characteristics of the difference aeroplane should be compared with the base aeroplane with regard to:

i. General dimensions and aeroplane design;

ii. Flight deck general design;

iii. Cabin layout;

iv. Engines (number, type and position);

v. Limitations (flight envelope).

4.2 ODR 2 - Aeroplane systems

a. Consideration should be given to differences in design between the difference aeroplane and the base aeroplane. This comparison should be completed using the ATA 100 index to establish system and subsystem classification and then an analysis performed for each index item with respect to main architectural, functional and/or operations elements, including controls and indications on the systems control panel.

4.3 ODR 3 - Aeroplane manoeuvres (operational differences)

a. Operational differences encompass normal, abnormal and emergency situations and include any change in aeroplane handling and flight management. It is necessary to establish a list of operational items for consideration on which an analysis of differences can be made. The operational analysis should take the following into account:

i. Flight deck dimensions (e.g. size, cut-off angle and pilot eye height);

ii. Differences in controls (e.g. design, shape, location, function);

iii. Additional or altered function (flight controls) in normal or abnormal conditions;
SECTION 2 JAR-OPS 1 Subpart N

AMC OPS 1.980(b) (continued)

iv. Procedures;
v. Handling qualities (including inertia) in normal and abnormal configurations;
vi. Performance in manoeuvres;
vi. Aeroplane status following failure;
vi. 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.

6 Table 4 - Difference Levels versus training

<table>
<thead>
<tr>
<th>Difference Level</th>
<th>Method/Minimum Specification for Training Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>A:</td>
<td>Represents knowledge requirement.</td>
</tr>
<tr>
<td>Self Instruction through operating bulletins or differences handouts</td>
<td></td>
</tr>
<tr>
<td>B:</td>
<td>Aided instruction is required to ensure crew understanding, emphasise issues, aid retention of information, or: aided instruction with partial application of procedures</td>
</tr>
<tr>
<td>Aided instruction e.g. computer based training (CBT), class room instruction or video tapes.</td>
<td></td>
</tr>
<tr>
<td>C:</td>
<td>For variants having part task differences affecting skills or abilities as well as knowledge. Training device required to ensure attainment and retention of crew skills</td>
</tr>
<tr>
<td>STD (JAR-STD 2A, Level 1)</td>
<td></td>
</tr>
<tr>
<td>D:</td>
<td>Full task differences affecting knowledge, skills and/or abilities using STDs capable of performing flight manoeuvres.</td>
</tr>
<tr>
<td>STD (JAR-STD 2A, Level 2)</td>
<td></td>
</tr>
<tr>
<td>E:</td>
<td>Full tasks differences requiring high fidelity environment to attain and maintain knowledge skills and abilities.</td>
</tr>
<tr>
<td>STD (JAR-STD 1A, Level C)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Levels A and B require familiarisation training, levels C, D and E require differences training. For Level E, the nature and extent of the differences may be such that it is not possible to fly both types or variants with a credit in accordance with Appendix 1 to JAR-OPS 1.980, sub-paragraph (d)(7).

[Ch. 1, 01.03.98; Amdt. 3, 01.12.01]

IEM OPS 1.980(b)
Operation on more than one type or variant - Philosophy and Criteria
See JAR-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
IEM OPS 1.980(b) (continued)

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 nav aids;
   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:

Table 1 - ODR 1 - AEROPLANE GENERAL

<table>
<thead>
<tr>
<th>BASE AEROPLANE: ‘X’</th>
<th>DIFFERENCE AEROPLANE: ‘Y’</th>
<th>COMPLIANCE METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL</td>
<td>DIFFERENCES</td>
<td>FLT CHAR</td>
</tr>
<tr>
<td>Flight Deck</td>
<td>Same flight deck arrangement, 2 observers seats on ‘Y’</td>
<td>NO</td>
</tr>
<tr>
<td>Cabin</td>
<td>‘Y’ max certificated passenger capacity: 335, ‘X’: 179</td>
<td>NO</td>
</tr>
</tbody>
</table>
### Table 2 - ODR 2 - SYSTEMS

<table>
<thead>
<tr>
<th>SYSTEMS</th>
<th>DIFFERENCES</th>
<th>FLT CHAR</th>
<th>PROC CHNG</th>
<th>Training</th>
<th>Checking</th>
<th>Recent Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>21 Air Conditioning</td>
<td>- Trim air system</td>
<td>NO</td>
<td>YES</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>- packs</td>
<td>NO</td>
<td>NO</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- cabin temperature</td>
<td>NO</td>
<td>YES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 Auto flight</td>
<td>- FMGS architecture</td>
<td>NO</td>
<td>NO</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>- FMGES functions</td>
<td>NO</td>
<td>YES</td>
<td>D</td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>- reversion modes</td>
<td>NO</td>
<td>YES</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>23 Communications</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 3 - ODR 3 - MANOEUVRES

<table>
<thead>
<tr>
<th>MANOEUVRES</th>
<th>DIFFERENCES</th>
<th>FLT CHAR</th>
<th>PROC CHNG</th>
<th>Training</th>
<th>Checking</th>
<th>Recent Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxi</td>
<td>- Pilot eye height, turn radius,</td>
<td>YES</td>
<td>NO</td>
<td>D</td>
<td>D</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td>- two engine taxi (1&amp;4)</td>
<td>NO</td>
<td>NO</td>
<td>A</td>
<td>/</td>
<td>/</td>
</tr>
<tr>
<td>Take-off</td>
<td>Flight Characteristics in ground law</td>
<td>YES</td>
<td>NO</td>
<td>E</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Rejected take-off</td>
<td>Reverser actuation logic</td>
<td>YES</td>
<td>NO</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>Take-off engine failure</td>
<td>- V, V split, pitch attitude/lateral control</td>
<td>YES(P)*</td>
<td>NO</td>
<td>B</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>- Performance</td>
<td>YES(H)*</td>
<td>NO</td>
<td>E</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

*P = Performance, H = Handling

[Ch. 1, 01.03.98]

### IEM OPS 1.985
- **Training records**
- **See JAR-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.
IEM OPS 1.988
Additional crew members assigned to specialist duties
See JAR-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 JAR-OPS 1.990

1 The demonstration or analysis referred to in JAR-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 JAR-OPS 1.990(b), the Authority may require an increased number of cabin crew members in excess of the requirements of JAR-OPS 1.990 on certain types of aeroplane or operations. Factors which should be taken into account include:

a. The number of exits;
b. The type of exits and their associated slides;
c. The location of exits in relation to cabin crew seats and the cabin layout;
d. The location of cabin crew seats taking into account cabin crew duties in an emergency evacuation including:
   i. Opening floor level exits and initiating stair or slide deployment;
   ii. Assisting passengers to pass through exits; and
   iii. Directing passengers away from inoperative exits, crowd control and passenger flow management;
   e. Actions required to be performed by cabin crew in ditchings, including the deployment of slide-rafts and the launching of life-rafts.

3 When the number of cabin crew is reduced below the minimum required by JAR-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 JAR-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 Authority.

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 JAR-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
SECTION 2

JAR-OPS 1 Subpart O

IEM OPS 1.1000(c) (continued)

(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.

[ACJ OPS 1.1005/1.1010/1.1015 and ACJ to Appendix 2 to JAR-OPS 1.1005/1.1010/1.1015
Crew Resource Management Training
See JAR-OPS 1.1005/1.1010/1.1015 and Appendix 2 to JAR-OPS 1.1005/1.1010/1.1015

1 Introduction

1.1 Crew Resource Management (CRM) should be the effective utilisation of all available resources
(e.g. crew members, aeroplane systems, and supporting facilities) to achieve safe and efficient operation.

1.2 The objective of CRM should be to enhance the communication and management skills of the crew
member, as well as the importance of effective co-ordination and two-way communication between all crew
members.

1.3 CRM training should reflect the culture of the operator, the scale and scope of the operation
together with associated operating procedures and areas of operation which produce particular difficulties.

2 General Principles for CRM Training for Cabin Crew

2.1 Cabin crew CRM training should focus on issues related to cabin crew duties, and therefore, should
be different from flight crew CRM training. However, the co-ordination of the tasks and functions of flight
crew and cabin crew should be addressed.

2.2 Whenever it is practicable to do so, operators should provide combined training for flight crew and
cabin crew, including feedback, as appropriate to Appendix 2 to JAR-OPS 1.1005/1.1010/1/1.1015 Table 1,
Columns (d), (e) and (f). This is of particular importance for senior cabin crew members.

2.3 Where appropriate, CRM principles should be integrated into relevant parts of cabin crew training.

2.4 CRM training should include group discussions and the review of accidents and incidents (case-
based studies).

2.5 Whenever it is practicable to do so, relevant parts of CRM training should form part of the training
conducted in cabin mock-ups or aircraft.

2.6 CRM training should take into account the items listed in Appendix 2 to JAR-OPS 1.1005/1.1010/1/1.1015 Table 1. CRM training courses should be conducted in a structured and realistic
manner.

2.7 The operator should be responsible for the quality of all CRM training, including any training
provided by sub-contractors/third parties (in accordance with JAR-OPS 1.035 and AMC-OPS 1.035,
paragraph 5.1).

2.8 CRM training for cabin crew should include, an Introductory CRM Course, Operator’s CRM
Training, and Aeroplane Type Specific CRM, all of which may be combined.

2.9 There should be no assessment of CRM skills. Feedback from instructors or members of the group
on individual performance should be given during training to the individuals concerned.

3 Introductory CRM Course

3.1 The Introductory CRM Course should provide cabin crew members with a basic knowledge of
Human Factors relevant to the understanding of CRM.

3.2 Cabin crew members from different operators may attend the same Introductory CRM Course
provided that operations are similar (see paragraph 1.3).]
4 Operator’s CRM Training

4.1 Operator’s CRM training should be the application of the knowledge gained in the Introductory CRM Course to enhance communication and co-ordination skills of cabin crew members relevant to the operator’s culture and type of operation.

5 Aeroplane Type Specific CRM

5.1 Aeroplane Type Specific CRM should be integrated into all appropriate phases of the operator’s conversion training on the specific aeroplane type.

5.2 Aeroplane Type Specific CRM should be the application of the knowledge gained in previous CRM training on the specifics related to aircraft type, including, narrow/wide bodied aeroplanes, single/multi deck aeroplanes, and flight crew and cabin crew composition.

6 Annual Recurrent Training

6.1 When a cabin crew member undergoes annual recurrent training, CRM training should be integrated into all appropriate phases of the recurrent training and may include stand-alone modules.

6.2 When CRM elements are integrated into all appropriate phases of the recurrent training, the CRM elements should be clearly identified in the training syllabus.

6.3 Annual Recurrent CRM Training should include realistic operational situations.

6.4 Annual Recurrent CRM Training should include areas as identified by the operator’s accident prevention and flight safety programme (see JAR-OPS 1.037).

7 CRM Training for Senior Cabin Crew

7.1 CRM training for Senior Cabin Crew Members should be the application of knowledge gained in previous CRM training and operational experience relevant to the specific duties and responsibilities of a Senior Cabin Crew Member.

7.2 The senior cabin crew member should demonstrate ability to manage the operation and take appropriate leadership/management decisions.

8 CRM Instructor Qualifications

8.1 The operator should ensure that all personnel conducting relevant training are suitably qualified to integrate elements of CRM into all appropriate training programmes.

8.2 A training and standardisation programme for CRM instructors should be established.

8.3 Cabin crew CRM instructors should:

a. Have suitable experience of commercial air transport as a cabin crew member; and

b. Have received instruction on Human Factors Performance Limitations (HPL); and

c. Have completed an Introductory CRM Course and the Operator’s CRM training; and

d. Have received instructions in training skills in order to conduct CRM courses; and

e. Be supervised by suitably qualified CRM instructors when conducting their first CRM training course.

8.4 An experienced non-cabin crew CRM instructor may continue to be a cabin crew CRM instructor, provided that the provisions of paragraph 8.3 b) to e) are satisfied and that a satisfactory knowledge has been demonstrated of the nature of the operation and the relevant specific aeroplane types. In such circumstances, the operator should be satisfied that the instructor has a suitable knowledge of the cabin crew working environment.

8.5 Instructors integrating elements of CRM into conversion, recurrent training, or Senior Cabin Crew Member training, should have acquired relevant knowledge of human factors and have completed appropriate CRM training.

9 Co-ordination between flight crew and cabin crew training departments

9.1 There should be an effective liaison between flight crew and cabin crew training departments. Provision should be made for flight and cabin crew instructors to observe and comment on each others.
SECTION 2  JAR-OPS 1 Subpart O

ACJ OPS 1.1005/1.1010/1.1015 and ACJ to Appendix 2 to JAR-OPS 1.1005/1.1010/1.1015 (continued)

[ training. Consideration should be given to creating flight deck scenarios on video for playback to all cabin crew during recurrent training, and to providing the opportunity for cabin crew, particularly senior cabin crew, to participate in Flight Crew LOFT exercises.]

[Amtd. 7, 01.09.04]

AMC OPS 1.1012
Familiarisation
See JAR-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 JAR-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;

Amendment 7  2-O-5  01.09.04
Exit location and its environment.

4.2 An aeroplane familiarisation visit may be combined with the conversion training required by JAR-OPS 1.1010(c)(3).

IEM OPS 1.1005/1.1010/1.1015/1.1020
Representative Training Devices
See JAR-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
JAR-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 JAR-OPS 1.1020

In developing the content of any refresher training programme prescribed in JAR-OPS 1.1020, operators should consider (in consultation with the Authority) whether, for aeroplanes with complex equipment or procedures, refresher training may be necessary for periods of absence that are less than the 6 months prescribed in JAR-OPS 1.1020(a).

IEM OPS 1.1020(a)
Refresher training
See JAR-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.

[Ch. 1, 01.03.98]
AMC OPS 1.1025
Checking
See JAR-OPS 1.1025
1 Elements of training which require individual practical participation should be combined with practical checks.
2 The checks required by JAR-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 JAR-OPS 1.1030
1 For the purposes of JAR-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 JAR-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 JAR-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;
ACJ OPS 1.1030 (continued)

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.

[Amdt. 3, 01.12.01]

IEM OPS 1.1035
Training records
See JAR-OPS 1.1035

An operator should maintain a summary of training to show a trainee’s completion of every stage of training and checking.

IEM to Appendix 1 to JAR-OPS 1.1005/1.1015/1.1020
First Aid Training
See Appendix 1 to JAR-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 JAR-OPS 1.1005/1.1010/1.1015/1.1020

Crowd Control

See Appendix 1 to JAR-OPS 1.1005/1.1010/1.1015/1.1020

1 Crowd control

1.1 Operators should provide training in the application of crowd control in various emergency situations. This training should include:

a. Communications between flight crew and cabin crew and use of all communications equipment, including the difficulties of co-ordination in a smoke-filled environment;

b. Verbal commands;

c. The physical contact that may be needed to encourage people out of an exit and onto a slide;

d. The re-direction of passengers away from unusable exits;

e. The marshalling of passengers away from the aeroplane;

f. The evacuation of disabled passengers; and

g. Authority and leadership.

[Ch. 1, 01.03.98]

IEM to Appendix 1 to JAR-OPS 1.1005/1.1010/1.1015/1.1020

Training Methods

See Appendix 1 to JAR-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.

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IEM to Appendix 1 to JAR-OPS 1.1010/1.1015

Conversion and recurrent training

See Appendix 1 to JAR-OPS 1.1010/1.1015

1 A review should be carried out of previous initial training given in accordance with JAR-OPS 1.1005 in order to confirm that no item has been omitted. This is especially important for cabin crew members first transferring to aeroplanes fitted with life-rafts or other similar equipment.

2 Fire and smoke training requirements

<table>
<thead>
<tr>
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<th>Required activity</th>
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</thead>
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<tr>
<td>First conversion to aeroplane type</td>
<td>Actual fire fighting and handling equipment</td>
<td>(Note 1)</td>
</tr>
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<td>(e.g. new entrant)</td>
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<td>Every year during recurrent training</td>
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<td>Every 3 years during recurrent training</td>
<td>Actual fire fighting and handling equipment</td>
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<td>Subsequent a/c conversion</td>
<td>(Note 1)</td>
<td>(Note 1)</td>
</tr>
<tr>
<td>New fire fighting equipment</td>
<td>Handling equipment</td>
<td></td>
</tr>
</tbody>
</table>

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 JAR-OPS 1.1040(b)

1 A number of the provisions of JAR-OPS require the prior approval of the Authority. As a consequence, the related sections of the Operations Manual should be subject to special attention. In practice, there are two possible options:

   a. The Authority approves a specific item (e.g. with a written response to an application) which is then included in the Operations Manual. In such cases, the Authority merely checks that the Operations Manual accurately reflects the content of the approval. In other words, such text has to be acceptable to the Authority; or

   b. An operator’s application for an approval includes the related, proposed, Operations Manual text in which case, the Authority’s written approval encompasses approval of the text.

2 In either case, it is not intended that a single item should be subject to two separate approvals.

3 The following list indicates only those elements of the Operations Manual which require specific approval by the Authority. (A full list of every approval required by JAR-OPS in its entirety may be found in Appendix 6 of the Operations Joint Implementation Procedures (JAA Administration & Guidance Material Section 4, Part 2.)

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### JAR-OPS 1

**SECTION 2**

IEM OPS 1.1040(b) (continued)

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<td>Procedures for flight crew to operate on more than 1 type or variant</td>
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<td>Procedures for cabin crew to operate on four airplane types</td>
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<td>Method of determination of minimum flight attitudes</td>
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IEM OPS 1.1040(c)
Operations Manual - Language
See JAR-OPS 1.1040(c)

1 JAR-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.

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AMC OPS 1.1045
Operations Manual Contents
See JAR-OPS 1.1045

1 Appendix 1 to JAR-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 JAR-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 JAR-OPS 1.1040(k)). [Any material received form an external source should be given its status by a statement in the Operations Manual.]

[Amdt. 5, 01.03.03]

IEM OPS 1.1045(c)
Operations Manual Structure
See JAR-OPS 1.1045(c) & Appendix 1 to JAR-OPS 1.1045

1 JAR-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 JAR-OPS 1.1045 (c) requires the operator to ensure that the detailed structure of the Operations Manual is acceptable to the Authority.

3 Appendix 1 to JAR-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 JAR-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 Authority.

5 To facilitate comparability and usability of Operations Manuals by new personnel, formerly employed by another operator, operators are recommended not to deviate from the numbering system used in Appendix 1 to JAR-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)

Part A GENERAL/BASIC

0 ADMINISTRATION AND CONTROL OF OPERATIONS MANUAL

0.1. Introduction
0.2 System of amendment and revision

1 ORGANISATION AND RESPONSIBILITIES

1.1 Organisational structure
1.2 Names of nominated postholders
1.3 Responsibilities and duties of operations management personnel
1.4 Authority, duties and responsibilities of the commander
1.5. Duties and responsibilities of crew members other than the commander

2 OPERATIONAL CONTROL AND SUPERVISION

2.1 Supervision of the operation by the operator
2.2 System of promulgation of additional operational instructions and information
2.3 Accident prevention and flight safety programme
2.4 Operational control
[2.5 Powers of Authority]

3 QUALITY SYSTEM

4 CREW COMPOSITION

4.1 Crew Composition
4.2 Designation of the commander
4.3. Flight crew incapacitation
4.4 Operation on more than one type

5 QUALIFICATION REQUIREMENTS

5.1 Description of licence, qualification/competency, training, checking requirements etc.
5.2 Flight crew
5.3 Cabin crew
5.4 Training, checking and supervisory personnel
5.5 Other operations personnel
SECTION 2 JAR-OPS 1

6 CREW HEALTH PRECAUTIONS

6.1 Crew health precautions

7 FLIGHT TIME LIMITATIONS

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 OXYGEN

11 EMERGENCY EVACUATION PROCEDURES

11.1 Instructions 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 JAR-OPS 1.1055(a)(12)

1 JAR-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 JAR-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 JAR-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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AMC/IEM Q — FLIGHT AND DUTY TIME LIMITATIONS AND REST REQUIREMENTS

RESERVED
ACJ/AMC/IEM R — TRANSPORT OF DANGEROUS GOODS BY AIR

IEM OPS 1.1150(a)(3) & (a)(4)
Terminology - Dangerous Goods Accident and Dangerous Goods Incident
See JAR-OPS 1.1150(a)(3) & (a)(4)
As a dangerous goods accident (See JAR-OPS 1.1150(a)(3)) and dangerous goods incident (See JAR-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 JAR-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 Authority 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 JAR-OPS 1.1165(b)(1) or (2) is in addition to that indicated by JAR-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 JAR-OPS 1.1160(b)(1)
1 Dangerous goods required to be on board an aeroplane in accordance with the relevant JARs 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 JAR-OPS 1.1160(b)(3)
The dangerous goods referred to in JAR-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.

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IEM OPS 1.1160(b)(4)
Medical Aid for a Patient
See JAR-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 JAR-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 packagings not exceeding 5 litres and with a total not exceeding 5 litres per person:]

b. Non-radioactive medicinal or toilet articles (including aerosols, hair sprays, perfumes, medicines containing alcohol); and, in checked baggage only, aerosols which are non-flammable, non-toxic and without subsidiary risk, when for sporting or home use. 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;

[]

[Amdt. 3, 01.12.01]
The exemption required by JAR-OPS 1.1165(b)(1) is in addition to the approval required by JAR-OPS 1.1155.

(Amdt. 3, 01.12.01)

**AMC OPS 1.1215(b)**

Provision of Information

See JAR-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 JAR-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.

(Amdt. 3, 01.12.01)

**AMC OPS 1.1220**

Training

See JAR-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 JAR-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 JAR-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 JAR-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 JAR-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 JAR-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 JAR-OPS 1.1220

1 Areas of Training. The areas of training identified in Tables 1 and 2 of JAR-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 self-study programme or a mixture of both of these. It should cover all the areas of dangerous goods relevant to the person receiving the training, although areas not likely to be relevant may be omitted (for instance, training in the transport of radioactive materials may be excluded where they will not be carried by the operator).

[Amtd. 3, 01.12.01]

AMC OPS 1.1225
Dangerous Goods Incident and Accident Reports
See JAR-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.

[Amdt. 3, 01.12.01]
Individual crew member knowledge and competence should be based on the relevant elements described in ICAO doc 9811, “Manual of the implementation of the Security provisions of annex 6” and ECAC DOC 30 part “Training for Cockpit and Cabin crew”.}
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